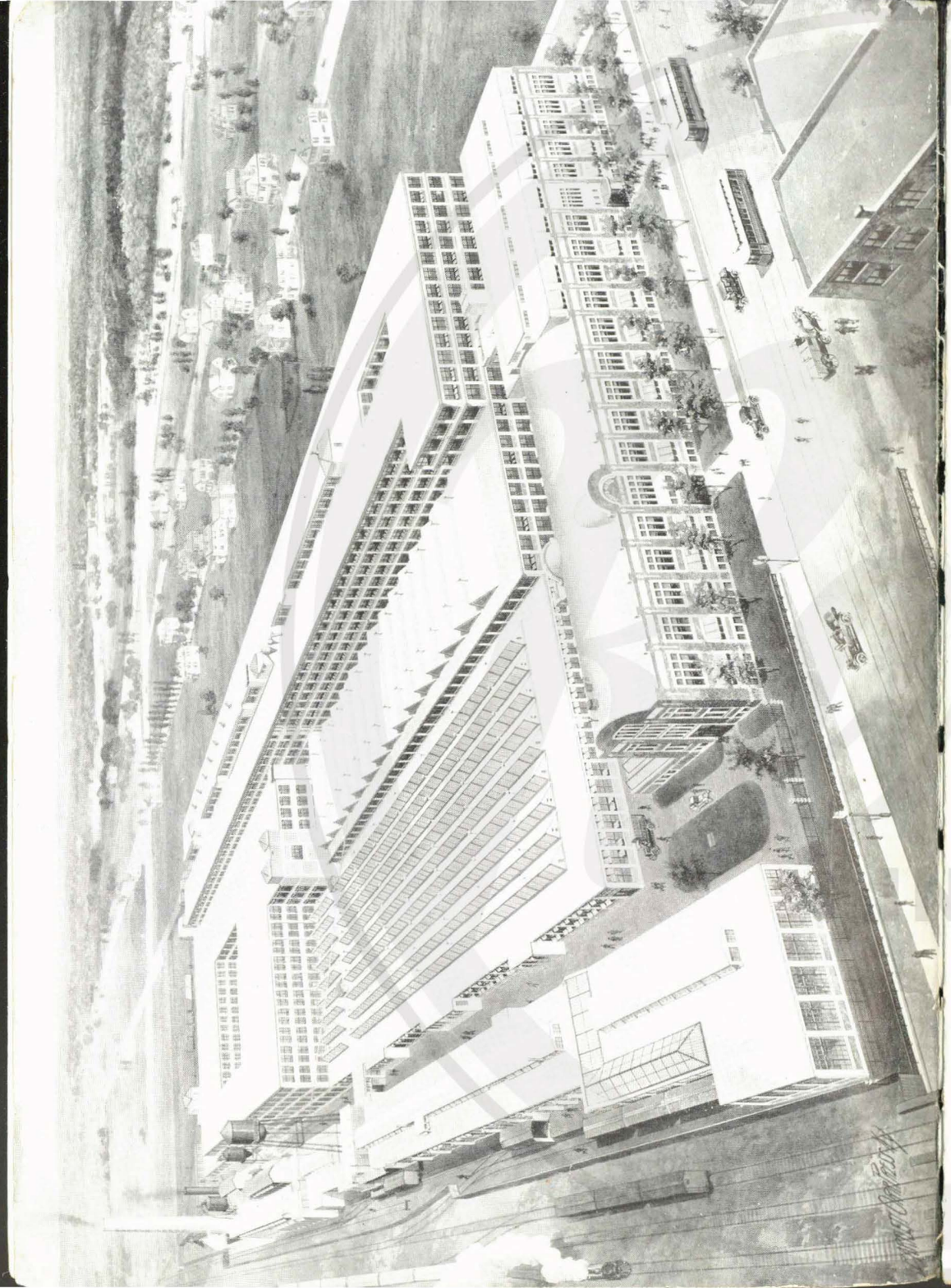
PIERCE-ARROW

MOTOR TRUCKS

PIERCE-ARROW MOTOR TRUCKS

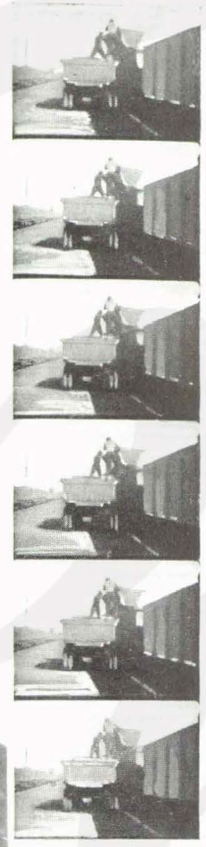
TRUCK No.3
THE FIRST MOTOR
TRUCK DELIVERED BY
PIERCE - ARROW
MOTOR CAR CO.



PIERCE-ARROW MOTOR TRUCKS

PIERCE-ARROW MOTOR CAR COMPANY

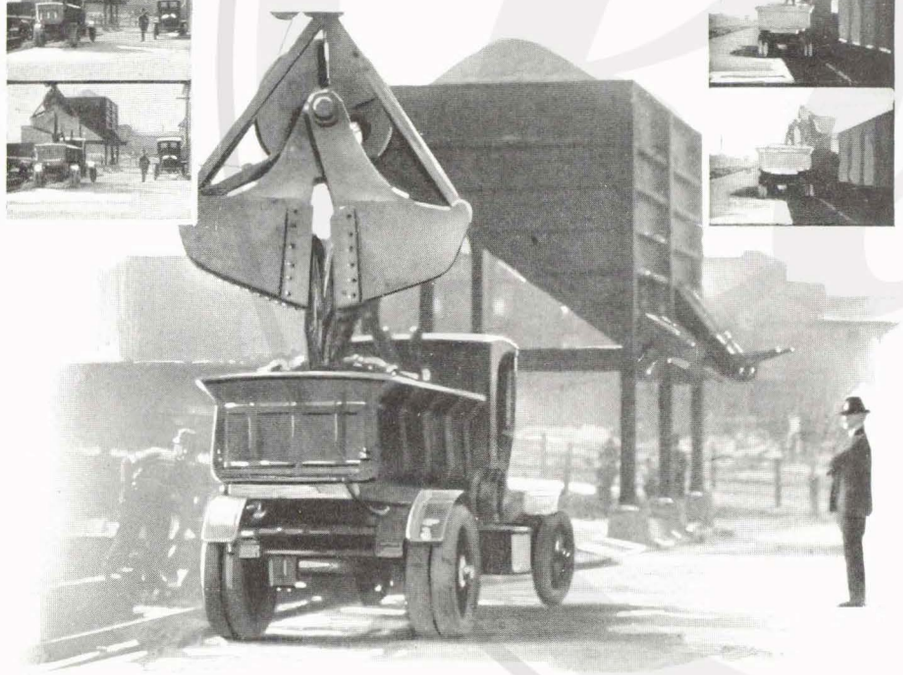
BUFFALO, N.Y.



To realize the full economy of any motor truck installation, as little time as possible should be consumed in loading and unloading.

This statement is axiomatic.

The pictures on this page and numerous others throughout the book are taken from moving picture films illustrating well thought out loading installations operating in conjunction with the Pierce-Arrow hydraulic hoist dump body trucks.



Warner-Quinlan

DeFrain Sand Company

FOREWORD

THREE important factors effect the desirability of a truck investment.

THE COMPANY making the truck.

THE TRUCK itself.

THE SERVICE given the purchaser by the manufacturing company.

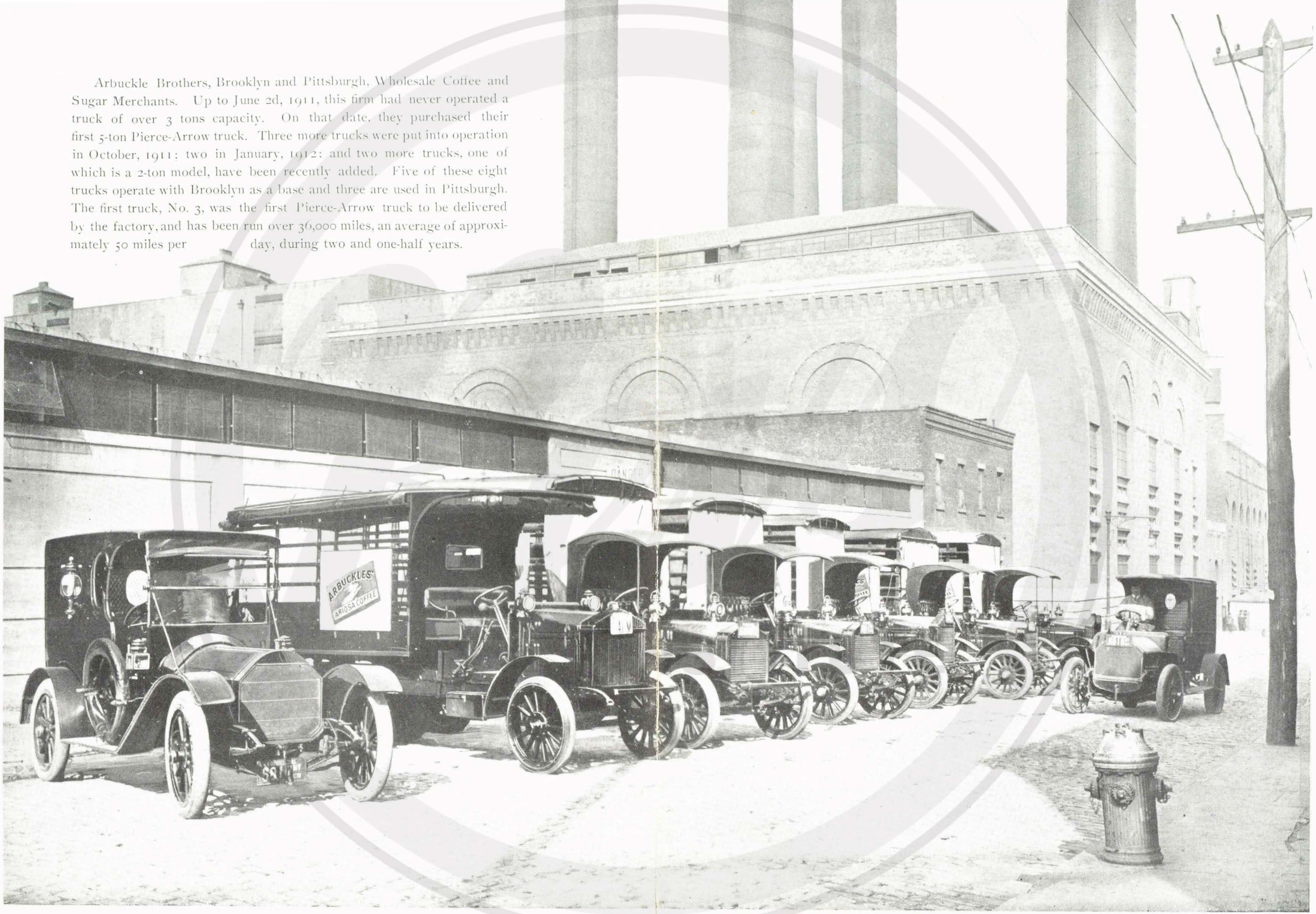
If the company is not substantial, reliable and conservative; financially sound and permanent, its warranty is worthless.

If the truck is not well designed and well built, if it is not the result of long and careful experiment and test; there can be no certainty in regard to its performance.

If the service extended to the purchaser is not willingly given, prompt and capable, it will tremendously handicap him in working the truck at its maximum capacity.

We believe that the Pierce-Arrow Motor Car Company, its product, and its service, will support the most searching analysis.

Arbuckle Brothers, Brooklyn and Pittsburgh, Wholesale Coffee and Sugar Merchants. Up to June 2d, 1911, this firm had never operated a truck of over 3 tons capacity. On that date, they purchased their first 5-ton Pierce-Arrow truck. Three more trucks were put into operation in October, 1911; two in January, 1912; and two more trucks, one of which is a 2-ton model, have been recently added. Five of these eight trucks operate with Brooklyn as a base and three are used in Pittsburgh. The first truck, No. 3, was the first Pierce-Arrow truck to be delivered by the factory, and has been run over 36,000 miles, an average of approximately 50 miles per day, during two and one-half years.



J. C. Coleman & Sons Co.
Boston Mass.

Arbuckle, Pittsburgh, Pa.

United Gas Improvement Co.
Philadelphia, Pa.

THE COMPANY

The Stockholders, the Board of Directors and the Executive Officers of the Pierce-Arrow Motor Car Company are one and the same group of men.

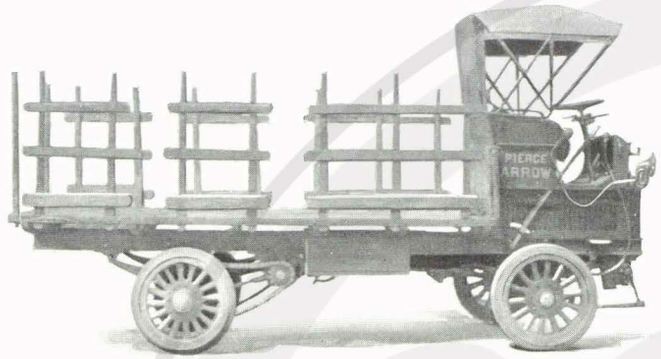
This means that the unity of the Pierce-Arrow organization is unhampered by outside interference or syndicated control. It means that the Pierce-Arrow directors are free to utilize their full resources of capital, brains and energy, to obtain the fulfillment of their ideal.

The Pierce-Arrow ideal from the beginning has been to build the best possible motor trucks and pleasure cars. The Pierce-Arrow product has always been designed with the one aim of maximum excellence and efficiency. The cost of manufacturing and selling the designed product, with the addition of a reasonable profit, has been the only basis for determining the selling price.

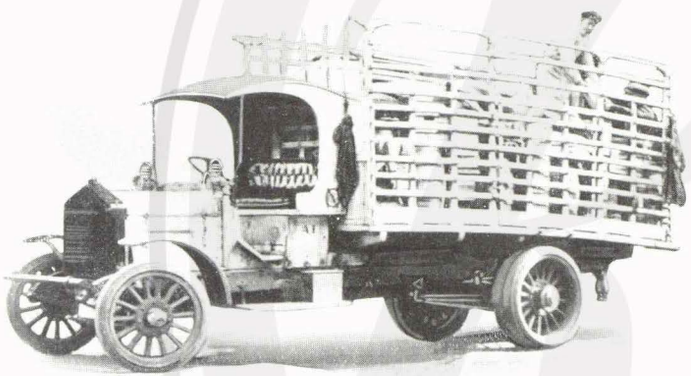
Pierce-Arrow cars and trucks are not built to a price, but to a constantly rising standard of excellence.

Every individual directly interested in Pierce-Arrow financial success is a working unit in the Pierce-Arrow organization.

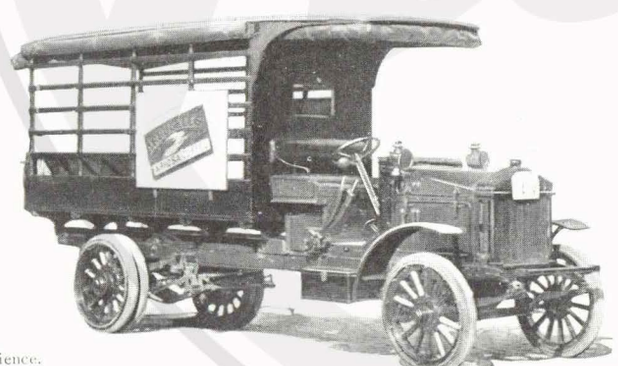
The Pierce-Arrow Motor Car Company builds nothing but motor trucks and motor cars. It is not interested, directly, or indirectly, in any other manufacturing enterprise. Its whole surplus is available to substantiate its credit, to back its promises, to insure its stability, and to help maintain and improve the quality of its product.



The first experimental Pierce-Arrow 5-ton truck, which was not good enough to satisfy Pierce-Arrow engineers.



The result of five years' experiment.



The result of seven years' experience. The present 2-ton truck which is fundamentally the same in design as the larger model.

Charles William Stores
New York

DeFrain Sand Company
Philadelphia, Pa.

THE PRODUCT

Only after five years of constant experiment, did the Pierce-Arrow Motor Car Company begin to manufacture motor trucks. Three years of practical working experience—eight years of constant watchfulness and concentrated effort—stand behind the present product as a guarantee of its effectiveness.

During the extensive tests of the first experimental model, the motor, transmission, clutch and front axle were found to be all that could be hoped for. The other integral parts of the chassis were good. The truck, as it stood, was a marketable vehicle; but it was not what the company believed its truck should be. It was apparent that certain radical changes in basic design were required.

These changes were made, and tried out; flexible frame and three point suspension; live load concentrated over the rear wheels with the driver's seat behind the motor; worm driven live rear axle; these were found good and adopted.

The engineering principles involved in the use of these elements, though revolutionary—at that time—in the American motor truck field, had been well understood and successfully employed in Europe for more than a decade. It is worthy of serious note that no manufacturer of any prominence has ever abandoned any one of them after adopting it.

Consumers Coal & Ice Company
Bayonne, N. J.

Elias Rogers Company, Ltd., Coal, Toronto, Ont. This company uses eight 5-ton Pierce-Arrow trucks and is preparing to entirely replace their horses with these trucks. The coal is handled in bags and it has been found profitable to employ three helpers on each truck in addition to the driver. Each of these trucks delivers from 40 to 50 tons a day.

Keeley Brewing Company, Chicago, Ill. This company uses three 5-ton Pierce-Arrow trucks

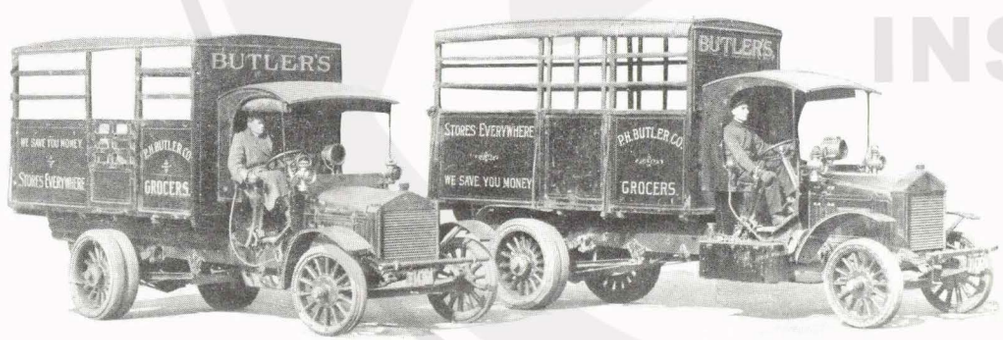
Burkhardt Brewing Company
Roxbury, Mass.

Spaulding & Spaulding, Coal, Buffalo, N. Y. In addition to their own hauling, this company delivers coal for the Rochester & Pittsburgh Coal and Iron Company. They employ sixteen 5-ton chassis and two 2-ton chassis, all Pierce-Arrow.

The whole installation is the result of very careful study on the part of both Spaulding & Spaulding and the Pierce-Arrow engineers. The first truck was purchased on August 28, 1911, and the equipment was subsequently increased until horses were absolutely dispensed with.

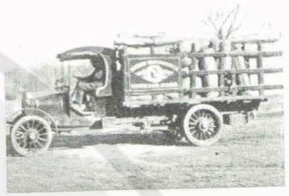
Burkhardt Brewing Company, Roxbury, Mass. This company uses four 5-ton Pierce-Arrow trucks

Standard Ice Manufacturing Company, Philadelphia, Pa. Using three 5-ton Pierce-Arrow trucks and hauling an average of over 50 tons per day on runs that average three miles out from the manufacturing plant to the distributing stations.

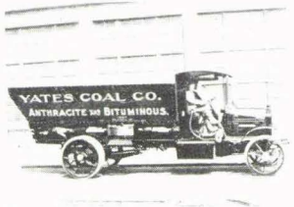


P. H. Butler Company, Groceries, Pittsburgh, Pa.

Oahu Ice and Electric Company
Honolulu, T. H.

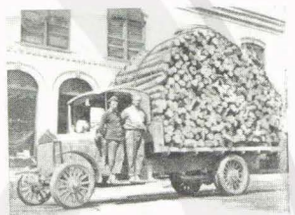


Winslow Brothers & Smith Company
Textiles, Norwood, Mass.



Yates Coal Company
Rochester, N. Y.

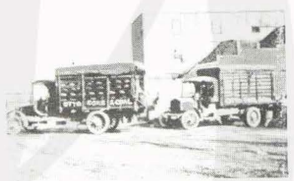
Knickerbocker Lime Company
Philadelphia, Pa.



Beede Brothers Company
Road Builders, Keene Valley, N. Y.

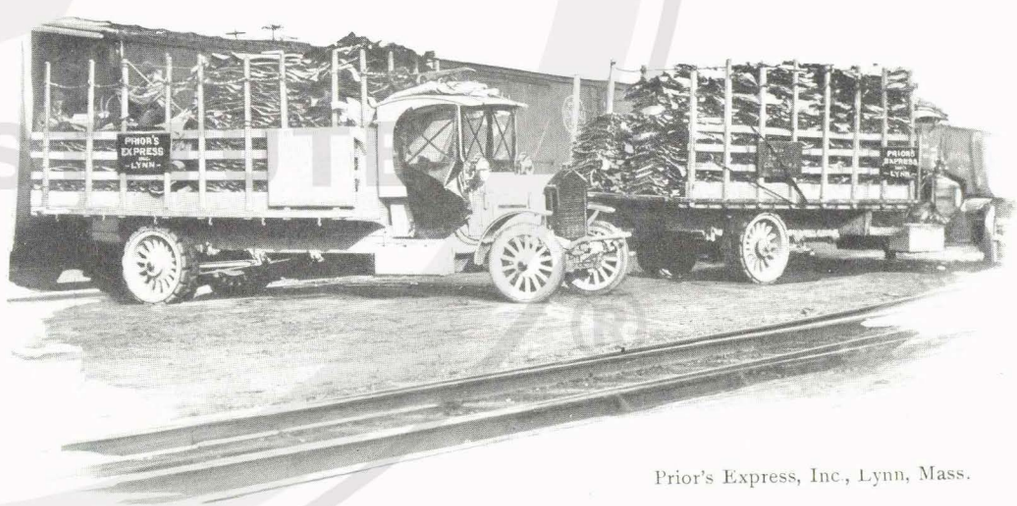
W. P. Wittemore Company
Hay and Grain, Boston, Mass.

Independent Brewing Company
Pittsburgh, Pa.



Otto Coke & Coal Company
Boston, Mass.

Victoria Sand Company
Buffalo, N. Y.



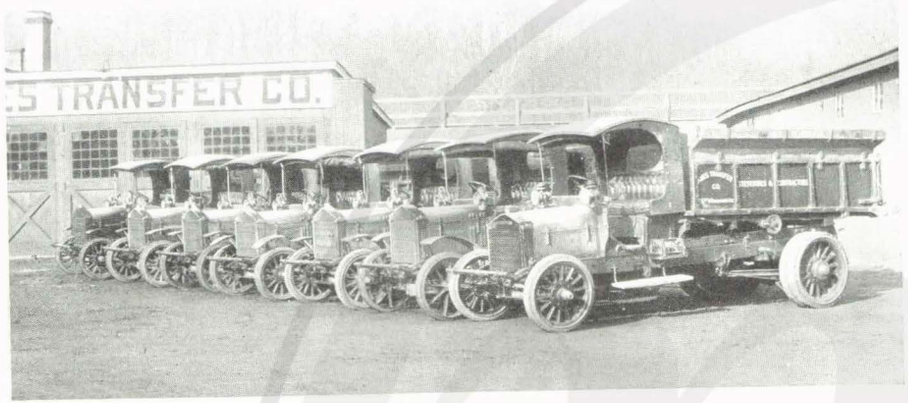
Prior's Express, Inc., Lynn, Mass.

James T. Murray, Rigging and Heavy Trucking, Troy, N. Y. Mr. Murray purchased his first 5-ton Pierce-Arrow truck in August, 1911. Subsequent orders have increased his fleet to five. These trucks are used to perform very varied duties, such as towing canal boats, hoisting stacks, delivering coal and hauling in connection with road building.

Victor Talking Machine Company, Camden, N. J.
Using seven 5-ton Pierce-Arrow trucks

Northwestern Fuel Company, Coal and Wood, St. Paul, Minn.
Using four Pierce-Arrow trucks

National Grocery Company, Jersey City, N. J.
Using three Pierce-Arrow trucks

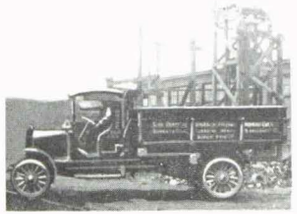


Ames Transfer Company, Truckmen, New York, N. Y. Using eight Pierce-Arrow trucks in all kinds of trucking

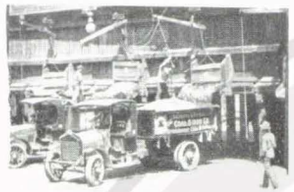
Acme Tea Company, Retail Grocers, Philadelphia, Pa. Using three Pierce-Arrow trucks

J. F. Kulp & Sons, Buffalo, N. Y., General Carting. This company requires the hardest kind of service from its trucks, and uses four 5-ton Pierce-Arrow chassis. The first was bought in August, 1911; the second in April, 1912; the third in August, 1912; and the fourth in April, 1913.

Cleveland Trinidad Paving Company, Cleveland, Ohio



Norwood Concrete Block
Construction Company
Norwood, Ohio



Rochester & Pittsburgh Coal
and Iron Company
Buffalo, N. Y.

Hanley Brewing Company
Providence, R. I.

Lauer Brewing Company
Reading, Pa.

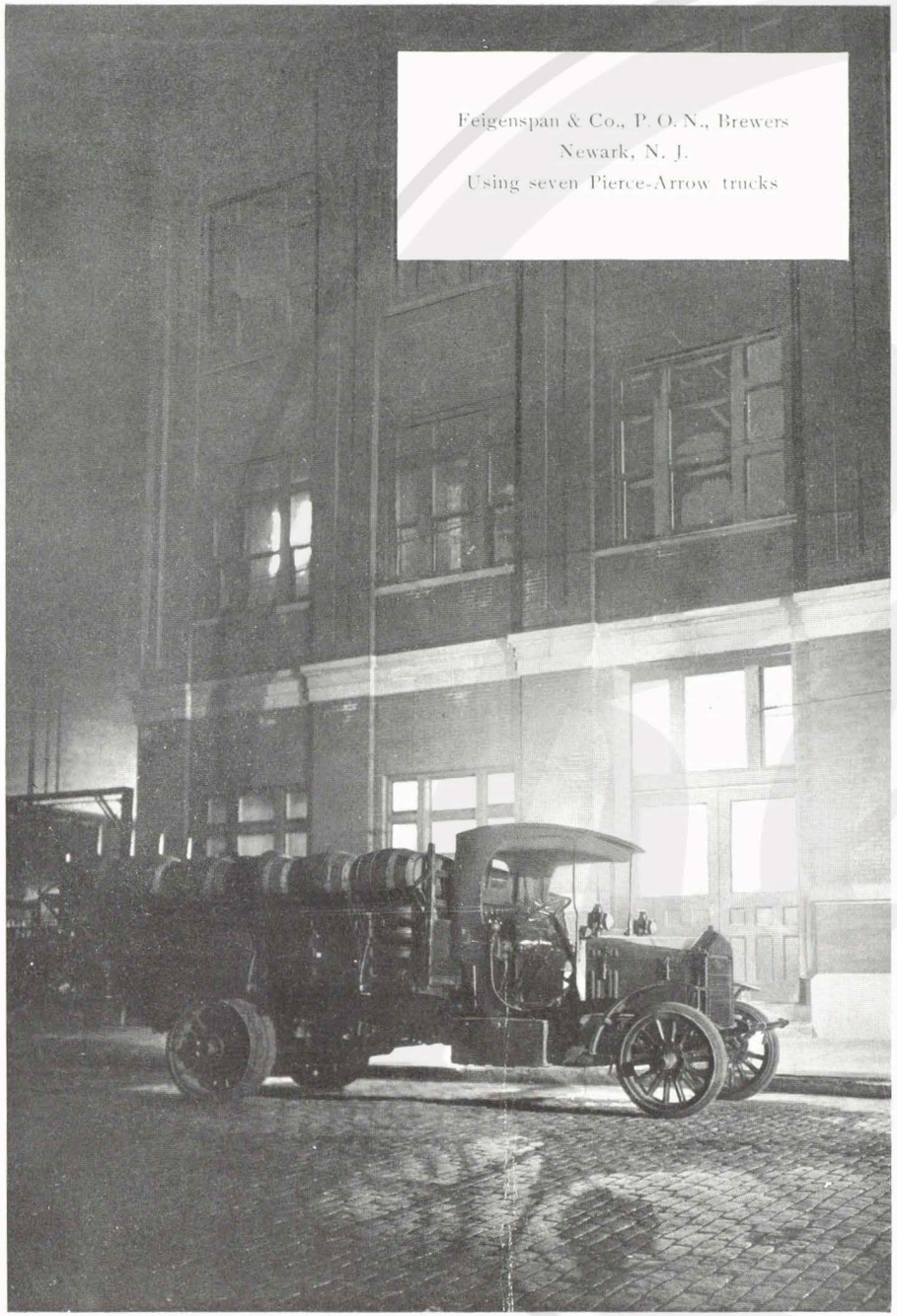
German American Brewing Company
Buffalo, N. Y.

Magnus Beck Brewing Company
Buffalo, N. Y.

Otto Coke & Coal Company, Boston, Mass.

Feigenspan & Co., P. O. N., Brewers, Newark, N. J.

P. Ballantine & Company, Brewers, Newark, N. J.



Feigenspan & Co., P. O. N., Brewers
Newark, N. J.
Using seven Pierce-Arrow trucks

American Car Sprinkler Co.
Road Oil Spraying
Worcester, Mass.

Rhode Island Processing Company
Coventry, R. I.

Ames Transfer Company
New York, N. Y.

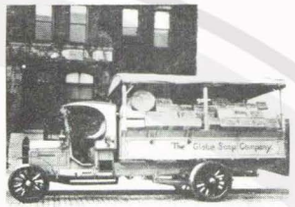
Wm. Montgomery & Company
Philadelphia, Pa.

C. Brigham Company, Milk, Cambridge, Mass.

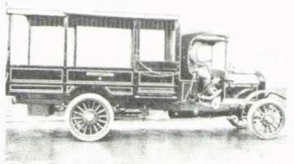
John Scott Grocery Company, Philadelphia, Pa.

Towar's Wayne County Creamery
Detroit, Mich.

Fairview Dairy, Newark, N. J.



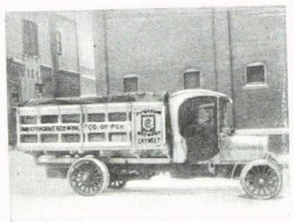
The Globe Soap Company
Cincinnati, Ohio



Pennsylvania Railroad Company
Philadelphia, Pa.

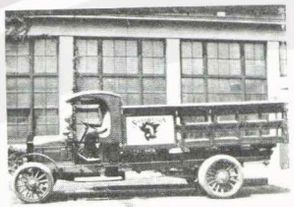
T. C. Jenkins, Groceries, Pittsburgh, Pa. This company owns and operates seven 5-ton Pierce-Arrow trucks

Joseph Campbell Company, "Campbell's Soups", Camden, N. J.
Using four Pierce-Arrow trucks



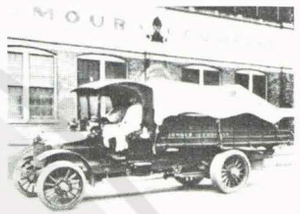
Independent Brewing Company
Pittsburgh, Pa.

Rueter & Company



Hoeschen-WentzlerBrewingCompany
Saskatoon, Sask., Canada

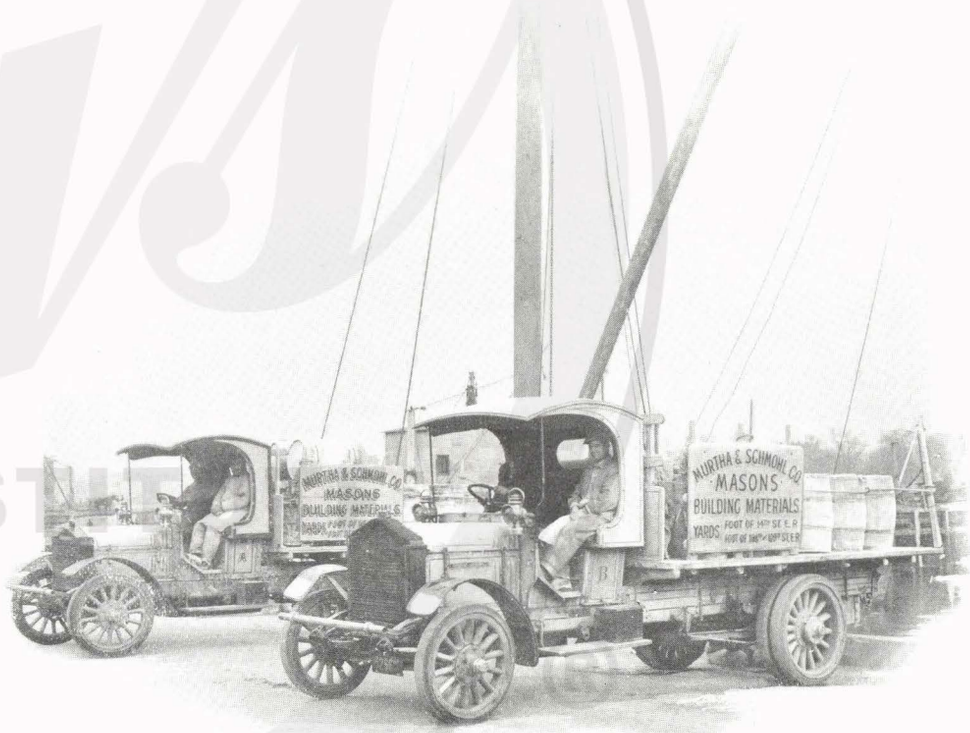
Sullivan Ice Company, Buffalo, N.Y.



Armour & Company, Chicago, Ill.

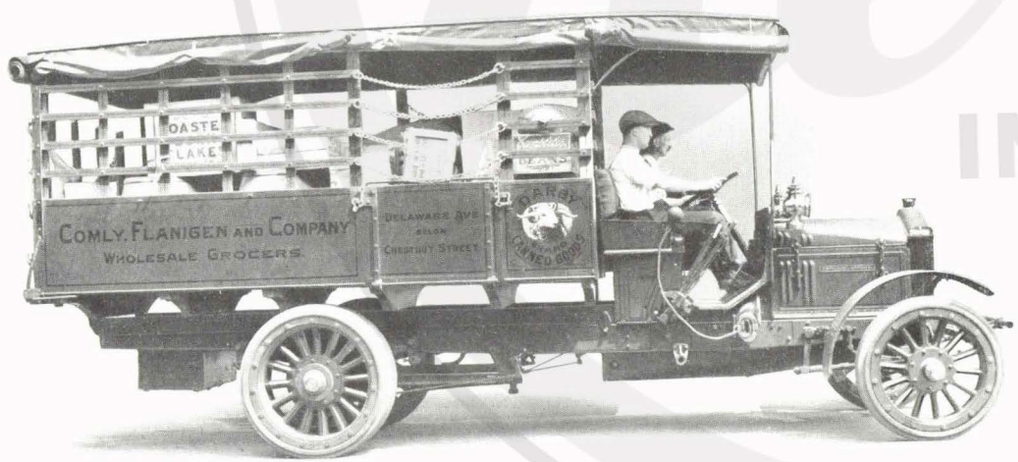
John J. Felin & Co., Philadelphia, Pa.

Rueter & Company, Brewers, Roxbury, Mass.

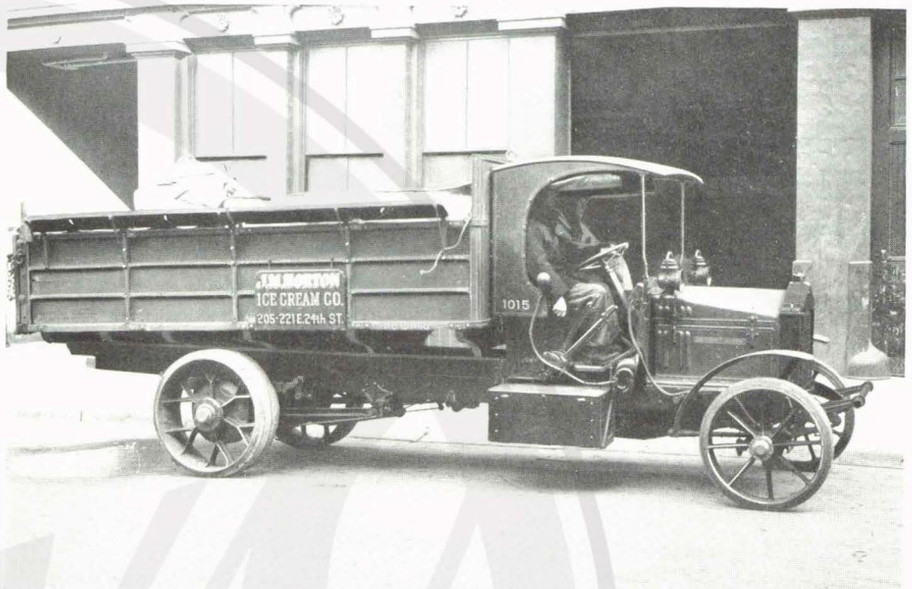


Murtha & Schmohl, Mason's Building Materials, New York City. Three Pierce-Arrow trucks

Geo. J. Meyer Malting Company, Buffalo, N. Y. The steel bodies with which the two 17-foot wheelbase, 5-ton Pierce-Arrow trucks owned by this company are equipped were built in the Pierce-Arrow factory. They are of 360 cubic feet capacity and are designed to carry 5 tons of grain, malt or similar materials.

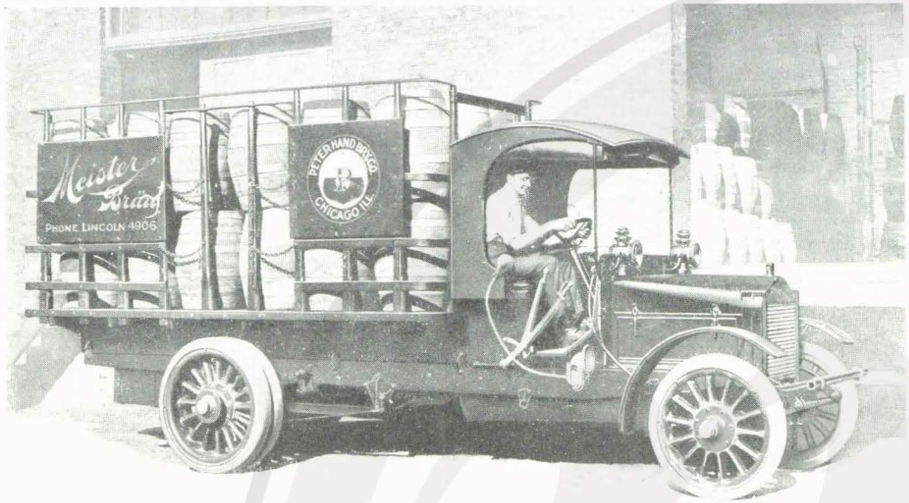


Comly, Flanigen & Company, Philadelphia, Pa.



The J. M. Horton Ice Cream Company, New York City. This company operates six 5-ton Pierce-Arrow trucks

Wm. Sellers & Company, Inc., Locomotive Cranes, Philadelphia, Pa.



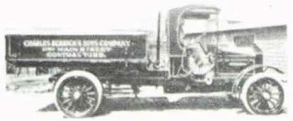
Peter Hand Brewing Company, Chicago, Ill.

Phoenix Brewery Company, Buffalo, N. Y.

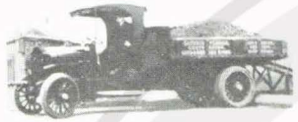
One of the three Seattle Board of Health Pierce-Arrow trucks

John H. Black, Brick, Buffalo, N. Y.

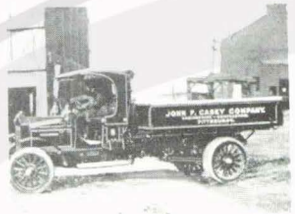
Carey Brick Company, Chicago, Ill.



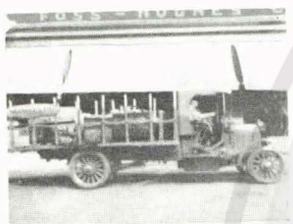
Charles Berrick's Sons Company
Buffalo, N. Y.



Severio Feraca, Contractor
New York City

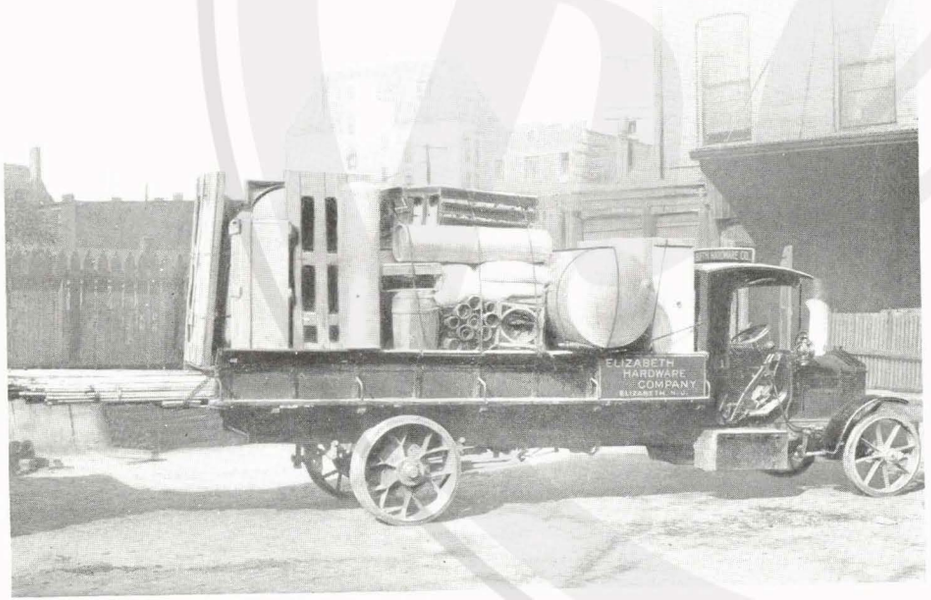


John F. Casey Company
Pittsburgh, Pa.



Lanston Monotype Machine Co.
Philadelphia, Pa.

W. H. Pipkorn Company
Milwaukee, Wis.



Elizabeth Hardware Company, Elizabeth, N. J.

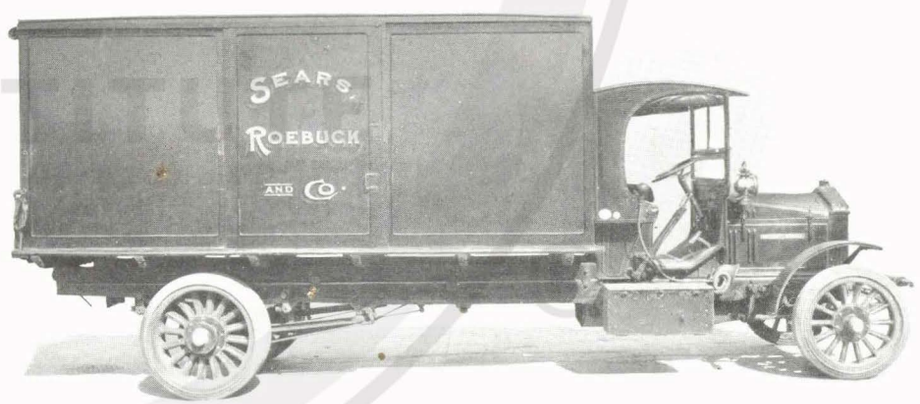
Michael McDonough Company, Swampscott, Mass.

Ames Transfer Company, New York City

Park Department of Buffalo, N. Y.

Capitol City Lumber Company, Hartford, Conn.

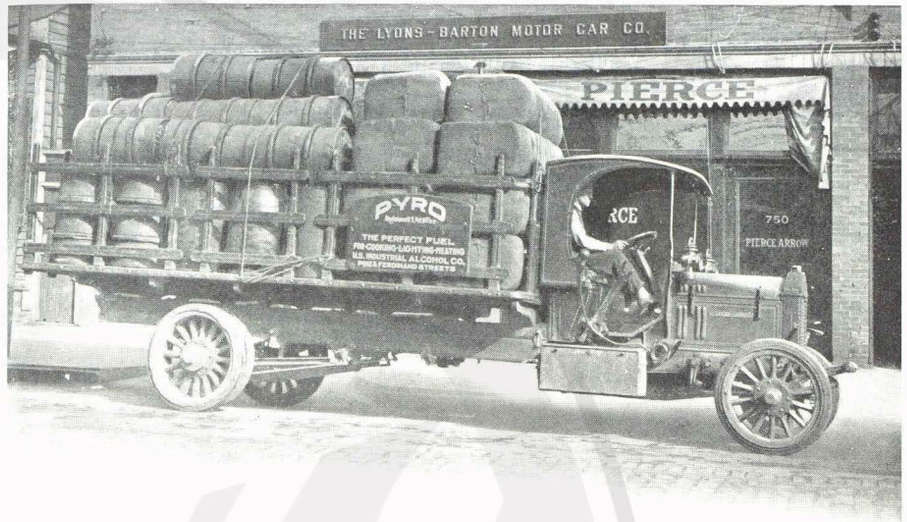
Hammond Lumber Company, Los Angeles, Cal. Using three Pierce-Arrow trucks



Sears-Roebuck & Company, Chicago, Ill.

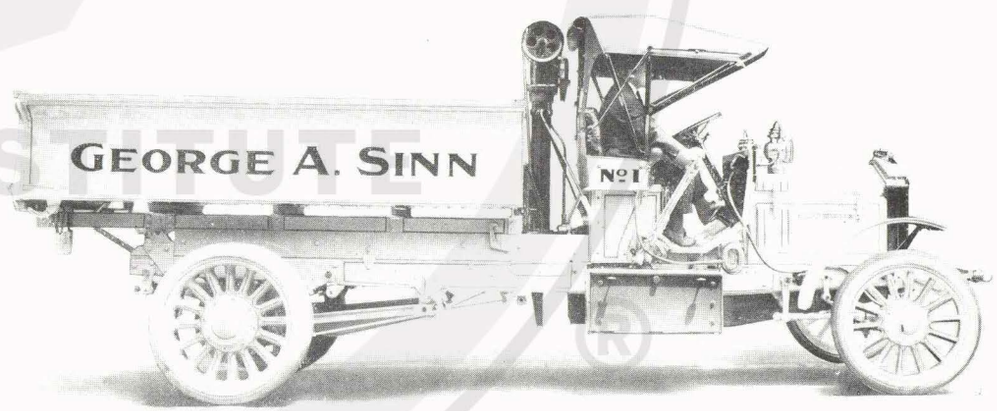
McCrady Brothers Company
Braddock, Pa.

F. J. Shannon & Company
Wholesale Grocers
Yonkers, N. Y.



The Standard Oil Company of Louisiana, New Orleans

J. C. Coleman & Sons Company, Roxbury, Mass.



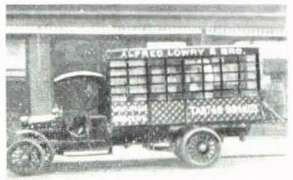
Geo. A. Sinn, Philadelphia, Pa.

The B. F. Goodrich Company, Akron, Ohio

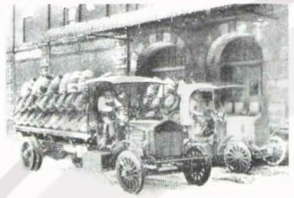
The Beaver Dam Marble Company, Baltimore, Md.

M. A. Reeb, Buffalo, N. Y.

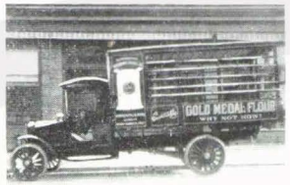
Motor Transportation Company, Los Angeles, Cal.



Alfred Lowry & Brother
Philadelphia, Pa.

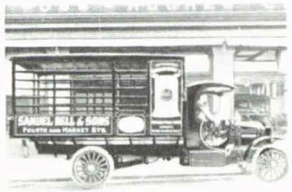


Isaac Leisy Brewing Company
Cleveland, Ohio



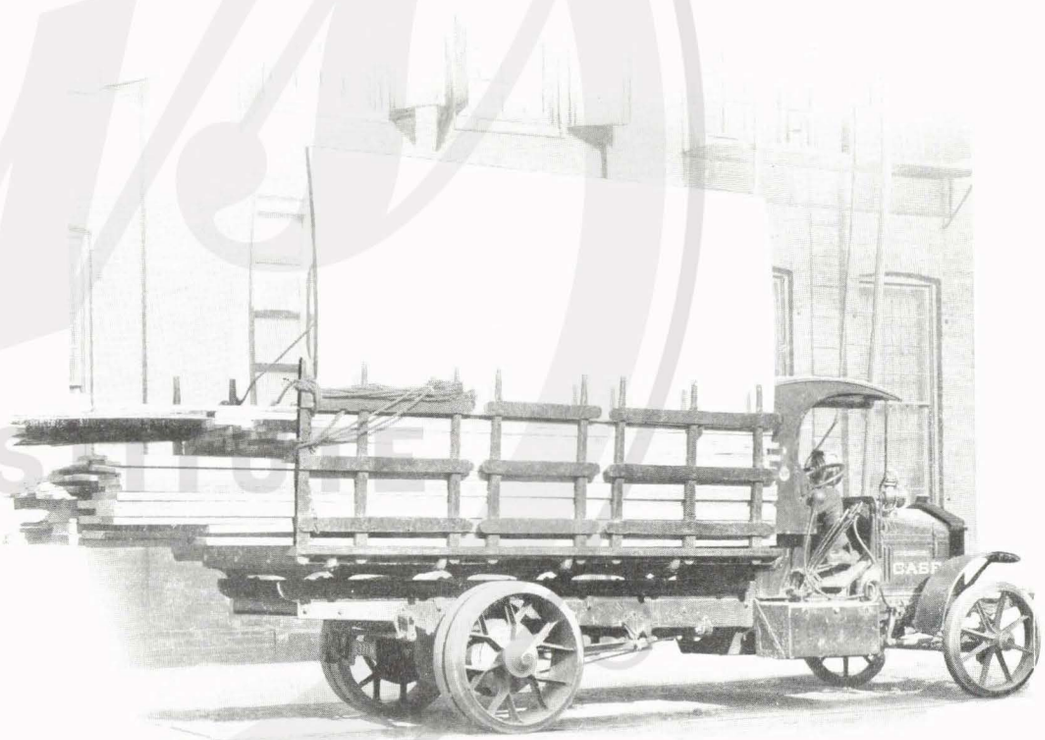
Gold Medal Flour

W. C. Reebie & Brother
Chicago, Ill.

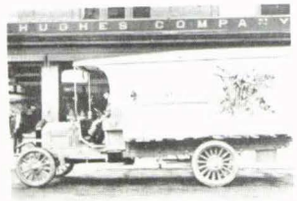


Samuel Bell & Sons
Philadelphia, Pa.

Cluett, Peabody & Company, Troy, N. Y. Using two 5-ton and one 2-ton Pierce-Arrow trucks



J. T. Case Threshing Machine Company, Racine, Wis.



F. A. Poth & Sons, Philadelphia, Pa.

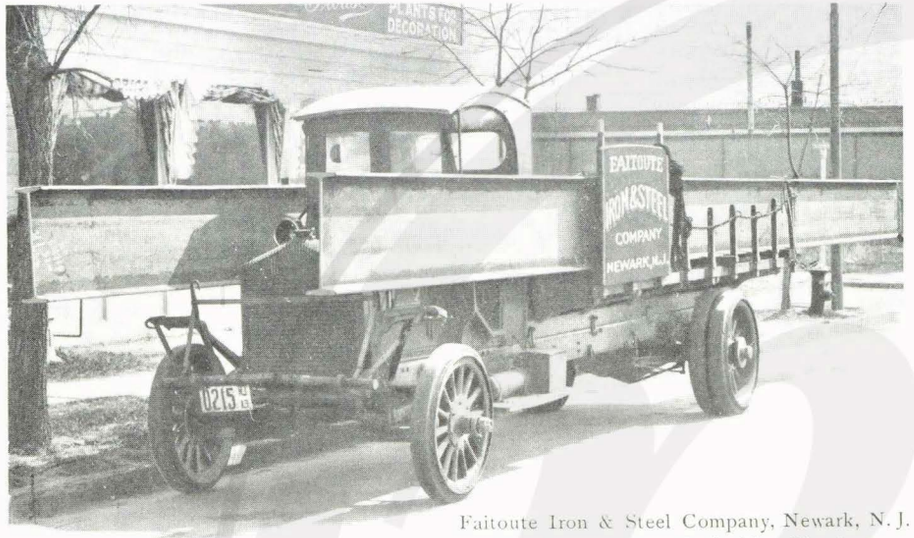
Chas. Freihofer & Sons, Bread Bakers
Troy, N. Y.

Wauskuck Company
Providence, R. I.

The McIntyre Iron Company, Inc.
Tahawus, N. Y.

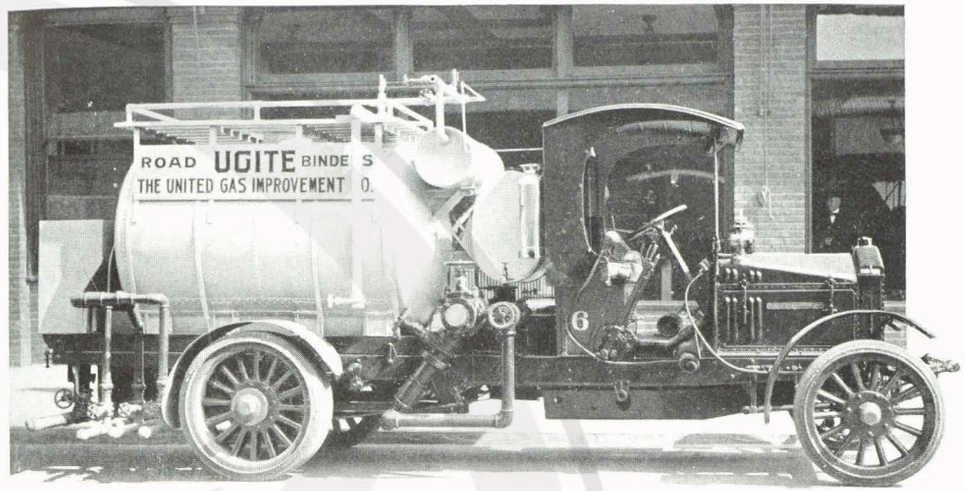
Portland Gold Mining Company, Victor, Colorado

National Cash Register Company, Dayton, Ohio

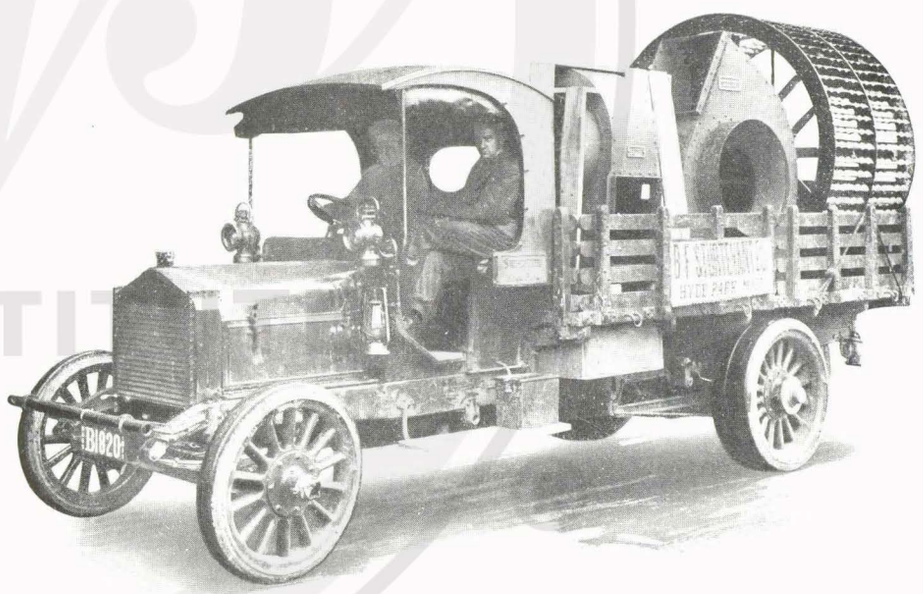


Faitoute Iron & Steel Company, Newark, N. J.
Showing a good method of handling long loads without the use of a trailer

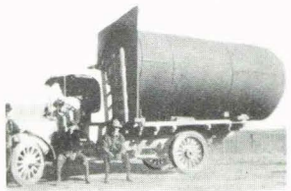
Colgate & Company, Jersey City, N. J.



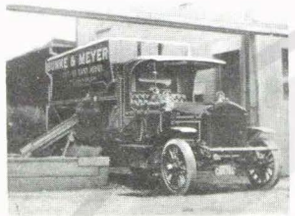
United Gas Improvement Company, Philadelphia, Pa. Using four Pierce-Arrow trucks



Sturtevant Blower Works, Hyde Park, Mass.



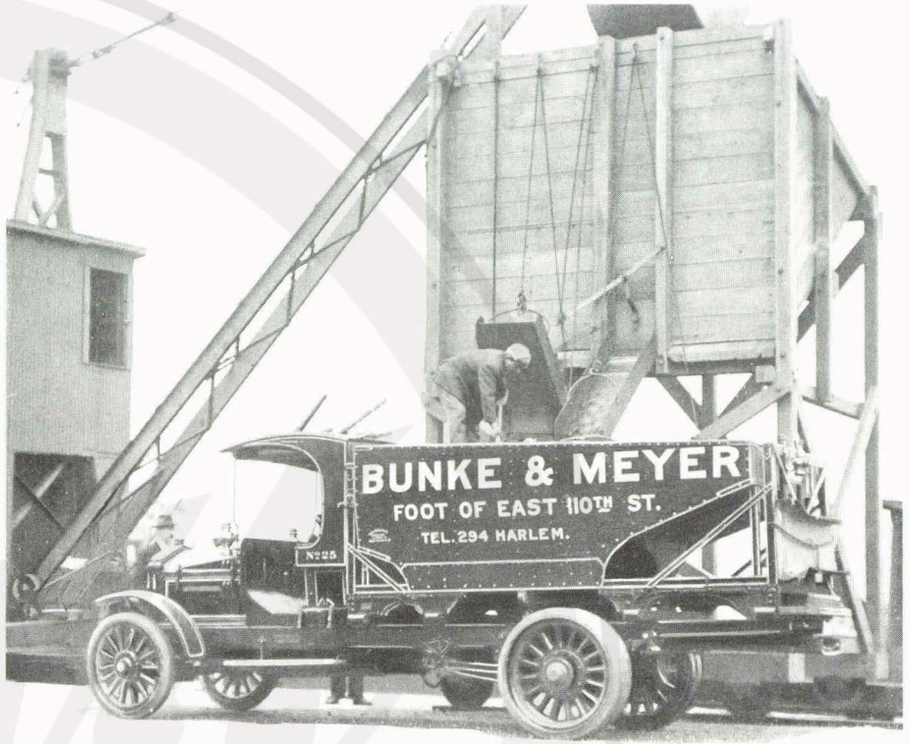
Beldridge Oil Company
Los Angeles, Cal.



Bunke & Meyer
New York

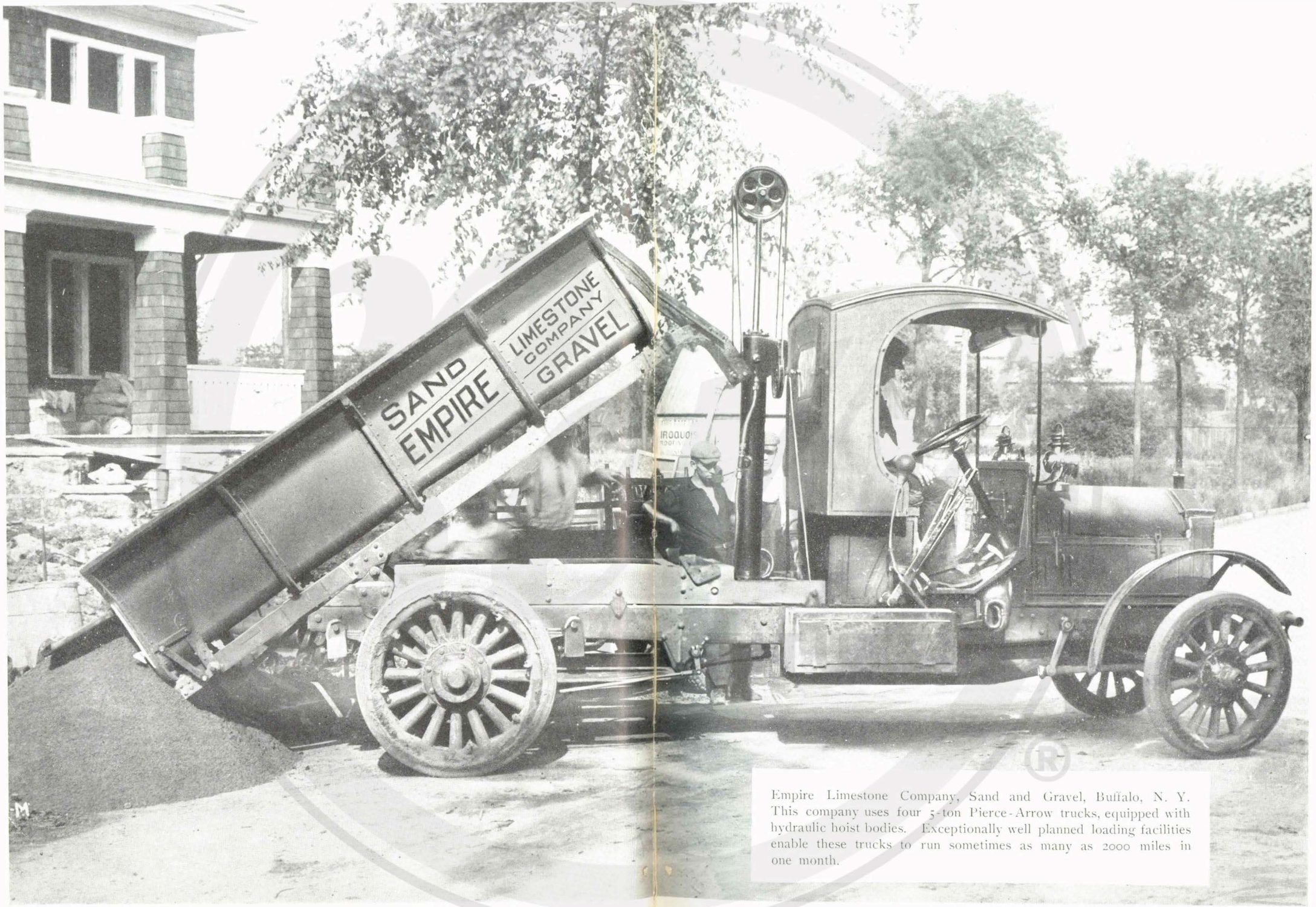
Robinson & Crawford
Philadelphia, Pa.

Bunke & Meyer, Coal, New York City. Showing a good type of elevating coal body



Bunke & Meyer, Coal, New York City

Michael McDonough Co., Swampscott, Mass.



Empire Limestone Company, Sand and Gravel, Buffalo, N. Y. This company uses four 5-ton Pierce-Arrow trucks, equipped with hydraulic hoist bodies. Exceptionally well planned loading facilities enable these trucks to run sometimes as many as 2000 miles in one month.

J. C. Coleman & Sons Company, Crushed Stone, Boston, Mass.

American Graphite Company
Jersey City, N. J.

General Chemical Company of
Pennsylvania
Pittsburgh, Pa.

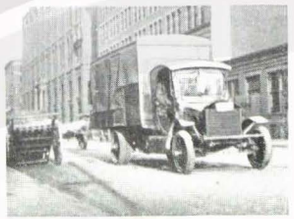
Capitol City Lumber Company
Hartford, Conn.

Union Furniture Company
Troy, N. Y.

Maryland State Roads Commission
Truck

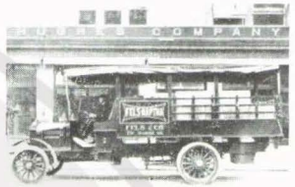
Consumers Coal and Ice Company, Lumber, Bayonne, N. J.

Kraemer's Express Corporation
College Point, L. I.



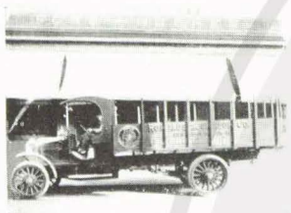
Kraemer's Express Corporation
College Point, L. I.

Pabst Brewing Company
Milwaukee, Wis.



Fels & Company, "Fels-Naptha"
Philadelphia, Pa.

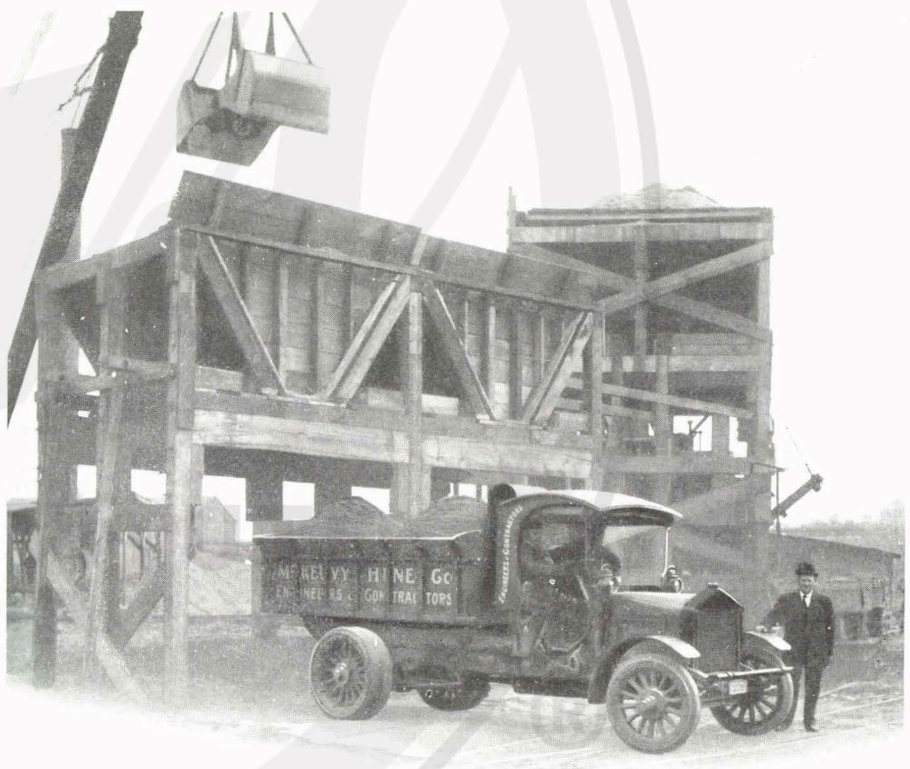
Gerhard Lang Brewery
Buffalo, N. Y.



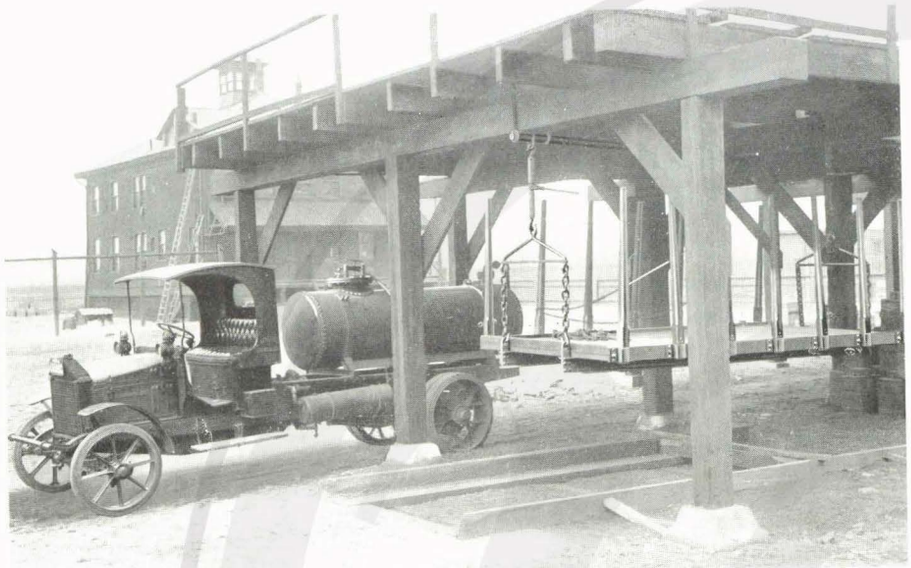
Ronalds & Johnson Company
Philadelphia, Pa.

United Gas Improvement Company
Philadelphia, Pa.

Mergenthaler Linotype Company, Brooklyn, N. Y.



McKelvy-Hine Company, Contractors, Youngstown, Ohio. "If for any reason the truck should fail to perform its duty, the McKelvy-Hine Company would be subjected to a loss of from $250.00 to $300.00 per day"— forfeit charges on railroad work.



General Chemical Company, Laurel Hill, L. I. Interchangeable bodies

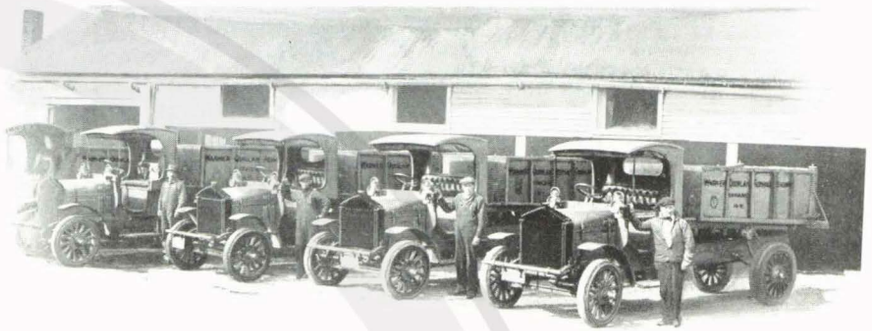
General Chemical Company of Pennsylvania, Pittsburgh, Pa.

Five-ton Pierce-Arrow. This truck worked all through the blizzard of the latter part of November, 1913, delivering coal in Cleveland. It was not until the second day after the storm that horse trucks could be used, and these with only partial loads. The power truck carried full loads and was only slightly delayed by the storm.

German Rock Asphalt & Cement Co., Ltd., Buffalo, N. Y.

Bickett Coal and Coke Company, Chicago, Ill. The three Pierce-Arrow trucks used by this company are delivering coal direct from standard gondola cars on team tracks. This work is done most economically through the use of a Patented Hopper loading device. One of these trucks recently made a record delivery of 234 tons of coal in one 10-hour day.

Olney & Payne Brothers, Coal, Pawtucket, R. I. Using three 5-ton Pierce-Arrow trucks

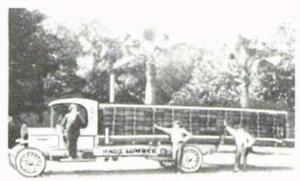


Warner-Quinlan Asphalt Company, Syracuse, N. Y.

Warner-Quinlan Asphalt Company, Syracuse, N. Y. This company owns seven 5-ton Pierce-Arrow trucks equipped with special bodies made by the Shadbolt Manufacturing Company of Brooklyn. The first truck was purchased February 26, 1912, and the last on March 7, 1913.

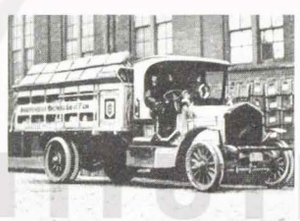
Purock Water Company, Philadelphia, Pa. Owners of 5-ton and 2-ton Pierce-Arrow trucks

First 2-ton Pierce-Arrow truck shipped to agents



LIST OF REPEAT ORDER PIERCE-ARROW OWNERS

Acme Tea Company, Retail Grocers	Philadelphia, Pa.
Ames Transfer Company, Truckmen	New York, N. Y.
Arbuckle Brothers, Coffee and Sugar	Pittsburgh, Pa.
Arbuckle Brothers, Coffee and Sugar	New York, N. Y.
E. J. Babcock, Coal	Boston, Mass.
P. Ballantine & Company, Brewery	Newark, N. J.
Magnus Beck Brewing Company, Brewery	Buffalo, N. Y.
Black-Rochon & Robinson, Freighting Business	McKittrick, Cal.
Boston Woven Hose Company	Boston, Mass.
British Columbia Sugar Refining Company	Vancouver, B. C.
Burkhardt Brewing Company, Brewery	Roxbury, Mass.
P. H. Bulter, Grocery	Pittsburgh, Pa.
John F. Casey Company, Contractors	Pittsburgh, Pa.
Central Coal and Coke Company, Coal	Kansas City, Mo.
Childs Grocery Company, Grocers	Camden, N. J.
Audley Clarke Company, Builders' Supplies	Brooklyn, N. Y.
Claiborne-Johnston Company, General Contractors	Baltimore, Md.
Cleveland Trinidad Paving Company, Paving Contractors	Cleveland, Ohio
J. & P. Coats, Manufacturers of Thread	Pawtucket, R. I.
Crane Company, Machinery	Chicago, Ill.

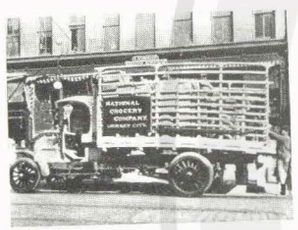


J. E. Cunningham, Contractor	Spokane, Wash.
J. K. Davison & Company, Sand and Gravel	Pittsburgh, Pa.
DeFrain Sand Company, Sand	Philadelphia, Pa.
J. Maury Dove Company, Coal	Washington, D. C.
J. P. Duffy Company, Masons, Builders Supplies	Brooklyn, N. Y.
Empire Limestone Company, Sand and Gravel	Buffalo, N. Y.
C. H. Evans & Sons, Brewers	New York City, N. Y.
Feigenspan & Company, Brewers	Newark, N. J.
The General Chemical Company, Chemicals	Pittsburgh, Pa.
German American Brewery, Brewery	Buffalo, N. Y.
German Rock Asphalt & Cement Co.	Paving Contractors, Buffalo, N.Y.
G. M. Gest, Electrical Contractor	Montreal, Canada
R. E. Griffith, Contracting	Los Angeles, Cal.
Hamond Lumber Company, Lumber	Los Angeles, Cal.
Hartford Coal Company, Coal	Hartford, Conn.
Peter Hand Brewing Company, Brewery	Chicago, Ill.
Higgins-Fisher Company, Limited, Sand and Gravel	Eburne, B. C.
High Rock Knitting Company, Knit Underwear	Philmont, N. Y.
J. M. Horton Ice Cream Company, Ice Cream	New York, N. Y.
Otto Huber, Brewery	Brooklyn, N. Y.
Illinois Brick Company, Brick	Chicago, Ill.
Independent Brewing Company, Brewery	Pittsburgh, Pa.
Iroquois Brewing Company, Brewery	Buffalo, N. Y.
T. C. Jenkins, Grocery	Pittsburgh, Pa.

LIST OF REPEAT ORDER PIERCE-ARROW OWNERS

Continued

Jones Brothers Company, Teas	Brooklyn, N. Y.
Keeley Brewing Company, Brewers	Chicago, Ill.
Kraemers Express Corporation, Express Business	College Point, L. I.
J. F. Kulp and Sons, General Trucking Carting	Buffalo, N. Y.
Gerhardt Lang Brewery, Brewery	Buffalo, N. Y.
Lanigan Brothers, Sand	New York, N. Y.
A. P. Lee, Hauling Coal	Chicago, Ill.
Isaac Leisy Brewing Company, Brewery	Cleveland, Ohio
Lembeck & Betz, Brewery	Jersey City, N. J.
Lincoln Fireproof Storage Company	Kansas City, Mo.
Linde Air Products Company, Air Products	Buffalo, N. Y.
Lone Star Brewery, Brewery	San Antonio, Texas
Mergenthaler Linotype Company, Linotype Machines	Brooklyn, N. Y.
Malcomson-Houghten Company, Coal	Detroit, Mich.
Merkel Brothers Company, Plumbers' Supplies	Cincinnati, O.
Meyer Malting Company, Malt Business	Buffalo, N. Y.
Miller & Lux Company, Wholesale Butchers,	San Francisco, Cal.
Moreton Truck Company, General Trucking	Detroit, Mich.
James T. Murray, Rigging and Heavy Trucking	Troy, N. Y.
Murtha & Schmohl, Masons Building Materials,	New York, N. Y.
National Grocery Company, Wholesale Grocery,	Jersey City, N. J.
Nave-McCord Mercantile Co., Wholesale Grocers,	St. Joseph, Mo.
Northwestern Fuel Company, Coal and Wood	St. Paul, Minn.
Olney & Payne Brothers, Coal	Pawtucket, R. I.
Pabst Brewing Company, Brewers	Milwaukee, Wis.
Pacific Coast Coal Company, Coal	Seattle, Wash.
Peoples Gas Light and Coke Company	Chicago, Ill.
Phoenix Brewery, Brewery	Buffalo, N. Y.
Priors Express, Incorporated, Express	Lynn, Mass.
Quandt Brewing Company, Brewers	Troy, N. Y.
M. A. Reeb, Builders Supplies	Buffalo, N. Y.
Daniel Reeves, Incorporated, Grocery	New York, N. Y.
Elias Rogers Company, Limited, Coal	Toronto, Ont.
Rogers Sand Company, Sand, Gravel, Etc.	Pittsburgh, Pa.
N. Ryan Company, Material Supply Dealers	Brooklyn, N. Y.
Sanantonia Contracting Company, Road Builders,	Newcomb, N. Y.
Scullin-Gallagher Iron & Steel Co., Iron & Steel Works,	St. Louis, Mo.
City of Seattle, Garbage and City Work	Seattle, Wash.
The John Shilito Company, Dry Goods	Cincinnati, O.
Smith, Hauser, Locker & Co., Aqueduct Contractor,	New York, N. Y.
Spaulding & Spaulding, Coal	Buffalo, N. Y.
Springfield Brewery Company, Brewery	Springfield, Mass.
Standard Ice Manufacturing Company	Philadelphia, Pa.
Standard Oil Company of New York, Oil, Fidelity Bldg.,	Buffalo, N. Y.
Stewart-Peck Sand Company, Sand	Kansas City, Mo.
Sullivan Ice Company, Ice	Buffalo, N. Y.
United Dressed Beef Company, of New York, Wholesale Butchers	New York, N. Y.
United Gas Improvement Company, Gas Works	Philadelphia, Pa.
Victor Talking Machine Company, Talking Machines	Camden, N. J
Wanskuck Company, Wools	Providence, R. I.
Warner-Quinlan Asphalt Company, Asphalt	Syracuse, N. Y.
West End Consolidated Mining Company, Mining	Tonopah, Nev.
Wittenberg Storage & Transfer Company, Storage	Tonopah, Nev.



The Metropolitan District Service Station, as an implement of service to Pierce-Arrow truck owners, is a model of complete equipment.

It is a visualized expression of the Pierce-Arrow Motor Car Company's sense of responsibility toward the users of its trucks. Built by the Harrolds Motor Car Company on a scale that looks far into the future, it is an expression of faith by our New York distributors in the future of motor trucks as a whole and Pierce-Arrow trucks in particular.

SERVICE

The record of sustained excellence of design, material and workmanship, that has characterized the Pierce-Arrow output from the earliest days, carries with it no light responsibility.

Purchasers of Pierce-Arrow trucks trust largely in this record. Should they be disappointed, should we fail to live up to our responsibilities, we would lose those future sales and repeat orders that mean continued success.

We believe that the purchase of a Pierce-Arrow truck should mark the beginning of a long and mutually

San Francisco

profitable relationship between its owner and the Pierce-Arrow organization. We believe that the cost of maintaining a Pierce-Arrow truck should be comparatively low. We cheerfully assume our full share of responsibility for the amount of this cost, but we also recognize that this responsibility is not all ours.

There are four factors determining the cost of maintenance of a truck.

First. The comparative excellence of design, material and workmanship.

Second. Conditions of operation.

Third. Care in handling, lubricating and cleaning.

Fourth. The general efficiency of the shop in which repairs are made.

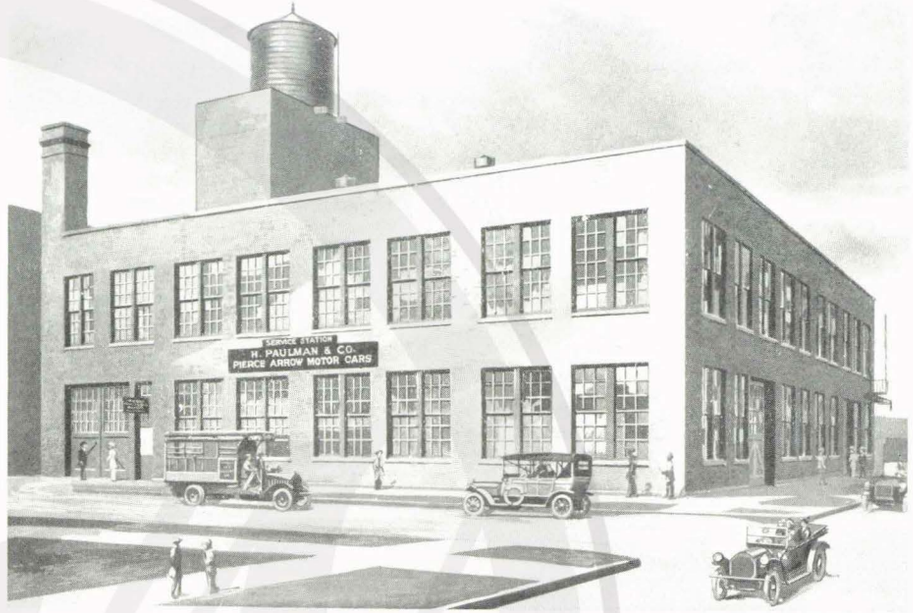
The Pierce-Arrow Motor Car Company assumes full responsibility in connection with the first factor.

Newark

Pittsburgh

Philadelphia

Hartford, Conn.



Chicago

The relative importance of the second and third factors depend entirely upon the owner of the truck, though the co-operation of the Pierce-Arrow service force, heartily accepted, can do much to reduce it.

So long as a truck owner makes use of the repair shop of a Pierce-Arrow agent, the fourth factor remains a Pierce-Arrow responsibility.

In order that the co-operation with truck owners may be of the greatest value, and the efficiency of the agent's repair shop of the highest quality, Pierce-Arrow service has been developed along four distinct, though inseparably related, lines.

The first of these lines is in the direction of service spirit, the desire to serve.

The second is in the direction of adequate equipment — a complete stock of readily accessible spare parts,

combined with a shop layout and installation, sufficiently complete to meet every reasonable demand.

The wrong men, even if possessed of the right spirit and ample shop facilities, will fail to give good service.

The third line of development is, therefore, educative. Its aim is to secure efficient service men, educated in service methods.

The fourth line covers organization — systematic planning and laying out of work; economy of effort where economy is desirable; rapid and efficient work, promptly delivered, at a minimum cost to the truck owner.

Service spirit, adequate equipment, personnel, organization; these are the elements of good service, and it is the constant effort of the Pierce-Arrow Motor Car Company to assist its agents to maintain such service for all Pierce-Arrow owners.

Denver

STANDARD BODY DESIGNS

Realizing the desirability for standardizing body designs as far as possible, we have designed a number of standard bodies for our 2-ton and 5-ton chassis.

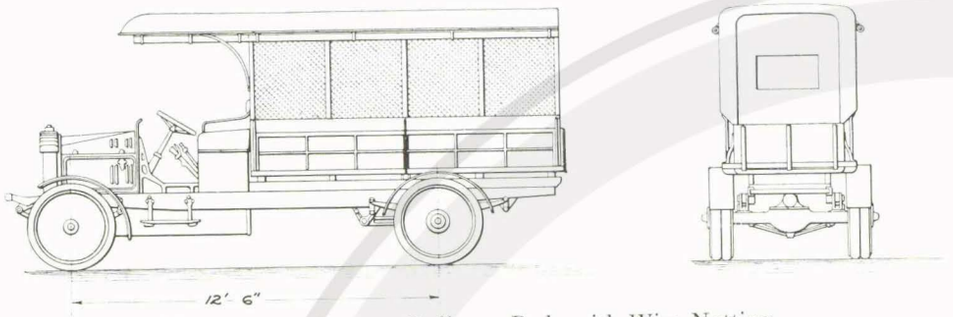
The line drawings of these bodies are accurately drawn to scale and serve to indicate the proportions and general appearance of the completed vehicles.

The designs will suggest to you the most desirable type of body to meet your requirements, and by this standardization we, as manufacturers, are able to offer for prompt delivery a wide selection of high-grade bodies at the lowest prices consistent with our standards of material and workmanship.

We hope you will co-operate with us by adhering as closely to the standard dimensions as conditions warrant; and in writing for further information, such as price, delivery dates, etc., please state the name and number of the body under consideration as given in the following index.

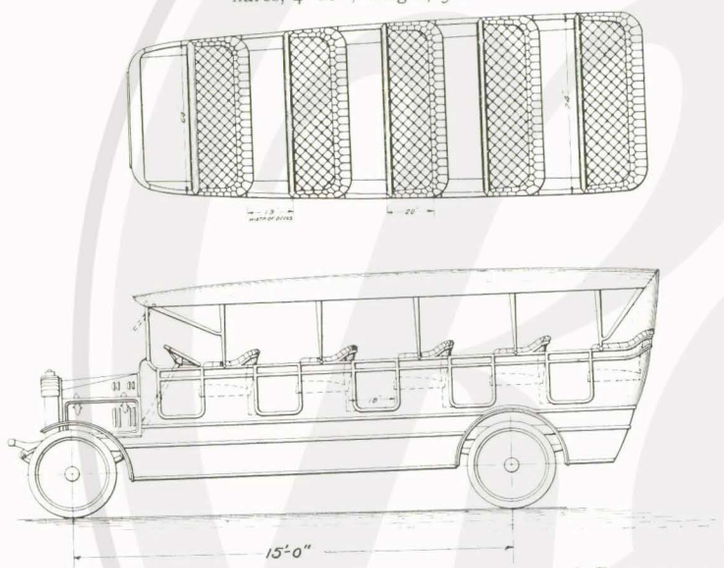
2-TON BODIES

5-TON BODIES



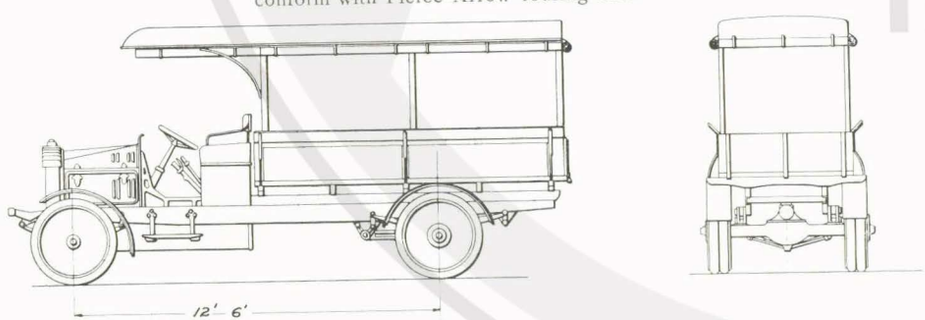
No. 33010 — Express Delivery Body with Wire Netting

Body dimensions inside: length, 10′ 6″; width on floor, 4′; width above flares, 4′ 10″; height, 5′ 6″



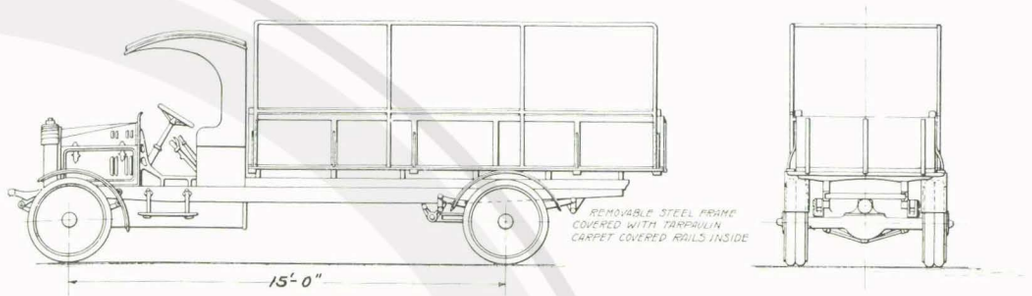
No. 33130 — Torpedo Type Char-a-banc to seat 18 Passengers

Body is built of cast aluminum sections reinforced with thoroughly seasoned ash. Cushions upholstery, cape top, wind shield, and all details are followed out to conform with Pierce-Arrow touring cars



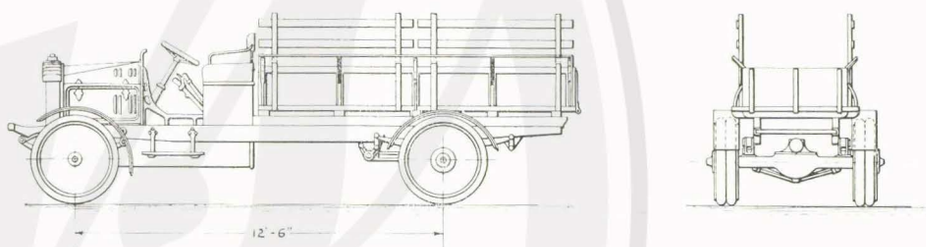
No. 33433 — Open Express Body with Permanent Top

Body dimensions inside: length, 10′ 6″; width on floor, 3′ 6″; width above flares, 4′ 6″; height, 5′ 3″



No. 33385 — Open Box Body with Removable Top

Body dimensions inside: length, 14′ 6″; width, 4′ 6″; height, 5′. Optional widths and heights dependent on traffic conditions and load to be carried

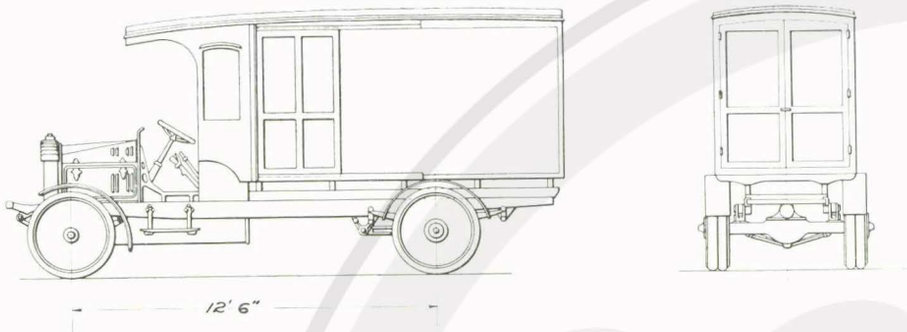


No. 33429 — Flare Box Body with Removable Gates

Body dimensions inside: length, 10′ 6″; width, 4′; height of stakes, 3′ 2″

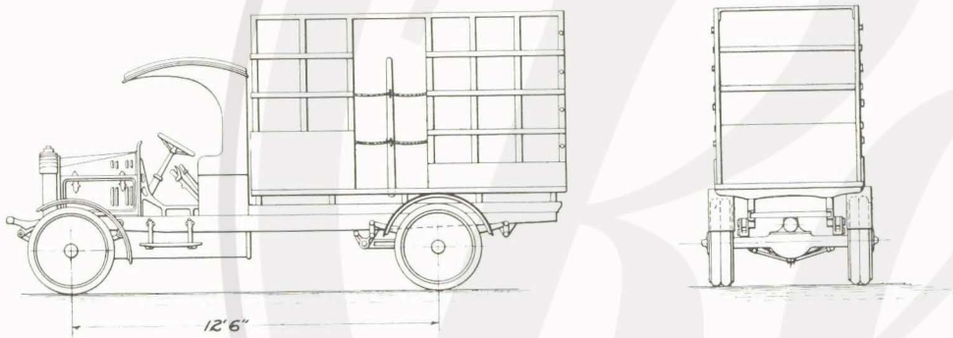
No. 33088 — Delivery Van Body — Rear Door Type

Body dimensions inside: length, 10′ 6″; width, 3′ 10″; width of floor, 3′ 2½″; height, 5′ 3″. Optional widths and heights dependent on traffic conditions and load to be carried



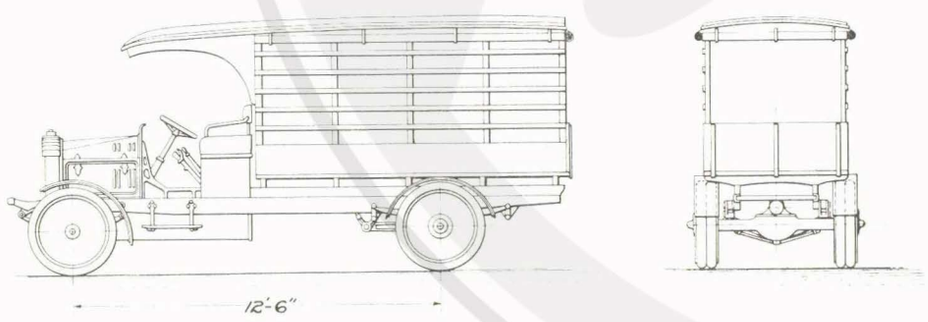
No. 32939 — Delivery Van Body with Sliding Side Doors

Body dimensions inside: length, 10′ 6″; width, 4′ 6″; height, 5′ 6″; opening at side door, 32″



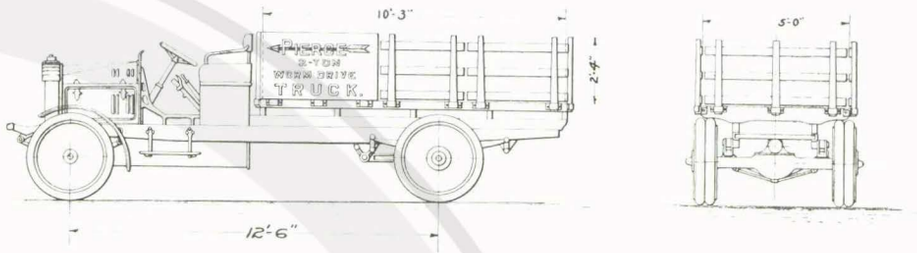
No. 33394 —Slatted Rack Body

Body dimensions inside: length, 10′ 6″; width, 4′ 6″; height, 6′



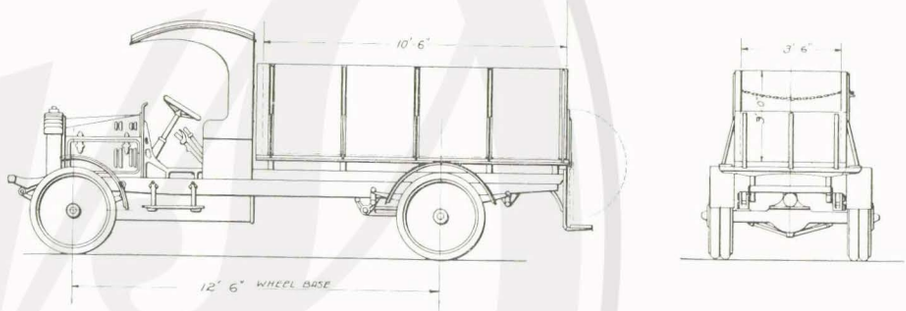
No. 33087 — Slatted Rack Body with Permanent Top

Body dimensions inside: length, 10′ 6″; width, 4′ 6″; height, 5′ 3″



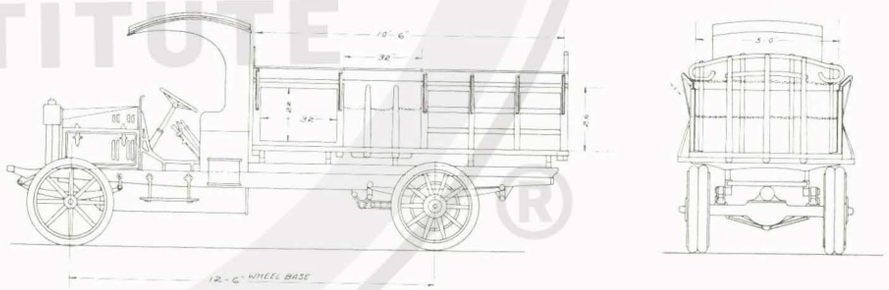
No. 32810 — Standard Stake Gate Body

Body dimensions inside: length, 10′ 3″; width, 5′; height, 2′ 4″



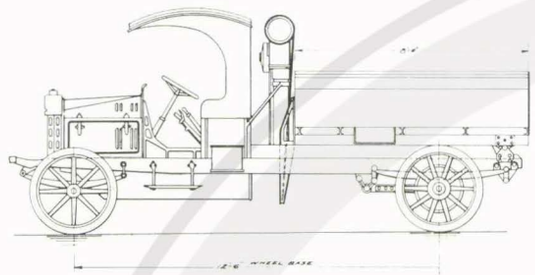
No. 33344 — Ice Delivery Body

Body dimensions inside: length, 10′ 6″; width, 3′ 6″; height, 3′; tail gate 20″ high



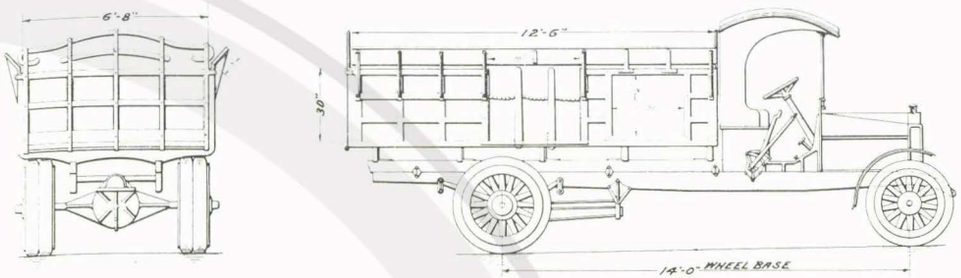
No. 33982 — Standard Brewery Body

Body dimensions inside: length, 10′ 6″; width, 5′; height to flares, 29″



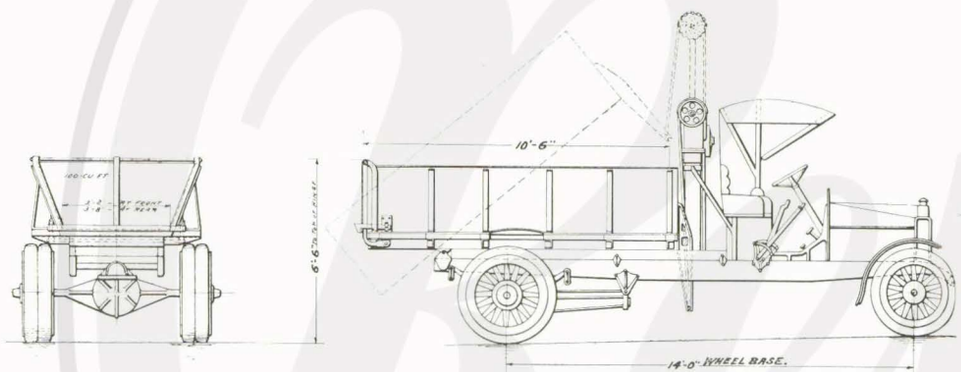
No. 34018 — Steel Dump Body with Hydraulic Hoist

Body dimensions inside: length, 8′; width, 4′ 6″; height, 23¾″



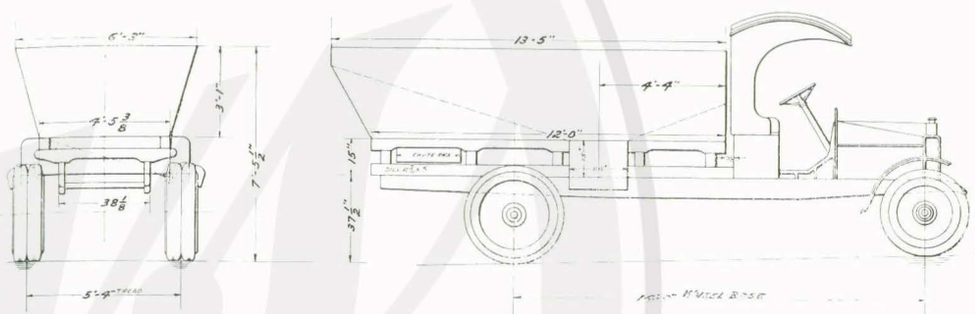
No. 27632 — Standard Brewery Body

Dimensions inside: length, 12′ 6″; width, 6′ 8″; height, to flares 30″



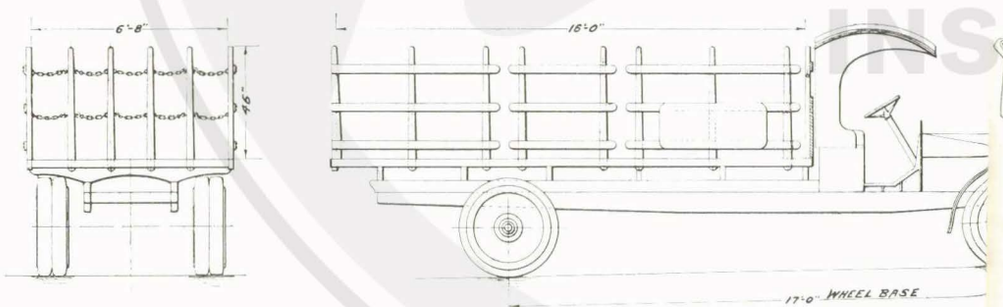
No. 24868 — Special Body for Hot Asphalt with Hydraulic Hoist

Floor and sides of this body are of 3-ply construction using wood, asbestos and steel. Fitted with removable tail gate. Buggy top over driver's seat is supplied where operating conditions limit over-all height of truck. Dimensions inside: length, 10′ 6″; width at front 3′ 2″, rear 3′ 8″; height, 28″.



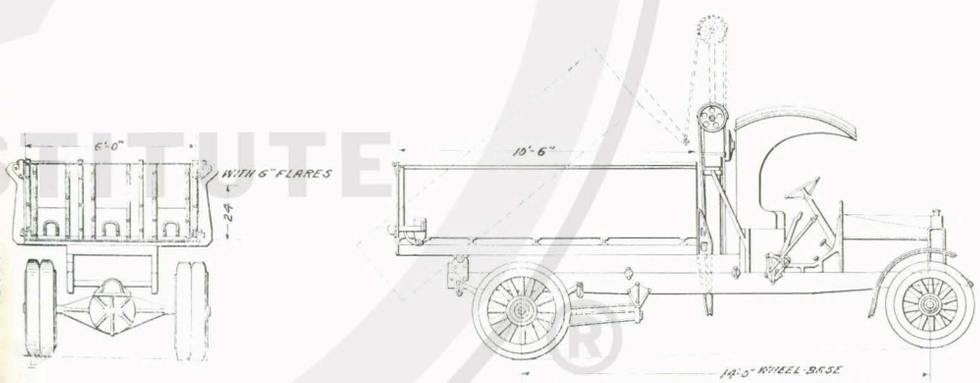
No. 30002 — Side Discharge Coal Body with Two Chutes

Load feeds by gravity to right or left-hand chute. Dimensions inside: length 13′ 5″; width at top, 6′ 3″; height, 3′ 1″



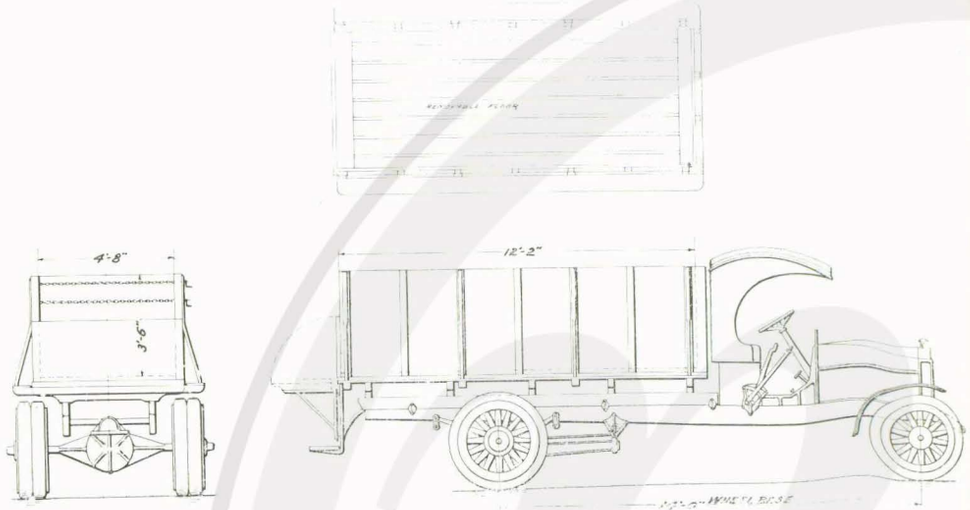
No. 27240 — Slatted Stake Gate Body, extra long

Suitable for general trucking. Dimensions inside: length, 16′; width, 6′ 8″; height, 46″



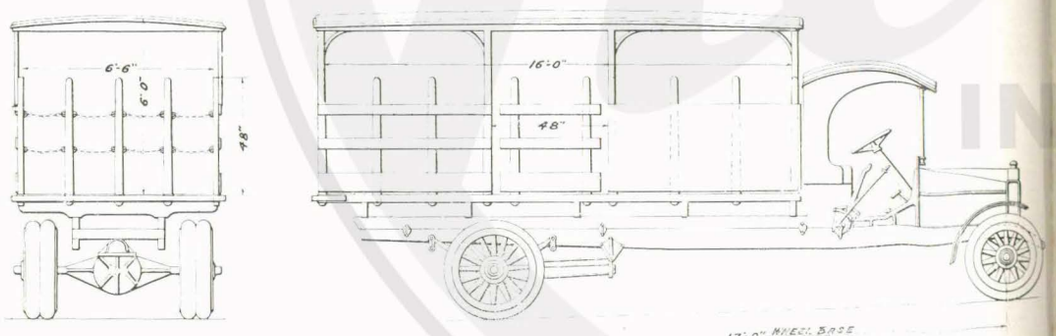
No. 30410 — Steel Dump Body with Hydraulic Hoist

Has removable tail gate with three chutes in same. Suitable for handling coal. Dimensions inside: length, 10′ 6″; width, 6′ 0″; height to flares, 24″; capacity, 6 cubic yards



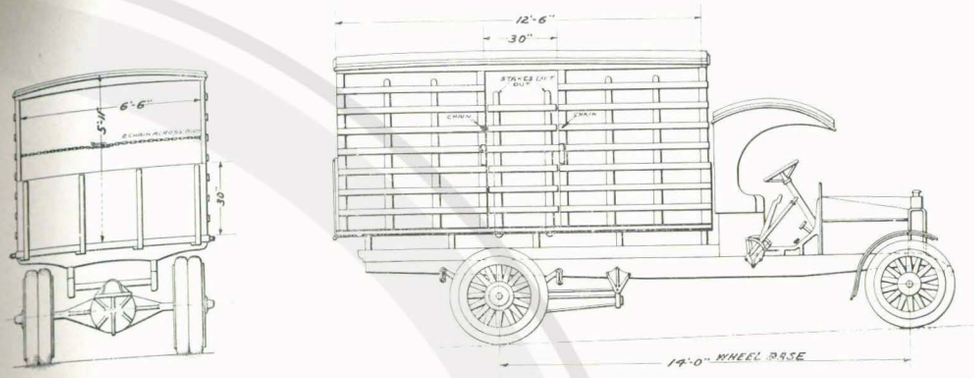
No. 30960 — Standard Ice Delivery Body

Dimensions inside: length, 12′ 2″; width, 4′ 8″; height, 3′ 6″. These may be varied to suit various sizes of blocks



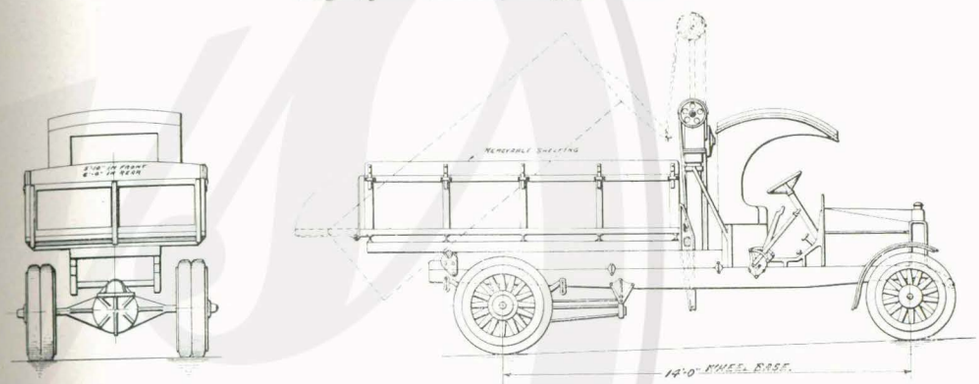
No. 31224 — Slatted Stake Gate Body with Removable Top

Suitable for general trucking. Dimensions inside: length, 16′; width, 6′ 6″; height of stakes, 48″; height to roof, 6′. Side gate, 48″ wide



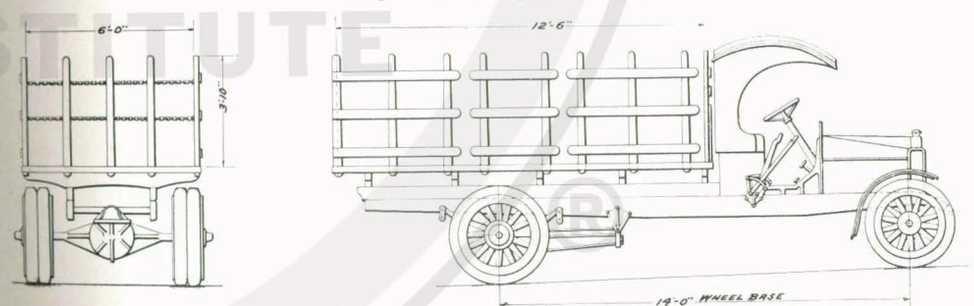
No. 32610 — Covered Rack Body with Steel Slats

Suitable for hardware business. Dimensions inside: length, 12′ 6″; width, 6′ 6″; height, 5′ 11″; side opening, 30″ wide



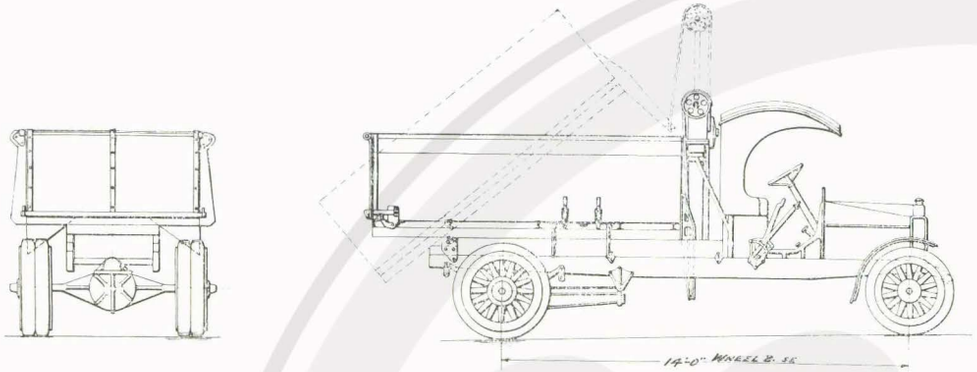
No. 32703 — Contractor's Wooden Dump Body with Hydraulic Hoist

Has steel covered floor, shelving at sides and tail gate hinged at bottom. Dimensions inside: length, 10′ 6″; width, front 5′ 10″, rear 6′; height to shelving, 22″; capacity, 4 cubic yards



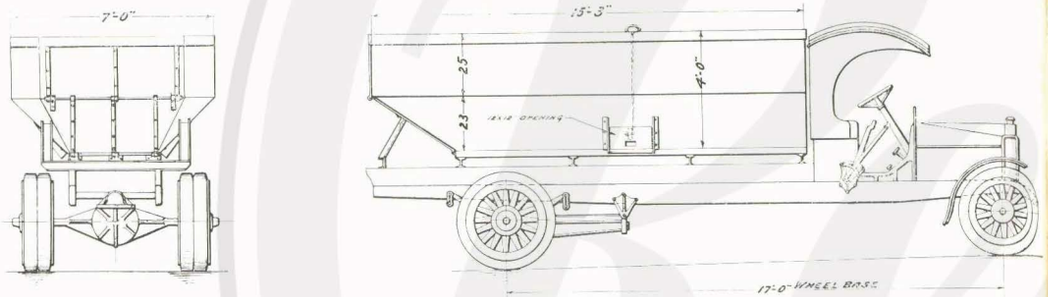
No. 33156 — Slatted Stake Gate Body

Dimensions inside: length, 12′ 6″; width, 6′; height, 3′ 10″. Suitable for general trucking



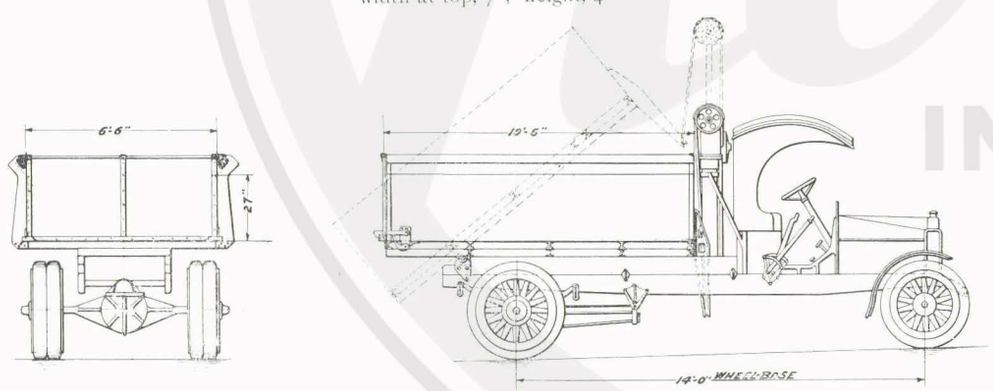
No. 33286 — Steel Dump Body with Hydraulic Hoist

Has removable tail gate. Suitable for handling coal. Dimensions inside: length, 10′ 6″; width, 6′ 6″; height, to flares 27″



No. 34778 — Steel Body for Maltsters

Has two chutes and double opening tail gate. Dimensions inside: length, 15′ 3″; width at top, 7′; height, 4′



No. 35602 — Steel Dump Body with Hydraulic Hoist

Suitable for coke and ashes. Has two side chutes and removable tail gate. Dimensions inside: length, 10′ 6″; width, 6′; height to flares, 28″. Capacity, 6½ cubic yards

MECHANICAL CONSTRUCTION AND DESIGN

IN GENERAL

In fundamental design, there is no difference between the two models of Pierce-Arrow motor trucks. Such differences as do exist are caused almost invariably by the different weights to be carried. The following description, therefore, covers both 5-ton and 2-ton models except where otherwise noted.

DISTRIBUTION OF WEIGHT

The distribution of weight is designed to concentrate from eighty to eighty-five per cent of the load on the rear wheels. This distribution results in a number of advantageous features. The adhesion of the driving wheels to the road is made as great as practicable, thus enabling the motor to deliver a maximum amount of propelling power. Large dual tires on the rear wheels, properly proportioned to the load, give very high mileages, frequently greatly in excess of those guaranteed by the tire companies. This concentration of the load on the rear wheels lessens the variation of the load on the front springs, allowing them to function perfectly whether the truck be loaded or empty. This has the double effect of sparing the motor much vibration and of making the steering easy under all conditions. This design allows a very large locking angle for the front wheels, giving, in many cases, a smaller turning circle than can be expected of many trucks with much shorter wheelbases. The arrangement of the driver's seat helps to make the motor and other working parts most accessible, a factor which has been carefully considered throughout the whole chassis.

FLEXIBLE FRAME

The flexible frame construction, which is characteristic of Pierce-Arrow trucks, is one of the most potent factors in holding down maintenance costs. The flexible frame is to the rigid form as rubber tires are to steel. The flexible frame absorbs shocks and distortion strains, the rigid frame passes them on to the more delicate mechanisms.

WORM DRIVE

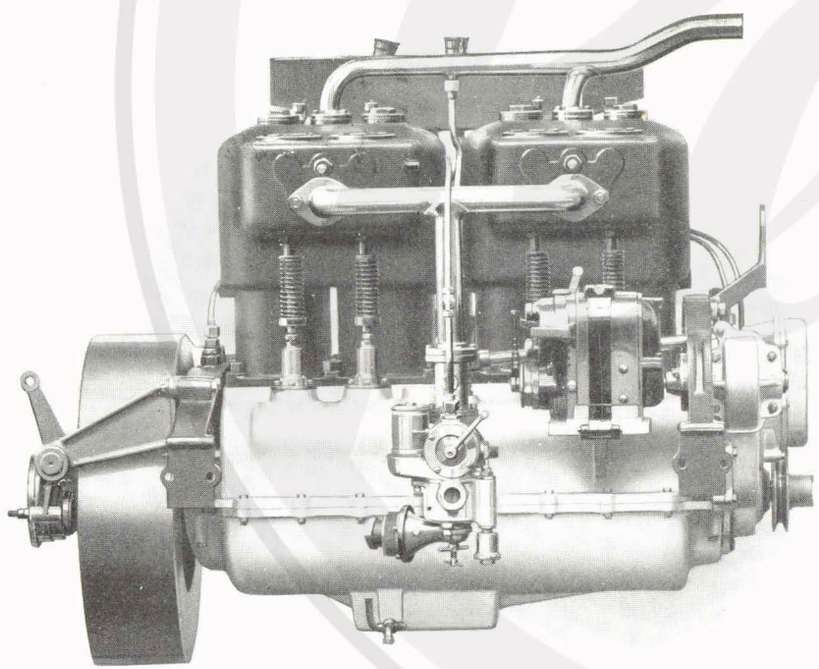
The adoption by Pierce-Arrow engineers of the worm drive for trucks was received, by many American designers, with a skepticism amounting almost to derision. Many of these men are now imitating Pierce-Arrow construction in this respect in order to give the owners of the trucks they design the benefit of extreme durability, reliability, mechanical efficiency, and freedom from adjustment and repairs resulting from the use of the worm and wheel gear reduction. Many Pierce-Arrow trucks have been run more than 40,000 miles, some have exceeded 50,000, and we have yet to record a failure of either worm or wheel. Many truck users appreciate the silence of the worm drive, particularly where delivering goods in residence districts.

MOTOR

The motors used in the two models are of standard Pierce-Arrow construction and design, four cycle, water cooled, with T-head cylinders cast in pairs. The 5-ton engine has a bore of 4⅞ inches and a stroke of 6 inches; the 2-ton engine is 4 inches by 5½ inches. The S. A. E. rating of the larger engine is 38 horse power, that of the smaller 25.6 horse power. Both motors are of very sturdy construction and the greatest care has been taken to protect them from the effects of possible neglect and abuse. Lubrication is by gravity feed on the 5-ton motor and by forced feed on the 2-ton. Both systems are direct acting and not dependent upon splash. An oil gauge on the dash is a constant reminder to the driver of the condition of his oil supply. A sealed governor limits the speed of the motor and through it, the maximum speed of the truck.

IGNITION

In the 5-ton truck motor, ignition is effected by either magneto or battery, the Bosch dual system being employed in connection with dry cell battery units. The 2-ton motor, being smaller, is easily started on the magneto and no battery is carried. The ignition advance is regulated, on both motors, by means of a hand lever mounted under the steering wheel.



5-ton Motor, inlet side

CARBURATION

The carburetor used is of standard Pierce-Arrow design, automatic in operation and generously water jacketed to make possible the use of low grade gasoline in the coldest weather. The throttle valve is controlled by both foot accelerator and hand lever. Gasoline feed is by gravity, with the tank, of ample capacity, carried beneath the driver's seat.

COOLING

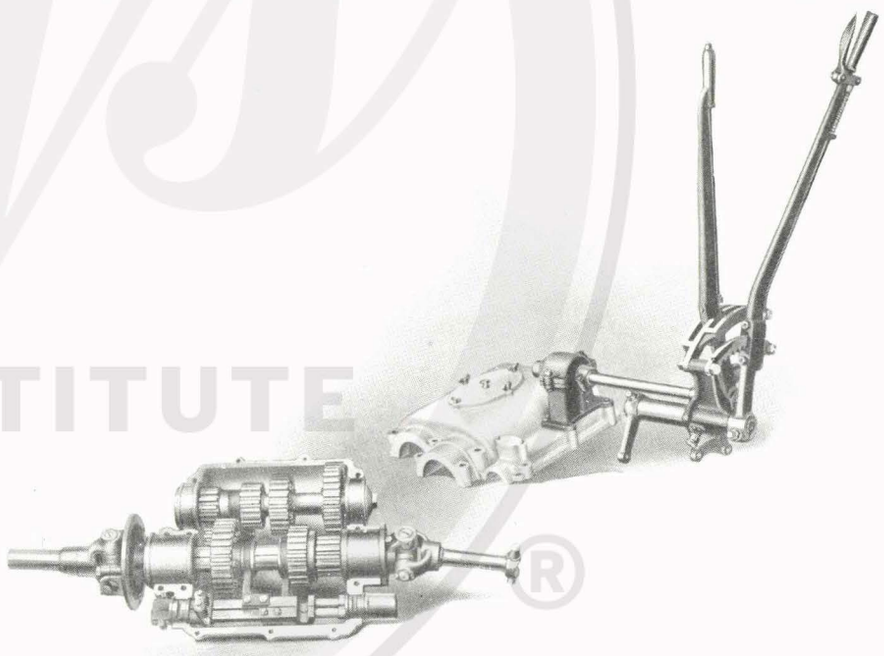
A centrifugal pump circulates water through the cylinders and the vertical finned tube radiator. The radiator is suspended in a manner to protect it from the weaving action of the flexible frame.

CLUTCH

The clutch is of the cone type, leather faced and running in oil. Double universal joints of sturdy and durable design connect the clutch to the transmission.

TRANSMISSION

The transmission is of the sliding gear, selective type, with three speeds forward and reverse. Shafts are mounted in ball bearings and the steels used are of special alloy, carefully heat treated to insure maximum strength and

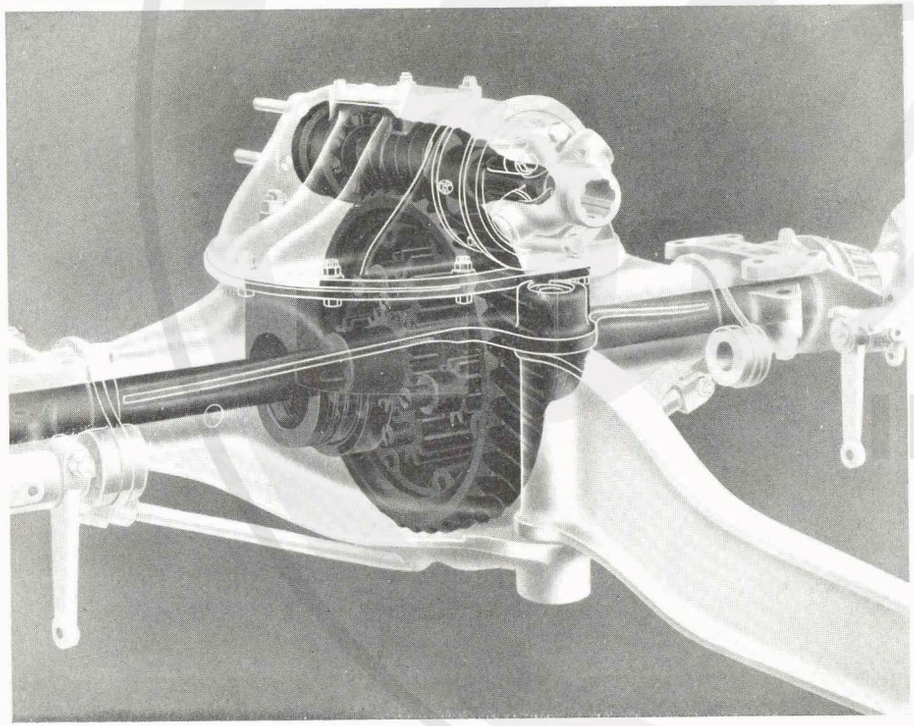


5-ton Transmission

durability. Transmissions are furnished for the 5-ton truck, when desirable, with special low ratio master gears, thus giving a very powerful gear ratio for starting and hill work without reducing the speed of the truck on the level. In connection with the two worm gear ratios available on this model, the purchaser has the option of four different gearings from which to select the combination best suited to his needs.

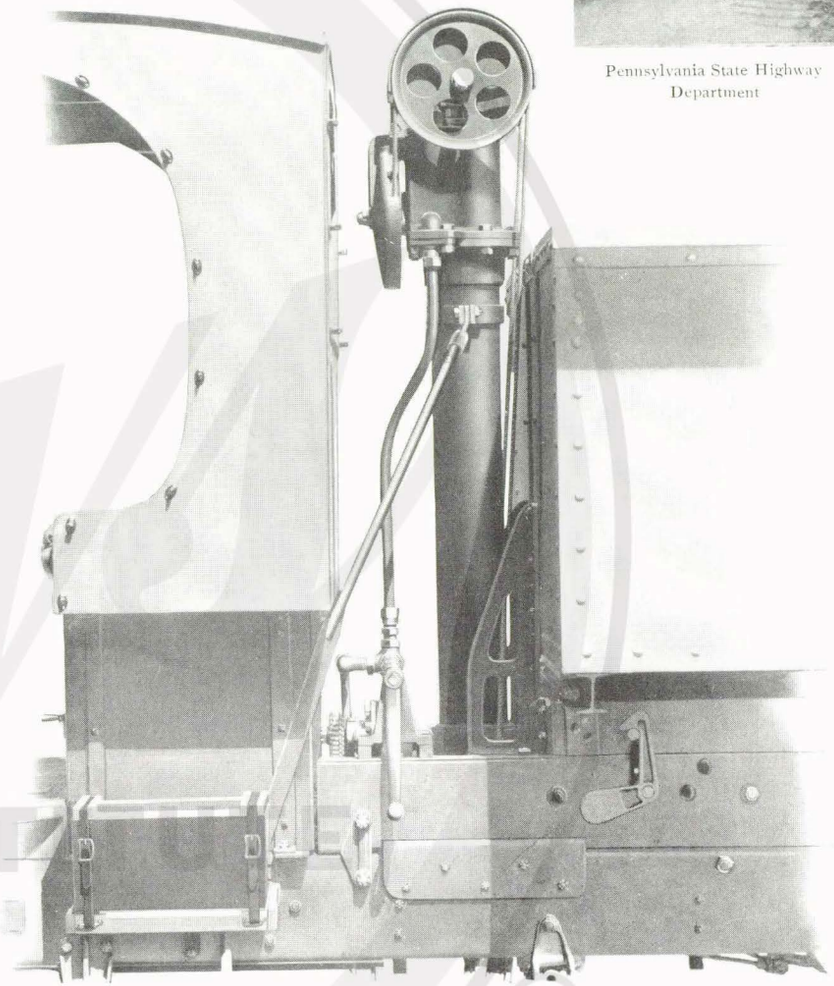
REAR AXLE

A propellor shaft with enclosed universal joints at each end transmits the power to the worm gear and rear axle. The worm, worm wheel and differential gearing are assembled as a unit with the cover of the dust-proof axle housing of steel. This housing carries all of the weight, the driving shafts being full floating and transmitting only the driving power to the wheels A torque rod takes all driving and braking torsional strains, while two side radius rods relieve the rear springs of all tractive effort. Annular ball bearings are used to take the radial and thrust loads of the worm and wheel, while the road wheels run on conical roller bearings.

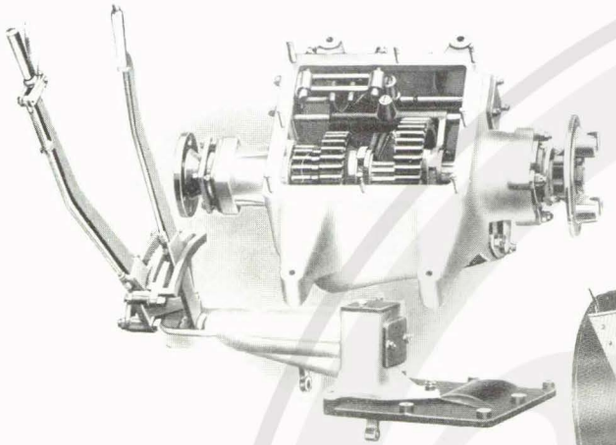


The Pierce-Arrow Worm Drive

Pennsylvania State Highway Department



The Pierce-Arrow Hydraulic Hoist used on Pierce-Arrow Dump Trucks



2-ton Transmission

2-ton Chassis

BRAKES

Two separate and independent braking systems are provided. The foot, or service, brake consists of special asbestos fabric lined shoes contracting on a drum just back of the transmission. The equalized hand brake consists of expanding, fabric lined shoes acting on drums attached to the rear wheels. Both brakes are positive in their action and easily adjusted.

FRONT AXLE

The front axle is a one-piece drop forging of I-beam section made of specially heat treated steel.

STEERING GEAR

The steering gear is of the nut and screw type, similar to that used on the touring cars.

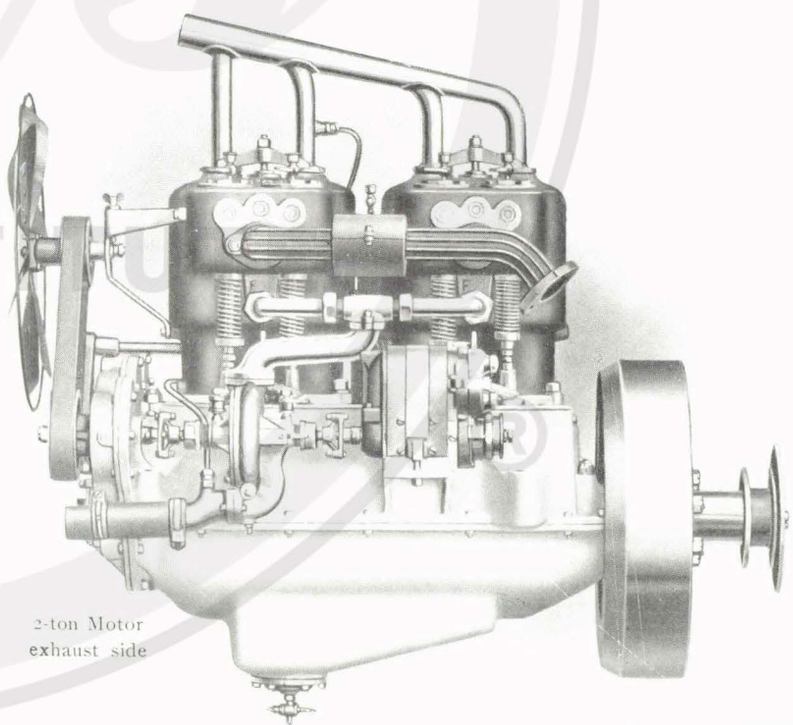
SPRINGS

Springs are of ample dimensions and semi-elliptic, both front and rear. The rear springs are shackled at both ends.

WHEELS

The road wheels are made in the Pierce-Arrow factory, of carefully selected and seasoned wood. The inspection of these wheels during the course of manufacture is such as to make it almost an impossibility for inferior or defective stock to be used.

Bodies to suit various requirements are manufactured in the Pierce-Arrow factory. The materials used are the best, in our judgment, for the purpose to which they are put.



2-ton Motor
exhaust side

SPECIFICATIONS IN BRIEF OF THE PIERCE-ARROW 5-TON MOTOR TRUCK

Pierce-Arrow 5-ton Motor Truck Chassis are made in two lengths

Number of Cylinders	Four, cast in pairs.
Cylinder Dimensions	4⅞ inches bore by 6 inches stroke — 38 horse power.
Revolutions per Minute	350 to 950.
Ignition	Bosch dual system.
Carburetor	Special Pierce-Arrow automatic. Gasoline, gravity feed.
Control	Hand throttle and foot accelerator.
Oiling	Automatic to all crank shaft and pin bearings, cylinders and pistons. Gauge on dash shows supply at all times.
Clutch	Cone type.
Transmission	Selective, sliding gears, direct on high speed. Side lever control. Worm drive
Speeds	Three forward — one reverse.
Bearings	Ball and roller all over, except motor.
Springs	Semi-elliptic.
Wheels	Artillery type.
Tires	36 x 5 inches front, single; 40 x 6 inches twin, rear. Solid rubber tires.
Brakes	Foot brake on outside of drum on rear of transmission. Equalized hand brakes on inside of drums on hubs, both rear wheels.
Tank Capacity	Gasoline, 25 gallons. Water, 11 gallons. Oil, 1 gallon.
Frame	Channel section, pressed from special steel and heat treated.
Wheel Base	14 feet. Long chassis, 17 feet.
Tread	60 inches.
Chassis Over All	20 feet long, 7 feet wide; long chassis, 24 feet long, 7 feet wide.
Platform Dimensions (Behind driver's seat)	Length, 12 feet 8 inches; width, 7 feet. Long chassis to specifications.
Height of Floor (From ground, loaded)	3 feet, 10 inches.
Speed	14 miles per hour with standard gear.
Steering Gear	Nut and screw type.
Radiator	Tubular type — vertical tubes.
Price — f. o. b. Buffalo	$4500.00.

Chassis equipment includes the running gear, tires and mechanism complete; driver's seat, top, dash and foot boards; front mud guards, side and tail lamps, speedometer, horn, jack and full set of tools; coil with battery and magneto and gasoline tank. Wood sills clipped to frame for mounting body.

Total admissible load on chassis — 12,500 pounds. This includes both body and paying load.

SPECIFICATIONS IN BRIEF OF THE PIERCE-ARROW 2-TON MOTOR TRUCK

Pierce-Arrow 2-ton Motor Truck Chassis are made in two lengths

Number of Cylinders	Four, cast in pairs.
Cylinder Dimensions	4-inch bore, 5½-inch stroke, 25.6 horse power.
Revolutions per Minute	350 to 1050.
Ignition	Bosch magneto.
Carburetor	Special Pierce-Arrow automatic. Gasoline, gravity feed.
Control	Hand throttle and foot accelerator.
Oiling	Automatic to all crank shaft and pin bearings, cylinder and pistons. Gauge on dash shows supply at all times.
Clutch	Cone type.
Transmission	Selective, sliding gears, direct on high speed. Side lever control. Worm gear drive.
Speeds	Three forward — one reverse.
Bearings	Ball and roller all over except the motor.
Springs	Semi-elliptic.
Wheels	Artillery type.
Tires	36 x 4 front, single; 36 x 4 rear, dual. Solid.
Brakes	Foot brake on outside of drum on rear of transmission. Equalized hand brakes on inside of drums on hubs, both rear wheels.
Tank Capacities	Gasoline, 15 gallons. Water, 8 gallons. Oil, 1 gallon.
Frame	Channel section pressed from special steel and heat treated.
Wheel Base	12 feet 6 inches, standard. Extra long, 15 feet.
Tread	56 inches.
Chassis Over All	18 feet 6 inches long, 5 feet 6 inches wide, standard. Extra long, 21 feet, 6 inches long.
Platform Dimensions (Behind driver's seat)	10 feet 6 inches long, 6 feet wide, standard. Extra long, 13 feet 6 inches long
Height of Floor (From ground, loaded)	3 feet 6 inches.
Speed	16 miles per hour.
Steering Gear	Nut and screw type.
Radiator	Tubular type — vertical tubes.
Price — f. o. b. Buffalo	$3000.00.

Chassis equipment includes the running gear, tires and mechanism complete in the lead; driver's seat, dash and foot boards; front mud guards, side and tail lamps, speedometer, horn, jack and full set of tools; Bosch magneto and gasoline tank. Wood sills clipped to frame for mounting body.

Total admissible load on chassis — 5200 pounds. This includes both body and paying load.

Ames Transfer Company, New York

E. J. Babcock, Coal, Boston, Mass.

THE SELECTION OF YOUR TRUCK

The slogan of the Pierce-Arrow sales organization is not simply "Get Orders."

No Pierce-Arrow salesman is content unless he is morally certain that the truck he sells you is just what your business requires. He knows that it is the repeat order that means profits to both agent and manufacturer. He knows that a well-placed truck, fulfilling all the hopes of its owner, is worth, to agent and manufacturer, many badly placed trucks that prove a disappointment to their purchasers.

The Pierce-Arrow selling organization is equipped to analyze thoroughly your transportation problems. Our salesmen hope to be able to recommend an installation of 2-ton or 5-ton Pierce-Arrow trucks, but they are not

so foolish as to make such a recommendation unless fully justified by the conditions of your business.

Pierce-Arrow trucks are designed and built to carry their rated capacity tonnage. We do not mean to imply that a single extra pound would prove to be the proverbial "last straw". We do state that the factor of safety used in proportioning every part of our trucks is employed to provide for the inevitable variations in strength of materials and workmanship, and to allow for the inaccuracies of all formulae relating to the proportioning of metal parts. We do not know how to build better trucks than we do build, and we could not sell these trucks for less than we do sell them, and make any profit.

If a salesman says that the 5-ton truck he handles is guaranteed to carry a 20 per cent overload, he is simply stating that it is a 6-ton truck, rated as a 5, to mask, perhaps, a price lower than is consistent with the very best quality. Such a statement must mean that the truck is not priced high enough to enable the manufacturer to build it of the very best and make a profit. The natural deduction to be drawn does not point to a philanthropic manufacturer.

The overload promise is as much price cutting as a rebated bill, and no one respects the goods of the price cutter. The good reputation of a product is its maker's best insurance, and no reputation can remain untarnished when subjected to constantly reiterated suspicion. Price cutting is like throwing mud at your own reputation—some of that mud is sure to stick.

Why not let our salesmen make a study of your transportation problem? They will not recommend Pierce-Arrow equipment unless it is suited to your particular requirements.

TABLE No. 1

HORSE-POWER FORMULAS

FOUR-STROKE CYCLE ENGINES

Authority	Formula
S. A. E. Royal Auto. Club	$\frac{D^2N}{2.5}=H.P.$
Brit. Inst. of Auto Engrs.	$0.45\,(D+L)\,(D-1.18)=H.P.$
E. P. Roberts	$\frac{D^2LRN}{18{,}000}=H.P.$

D = Diam. of cylinder in inches.
L = Length of stroke in inches.
R = Rev. per min. of crank shaft.
N = Number of cylinders.

DERIVATION OF THE S. A. E. HORSE-POWER FORMULA

The indicated horse power of a single-cylinder, four-cycle engine is equal to one-quarter times the mean effective pressure P, acting throughout the working stroke, times the area of the piston A, in square inches, times the piston speed S divided by 33,000, thus:

$$\text{I. H. P.} = \frac{1}{4}\,\frac{P\ A\ S}{33{,}000}$$

Multiplying this by the number of cylinders N gives the I. H. P. for an engine of the given number of cylinders, and further multiplying by the mechanical efficiency of the engine E gives the brake horse power. Therefore the complete equation for B. H. P. reads:

$$\text{B. H. P.} = \frac{P\ A\ S\ N\ E}{33{,}000\times 4}$$

The S. A. E. assumed that all motor car engines will deliver or should deliver their rated power at a piston speed of 1000 feet per minute, that the mean effective pressure in such engine cylinders will average 90 pounds per square inch, and that the mechanical efficiency will average 75 per cent.

Substituting these values in the above B. H. P. equation, and substituting for A its equivalent, .7854 D^2, the equation reads:

$$\text{B. H. P.} = \frac{90\times .7854\ D^2\times 1{,}000\times N\times .75}{33{,}000\times 4}$$

and combining the numerical values it reduces to:

$$\text{B. H. P.} = \frac{D^2N}{2.489}$$

or, in round numbers, with a denominator 2.5.

TABLE No. 2

BAUME SCALE AND SPECIFIC GRAVITY EQUIVALENT

FOR LIQUIDS LIGHTER THAN WATER

Baume Degrees	Specific Gravity	Pounds in Gallon	Baume Degrees	Specific Gravity	Pounds in Gallon	Baume Degrees	Specific Gravity	Pounds in Gallon
10	1.0000	8.33	37	0.8383	6.99	64	0.7216	6.03
11	0.9929	8.27	38	0.8333	6.95	65	0.7179	6.00
12	0.9859	8.21	39	0.8284	6 91	66	0.7142	5.97
13	0.9790	8.16	40	0.8235	6.87	67	0.7106	5.94
14	0.9722	8.10	41	0.8187	6 83	68	0.7070	5 91
15	0.9655	8.05	42	0.8139	6.80	69	0.7035	5.88
16	0.9589	7.99	43	0.8092	6.76	70	0.7000	5.85
17	0.9523	7.94	44	0.8045	6.72	71	0.6965	5 82
18	0.9459	7.88	45	0.8000	6.68	72	0.6930	5.79
19	0.9395	7.83	46	0.7954	6.64	73	0.6896	5.77
20	0.9333	7.78	47	0.7909	6.60	74	0.6863	5.74
21	0.9271	7.73	48	0.7865	6.57	75	0.6829	5.71
22	0.9210	7.68	49	0.7821	6.53	76	0.6796	5.68
23	0.9150	7.63	50	0.7777	6.49	77	0.6763	5.65
24	0.9090	7.58	51	0.7734	6.46	78	0.6730	5.63
25	0.9032	7.54	52	0.7692	6.42	79	0.6698	5.60
26	0.8974	7.49	53	0.7650	6.39	80	0.6666	5.57
27	0.8917	7.44	54	0.7608	6.36	81	0.6635	5.55
28	0.8860	7.39	55	0.7567	6.32	82	0.6604	5.51
29	0.8805	7.34	56	0.7526	6.29	83	0.6573	5.48
30	0.8750	7.29	57	0 7486	6.26	84	0.6542	5.45
31	0.8695	7.25	58	0.7446	6.22	85	0.6511	5.42
32	0.8641	7.21	59	0.7407	6.19	86	0.6481	5.40
33	0.8588	7.16	60	0.7368	6.16	87	0.6451	5.38
34	0.8536	7.12	61	0.7329	6.13	88	0.6422	5.36
35	0.8484	7.07	62	0.7290	6.10	89	0.6392	5.33
36	0.8433	7.03	63	0.7253	6.07	90	0.6363	5.30

$$\text{At } 60^\circ \text{ F., Sp. Gr.} = \frac{140}{130 + {}^\circ\text{Bé}}$$

TABLE No. 3

SPECIFIC GRAVITY AND WEIGHT OF MATERIALS

MATERIAL	Specific Gravity	Weight in Pounds of One Cubic Foot	Weight in Pounds of One Cubic Inch	Cubic Inches in One Pound
Aluminum—cast	2.569	160	.093	10.80
" wrought	2.681	167	.097	10.35
" bronze	7.787	485	.281	3.56
Antimony	6.712	418	.242	4.13
Arsenic	5.748	358	.207	4.83
Bismuth	9.827	612	.354	2.82
Brass—cast, from	7.868	490	.284	3.53
Brass—cast, to	8.430	525	.304	3.29
Brass—cast, average	8.109	505	.292	3.42
" Muntz—metal	8.221	512	.296	3.37
" naval (rolled)	8.510	530	.307	3.26
" sheet	8.462	527	.305	3.28
" wire	8.558	533	.308	3.24
Bronze (gun metal), from	8.478	528	.306	3.27
Bronze (gun metal), to	8.863	552	.319	3.13
Bronze (gun metal), average	8.735	544	.315	3.18
Copper—cast	8.622	537	.311	3.22
" hammered	8.927	556	.322	3.11
" sheet	8.815	549	.318	3.15
" wire	8.895	554	.321	3.12
Gold (pure)	19.316	1203	.696	1.44
" standard 22 karat fine (Gold 11—Copper 1)	17.502	1090	.631	1.59
Iron—cast, from	6.904	430	.249	4.02
Iron—cast, to	7.386	499	.266	3.76
Iron—cast, average	7.209	464	.260	3.85
Iron—wrought, from	7.547	470	.272	3.56
Iron—wrought, to	7.803	486	.281	3.68
Iron—wrought, average	7.707	480	.278	3.60
Lead—cast	11.368	708	.410	2.44
" sheet	11.432	712	.412	2.43
Manganese	8.012	499	.289	3.46
Nickel—cast	8.285	516	.299	3.35
" rolled	8.687	541	.313	3.19
Platinum	21.516	1340	.775	1.29
Silver	10.517	655	.379	2.64
Steel, from	7.820	487	.282	3.55
Steel, to	7.916	493	.285	3.51
Steel, average	7.868	490	.284	3.53
Tin	7.418	462	.267	3.74
White Metal (Babbitt's)	7.322	456	.264	3.79
Zinc—cast	6.872	428	.248	4.04
" sheet	7.209	449	.260	3.85

WOODS, DRY

MATERIAL	Weight in Pounds of One Cubic Foot	MATERIAL	Weight in Pounds of One Cubic Foot
Ash	43-53	Larch	31-37
Beech	43-53	Lignum-vitae	83
Birch	40-46	Mahogany—Honduras	35
Boxwood	57-83	" Spanish	53
Cork	15	Oak—American red	54
Ebony	70-83	" English	48-58
Elm	34-45	Pine—red	30-44
Fir, spruce	30-44	" white	27-34
Greenheart	70	" yellow	29-41
Hornbeam	47	Teak	41-55

TABLE No. 4

DECIMALS OF AN INCH, FOR EACH 1/64.

1/32	1/64	Decimal	Fraction	1/32	1/64	Decimal	Fraction
	1	.015625			33	.515625	
1	2	.03125		17	34	.53125	
	3	.046875			35	.546875	
2	4	.0625	1–16	18	36	.5625	9–16
	5	.078125			37	.578125	
3	6	.09375		19	38	.59375	
	7	.109375			39	.609375	
4	8	.125	1–8	20	40	.625	5–8
	9	.140625			41	.640625	
5	10	.15625		21	42	.65625	
	11	.171875			43	.671875	
6	12	.1875	3–16	22	44	.6875	11–16
	13	.203125			45	.703125	
7	14	.21875		23	46	.71875	
	15	.234375			47	.734375	
8	16	.25	1–4	24	48	.75	3–4
	17	.265625			49	.765625	
9	18	.28125		25	50	.78125	
	19	.296875			51	.796875	
10	20	.3125	5–16	26	52	.8125	13–16
	21	.328125			53	.828125	
11	22	.34375		27	54	.84375	
	23	.359375			55	.859375	
12	24	.375	3–8	28	56	.875	7–8
	25	.390625			57	.890625	
13	26	.40625		29	58	.90625	
	27	.421875			59	.921875	
14	28	.4375	7–16	30	60	.9375	15–16
	29	.453125			61	.953125	
15	30	.40875		31	62	.90875	
	31	.484375			63	.984375	
16	32	.5	1–2	32	64	1.	1

TABLE No. 5

WIND PRESSURE*

Velocity Miles per Hour	Pressure Pounds per Square Foot	
10	0.4	Fresh breeze
20	1.6	Stiff breeze
30	3.6	Strong wind
40	6.4	High wind
50	10.0	Storm
60	14.4	Violent storm
80	25.6	Hurricane
100	40.0	Violent hurricane

*As ascertained by U. S. Signal Service at Mt. Washington, N. H.

TABLE No. 6

UNITED STATES OFFICIAL MILLIMETRES CONVERSION TABLE

Millimetres	Equivalent in Inches	Millimetres	Equivalent in Inches
1	0.03937	51	2.00787
2	0.07874	52	2.04724
3	0.11811	53	2.08661
4	0.15748	54	2.12598
5	0.19685	55	2.16535
6	0.23622	56	2.20472
7	0.27559	57	2.24409
8	0.31496	58	2.28346
9	0.35433	59	2.32283
10	0.39370	60	2.36220
11	0.43307	61	2.40157
12	0.47244	62	2.44094
13	0.51181	63	2.48031
14	0.55118	64	2.51968
15	0.59055	65	2.55905
16	0.62992	66	2.59842
17	0.66929	67	2.63779
18	0.70866	68	2.67716
19	0.74803	69	2.71653
20	0.78740	70	2.75590
21	0.82677	71	2.79527
22	0.86614	72	2.83464
23	0.90551	73	2.87401
24	0.94488	74	2.91338
25	0.98425	75	2.95275
26	1.02362	76	2.99212
27	1.06299	77	3.03149
28	1.10236	78	3.07086
29	1.14173	79	3.11023
30	1.18110	80	3.14960
31	1.22047	81	3.18897
32	1.25984	82	3.22834
33	1.29921	83	3.26771
34	1.33858	84	3.30708
35	1.37795	85	3.34645
36	1.41732	86	3.38582
37	1.45669	87	3.42519
38	1.49606	88	3.46456
39	1.53543	89	3.50393
40	1.57480	90	3.54330
41	1.61417	91	3.58267
42	1.65354	92	3.62204
43	1.69291	93	3.66141
44	1.73228	94	3.70078
45	1.77165	95	3.74015
46	1.81102	96	3.77952
47	1.85039	97	3.81889
48	1.88976	98	3.85826
49	1.92913	99	3.89763
50	1.96850	100	3.93700

TABLE No. 7

METRIC CONVERSION TABLES

U. S. TO METRIC

LINEAR

1 inch = 25.4001 millimetres
1 foot = 0.304801 metres
1 yard = 0.914402 metres
1 mile = 1.60935 kilometres

SQUARE

1 square inch = 6.452 square centimetres
1 square foot = 9.290 square decimetres
1 square yard = 0.836 square metres

CUBIC

1 cubic inch = 16.387 cubic centimetres
1 cubic foot = 0.02832 cubic metres
1 cubic yard = 0.765 cubic metres

WEIGHT

1 grain = 64.7989 milligrammes
1 avoirdupois ounce = 28.3495 grammes
1 troy ounce = 31.10348 grammes
1 avoirdupois pound = 0.45359 kilogrammes

LIQUID

1 fluid drachm = 3.70 cubic centimetres
1 fluid ounce = 29.57 millilitres
1 quart = 0.94636 litres
1 gallon = 3.78544 litres

METRIC TO U. S.

LINEAR

1 metre = 39.3700 inches
1 metre = 3.28083 feet
1 metre = 1.09361 yards
1 kilometre = 0.62137 miles

SQUARE

1 square centimetre = 0.1550 square inches
1 square metre = 10.7640 square feet
1 square metre = 1.196 square yards

CUBIC

1 cubic centimetre = 0.0610 cubic inches
1 cubic metre = 35.314 cubic feet
1 cubic metre = 1.308 cubic yards

WEIGHT

1 milligramme = 0.01543 grains
1 kilogramme = 15432.36 grains
1 hectogramme = 3.5274 avoirdupois ounces
1 kilogramme = 2.20462 avoirdupois pounds

LIQUID

1 millilitre = 0.27 fluid drachms
1 centilitre = 0.338 fluid ounces
1 litre = 1.0567 quarts
1 dekalitre = 2.6417 gallons

TABLE No. 8

WEIGHTS OF MISCELLANEOUS MATERIALS PER CUBIC FOOT

	POUNDS
Asbestos	192
Brick	119
Fire Brick	137
Portland Cement	81
Clay	120
Anthracite Coal	53
Bituminous Coal	45
Lump Coke	28
Loose Earth	80
Pressed Earth	100
Window Glass	165
Granite	165
Gravel	109
Ice	58
Lime	50
Limestone — broken	85
Oil — petroleum	55
Salt — coarse	45
Sand — dry, loose	90
Sand — moist, loose	95
Slate	175
Sulphur	127

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