(*Continued from page 451.*)

had at the receiving house. It is discharged into the boot, carried up the leg, and spouted into the bins. This time, however, instead of one leg, there may be from sixteen to twenty; and the four bins will have increased to over one hundred. Our five thousand bushels of grain, then, are discharged by gravity from the bottom of the bin to the boot of an elevator, are lifted and discharged again into a big spout, through which they flow directly down into the hold of a lake cargo vessel moored alongside the elevator.

This vessel is of a special type which has been developed for the lake trade. Although she may be capable of carrying over ten thousand tons of cargo, she is nothing more nor less than a huge barge with straight, parallel sides; blunt of bow and stern; with accommodations for the seamen at the bow, and with engine, boilers, and captain's accommodations at the stern. The main body of the ship consists of one vast hold, access to which is gained by a long line of hatches. Our 5,000 bushels of grain together with hundreds of thousands of bushels that may have been gathered from half a dozen different centers in the wheat-growing districts of the West, now start on their long journey at ten or twelve knots an hour to Buffalo, being consigned to one of the great waterside elevators in that city. The vessel is moored alongside the elevator, with its hatches opposite a huge tower-like structure built against its side and extending a story higher than the rest of the building. Inside of the tower and swinging from a hinge at its top is a huge steel-and-timber structure, which is nothing more nor less than our old friend the belt elevator grown to Brobdingnagian proportions. Almost before the ship is alongside and the hatch covers are off, this swinging elevator is moved until its boot hangs directly over the opening into the hold. The boot is extended until it enters the hold and is buried deep in the mass of grain. The elevator leg is some 90 feet in length and it can be raised or lowered some 50 feet if necessary. In a single hour it can lift 15,000 bushels out of the hold and into the elevator.

As the grain reaches the head of the tower leg, it is shot directly into a receiving bin. Beneath this bin is a weighing scale with a hopper of 200 bushels capacity. The scales are set for a certain weight, and the weighing hopper is filled by pulling a lever which moves a slide in the bottom of the receiving bin above. The man who does the weighing is so expert that he can fill the scale hopper with the exact amount, no more nor less, once in every fifty seconds; which he must needs do when the huge marine leg is pumping grain out of the hold at the rate of 15,000 bushels per hour. From the weighing hopper the grain is delivered direct to the storage bin; or if, like our 5,000 bushels, it be destined for transportation across the sea, it will be carried across the building and out again as fast as the railway cars can be found to accommodate it. The cars will carry the grain direct to one of the great grain-exporting seaports, Portland, Boston, Newport News, or New York.

The method of operation at the seaport elevators is similar to that of the Chicago warehouse. The main difference is that, whereas at Chicago the barge steamer lay against the side of the elevator and the grain was delivered directly to the hold through the spout below the open door, it will frequently happen that the grain must be carried several hundred feet out over a pier and there discharged into the hold of the ocean-going steamship. This is done by means of a belt conveyer.

Now, this is not by any means the first time that our consignment of grain has made its acquaintance with the belt conveyer, which has been aptly described as the elevator leg belt stripped of its metal cups and lying upon its side. The belt conveyer is extensively used in the vari-

(*Concluded on page 453.*)

Chicago & North Western Ry.

NEW PASSENGER TERMINAL, CHICAGO—Madison Street Entrance

THE PORTAL OF THE WEST

THE New Passenger Terminal of the Chicago and North Western Railway at Chicago is to be one of the finest monuments ever erected to the commercial life and spirit of the West.

It is to be located between Canal and Clinton Streets, extending from the main entrance fronting on Madison Street, over Washington and Randolph Streets to Lake Street.

More than $20,000,000 is to be expended to provide a railway entrance to the city through which passenger traffic to and from the territory that has made Chicago powerful and rich is to move in ceaseless activity.

Work upon the new station is proceeding with all the rapidity that skill and liberal expenditure can command.

The new station will have a capacity for handling a quarter-million patrons daily.

It is confidently asserted that its provisions for doing this expeditiously and with the greatest comfort will excel anything ever known to the traveling public.

Almost 10,000 miles of railway are included in the marvelous system of the North Western Line. It reaches 2,000 active Western cities, towns and villages included in nine Western States, which are thus placed in immediate and vital touch with Chicago, the Great Central Market.

By traffic arrangements with its connecting lines practically every point west and northwest of Chicago is placed in direct touch with the city, by through passenger train service, and freight shipments are handled with precision and dispatch, consigned through to any one of 9,500 stations, located on 62,000 miles of railway, about one-eighth of the entire railway mileage of the whole world and one-fourth of the railway mileage of the United States.

The North Western Line is the pioneer line west and northwest of Chicago and the Only Double Track Railway between Chicago and the Missouri River. Its service includes

THE BEST OF EVERYTHING

THE NORTH-WESTERN LINE

All Agents sell tickets via this popular route. For tickets, rates and full information address

W. B. KNISKERN,

Passenger Traffic Manager, Chicago, Ill.

RECENTLY PATENTED INVENTIONS.

Pertaining to Apparel.

WAIST AND SKIRT SUPPORTER.—A. M. PRESTON, Broxton, Ga. The objects here are: to provide a supporter which is at once simple in construction, durable and certain in operation: to provide a device which will lie closely and snugly to the form; and to provide a device which is neat and presentable in appearance.

SELF-SUPPORTING STOCKING.—G. GRAHAM, New York, N. Y. The invention relates more particularly to the means employed for supporting a stocking. The upper portion of the stocking is so formed that it in itself constitutes a garter, so that no separate supporting means need be employed. The invention covers any fabric foot covering, as for instance, socks, hose, half-hose, etc.

Electrical Devices.

TROLLEY-POLE CATCHER.—J. H. WALKER, Lexington, Ky. The purpose in this case is to provide a construction in connection with the pole and a lower connection, whereby the pole may be prevented from rising to a perpendicular position when the trolley wheel jumps the wire, and whereby the pole may be held in any intermediate position and may be permitted to freely move in contact with the wire in the operation.

Of Interest to Farmers.

JOURNAL FOR AGRICULTURAL IMPLEMENTS.—A. C. DITMAR, Davenport, Wash. An efficient journal is provided which can be attached to a plow beam or the like for the purpose of revolubly mounting a colter disk or other part, in which the disk can be set at any angle, which will fit any kind of plow, in which the spindle is in a dust-proof boxing, and in which the wearing parts are supplied with lubricant.

ANIMAL COVER.—C. L. HASTINGS, Fond du Lac, Wis. The aim in this invention is to provide a durable cover, which is particularly useful for cattle, by means of which the animal can be well covered, when necessary, which thoroughly envelops the body, leaving the head, neck, and legs free, and in which means are provided to prevent the displacement of the blanket from the rear of the body.

Machines and Mechanical Devices.

FILLING DEVICE.—J. PAPISH, 605 Freeman Street, Valparaiso, Ind. The aim is to provide in this invention, a device by means of which powders, crystals or other granular material can be expeditiously and easily introduced into small-necked bottles and the like, which requires little effort to operate it, and which fills the receptacles without spilling any of the material which is being introduced into the receptacle.

Railways and Their Accessories.

DOOR.—C. B. WHITMAN, Watervliet, N. Y. This improvement in doors is especially designed to be used in connection with street railway cars, and has for its purpose to automatically register the number of passengers entering, and which will permit of the exit without operating the registering mechanism. The movements of the motorman on the platform will not be more restricted than when the usual type of door is employed.

NOTE.—Copies of any of these patents will be furnished by Munn & Co. for ten cents each. Please state the name of the patentee, title of the invention, and date of this paper.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Issued for the Week Ending November 30, 1909,

AND EACH BEARING THAT DATE

[See note at end of list about copies of these patents.]

Accumulator, hydraulic, A. W. French	941,867
Adjustable bracket, J. Knape	941,682
Advertising apparatus, A. Weismann	942,021
Aerial vessel, J. Suter	941,896
Agricultural machine, L. E. Roby	941,465
Air compressor, Olsen & Schroder	941,646
Air compressor or pump, J. Delbridge	941,627
Air conveyer, fresh, E. E. Lamb	941,370
Air heater, G. L. Bryant	941,756
Alloys, producing low carbon, low silicon titanium, F. M. Becket	941,553
Alumina, manufacture of, G. McCulloch	941,799
Aluminum cell reactance, J. J. Frank	941,445
Amalgamator, M. F. Lansdale	941,371
Amalgamator, H. A. Corliss	941,560
Amusement apparatus, J. A. & L. Voller	941,828
Amusement device, R. H. Alexander	941,902
Anchor, M. W. Hall	941,776
Animal trap, J. M. Gunn	941,988
Anode mold, J. F. Miller	941,796
Antiseptic, A. Liebrecht	941,388
Arch and heel support, M. E. Rice	941,464
Armor plate, treating, S. S. Wales	941,477
Auto propeller, E. E. Wilson	941,970
Automatic alarm, W. H. Reiff	941,950
Automatic switch, J. Ma Godoy	942,033
Automobile buffer bar, J. H. Sager	941,654
Axle boxes, means for attaching, E. J. Spahr	941,882
Bag holding device, H. Ihme	941,578
Bag tie, W. H. Morrill	942,007
Bait, artificial, M. A. Burthe	941,911
Bar. See Automobile buffer bar.	
Bar fixture, Schneider & Zeihn	942,014
Barrel heads in place, means for holding, W. H. Decker	941,562
Barrel making machine, E. F. Bengler	941,404
Basin, wash, J. W. Sharp, Jr	941,540
Bath tub seat, J. A. Skogsberg	941,544
Battery jars, lining for storage, A. J. Meier	941,720

(*Continued on page 453.*)

(*Concluded from page 452.*)

ous inland and Great Lake grain warehouses for transporting the grain horizontally from one part of the warehouse to the other. Thus, when the wheat is shoveled out of the railway car into a spout below the open door, it will frequently happen that the transfer takes place at some distance from the particular one of the twenty elevator legs by which the grain is to be lifted to the top of the bin. In this case it will be allowed to fall through onto a broad traveling belt of the kind shown in our illustration, upon which it will move swiftly until it reaches the spot at which it is to be delivered or "tripped." Here the belt will pass over a set of pulleys arranged above one another in such a way that the grain can be shot off the belt for such further handling as may be desired. In this particular case it will be delivered to the boot of the elevator, carried up, and discharged to its own particular bin.

Time saving is a great consideration in these huge warehouses, and one of the most interesting features is the system of swinging distributing spouts, intervening between the receiving and weighing bins at the head of the elevators and the huge honeycomb of storage bins below. One of our views shows these spouts, hinged below the floor of the top story of the building and capable of being swung around and over the top of the particular bin to which the grain is to be delivered. This arrangement is one of many ingenious arrangements by which the enormous mass and weight of grain can be received, weighed, placed in its own particular bin, drawn away therefrom, lifted, transported horizontally, and finally delivered to car or steamship in the least possible time, with unfailing accuracy, and at the minimum of cost.

In the above description we have traced the grain from a farm in the Middle West to the hold of the steamship that would carry it to Europe. As regards the general system of receiving, selling, and distributing the grain, the same methods apply to the wheat which is consigned to the great flour mills, say, of Minneapolis, or to any of the centers in which it is prepared for the consumption of the masses.

CHICAGO AND THE RAILROAD SYSTEM OF THE MIDDLE WEST.

(*Continued from page 447.*)

000 passenger station, that will be ready for occupation early in 1910. With one exception it will be the largest passenger terminal in the United States. Over thirteen acres of ground will be occupied by the station and station tracks. The approaches cover thirty additional acres, fifteen acres being used for the north and the west approaches. The present station, with capacity for handling fifty thousand passengers per day, is now overtaxed; the new terminal will be capable of taking care of a quarter of a million people every twenty-four hours.

The plans call for an elevated terminal, reached by two elevated approaches of four tracks each, and a train shed 800 feet long and 320 feet wide, that will contain sixteen tracks, each with a capacity of fifteen cars. The area of the basement is over two acres; the street floor of the station building covers one and three-quarters acres; the train shed, six acres. Altogether there will be practically ten acres of floor space devoted to public use. One of the most important features is the treatment of the train shed. This structure will not have the usual long black expanse of sooty roof that offends the eye. The sixteen long tracks which will occupy the shed will be covered by what is known as the "Bush roof," in which the curve of the roof over each pair of tracks is broken by a concrete slot or duct, running the length of each track, and so placed that the locomotive funnels will discharge through it into the open air.

The electrification of Chicago steam railways inside of the city limits is at

(*Continued on page 454.*)

Do You Deliver Goods?

"Built for Business"

We have not found a business in which the **Rapid Commercial Power Wagon** does not save money compared with the cost of delivering with horses.

Giving satisfactory service in 52 different lines of business. Saving money for their owners every day.

Rapid Commercial Power Wagons

If you deliver goods in any shape or form, it is not a question of whether or not a **Rapid Commercial Power Wagon** will save you money—it is simply a question of which kind of a **"Rapid"** will best fit your business.

Write us the nature of your business. State how many wagons or trucks you now use and how many men are required on each, and our Traffic expert will send you an accurate analysis showing the comparative cost and the definite saving, between doing business the modern **"Rapid"** way and with the use of horses.

Rapid Motor Vehicle Co.

1112 Saginaw Street, **PONTIAC, MICHIGAN, U. S. A.**

By All Means Investigate

The Lambert Friction-Drive

Before You Buy Any Other Car

There are five models to select from, ranging from $900 to $1700.

Model 36, for five passengers, at $1275, is shown above.

It has a straight line body with a square front dash (very popular in the best 1910 Models).

A wheel base of 110 inches.

A tonneau that appears to have been made for a seven-passenger instead of a five-passenger car.

Twenty-eight to thirty actual horse-power.

Full elliptic springs in rear with semi-elliptic in front, giving to the Car an element of ease rarely found in any but the highest-priced cars.

A positive self-starting device that is added to the regular equipment at slight additional cost.

Full equipment.

For good roads or bad roads, for hills or sand, or big loads, the Lambert Friction-Drive operates with less annoyance, takes hold better and is far less liable to breakage than is the case with any other known form of transmission.

Furthermore, the extreme simplicity of the friction-drive makes it **by odds** the most economical transmission for the motorist. Not only are there no costly gears to replace in case of "stripping," but should the friction-band become worn or injured, it can be replaced for about one-twentieth the cost of new gears.

Send for detailed information.

BUCKEYE MANUFACTURING COMPANY

1814 COLUMBUS AVENUE **ANDERSON, INDIANA**

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A Free Opinion as to the probable patentability of an invention will be readily given to any inventor furnishing us with a model or sketch and a brief description of the device in question. All communications are strictly confidential. Our **Hand-Book** on Patents will be sent free on request.

Ours is the **Oldest** agency for securing patents; it was established over sixty years ago.

MUNN & CO., 361 Broadway, New York
Branch Office. 625 F St., Washington, D. C.

Bearing for trough conveyers, etc., roller, H. Bentley	941,972
Bearing, roller, H. Hess	941,636
Bearings, means for introducing balls into ball, E. Geschke	941,632
Bed, folding, L. B. Jeffcott	941,879
Bed, folding, J. H. Edmonds	941,982
Bed, invalid, J. H. Comer	941,620
Bedstead mount buffing machine, J. F. Gail	941,706
Belt, drive, A. G. Kolbe	941,786
Bench dog, E. A. Schade	941,816
Bill holder, I. H. P. Colleen	941,559
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Binder, Wigginton & Hodges	941,482
Binder attachment, self, E. Pennington	941,945
Binding post, L. Steinberger	941,893
Blind stop, H. L. Beadle	941,552
Boat, C. Hoffman	941,923
Bobbin holder, S. W. Wardwell	941,595
Boilers, engine setting for horizontal, G. W. Morris	941,460
Book, manifolding copying, Whyte & Rau	942,023
Boot and shoe forms, holder for, T. F. McCann	941,723
Bottle caps, device for removing, Forsyth & Wallace	941,865
Bottle closure, Richards & Ahnfeldt	941,651
Bottle neck protector, V. Durand, Jr	941,769
Bottle, non-refillable, E. B. Barner	941,551
Bottle, non-refillable, Jenssen & Weitzel	941,994
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Bottle, telltale, Midbo & Gulbrandson	941,890
Bowling alley pin setting mechanism, L. A. Brigel	941,611
Box or container, J. F. Byrne	941,356
Brake apparatus, fluid pressure, M. Corrington	941,914
Buckle, L. H. Fishel	941,702
Building block, E. Chapman	941,617
Building block and wall, F. J. Schuster	941,656
Buoy, automatic locating, Marcou & St. Peter	941,377
Bushing and check valve, combined reducing, W. S. Jacobs	941,713
Bushing for pulleys, gears, and the like, H. G. Wolf	941,602
Cab signal circuit, P. J. Simmen	941,541
Cabinet, envelop, H. K. Smith	941,756
Cableway, T. S. Miller	942,038
Calculating machines, index plate for, J. Graber	941,774
Calendar, E. C. Mahon	941,719
Camera, I. O. Perring	941,688
Camera, H. W. Conner	941,696
Can cap dropper, E. M. Cobb	941,357
Can closing device, J. H. Pelletier	941,533
Can heading machine, J. Brenzinger	941,755
Canceling machine, letter, L. Blessing et al.	941,848
Candy pulling machine, H. S. Brewington	941,610
Cane, wax-like product obtained from sugar, A. Wynberg	941,401
Canopy frame having doors, W. S. Davidson	941,765
Canopy, ventilating, J. N. Moody	941,685
Car, E. S. Bucknam	941,855
Car bolster, C. H. Anderson	941,691
Car controlling system, electric, A. B. Stitzer	941,391
Car coupling, C. H. Tomlinson	941,965
Car, dump, S. Otis	941,381
Car fender, J. D. Wright	942,027
Car fender, air actuated street, J. M. Clancy	941,497
Car fender, street, A. L. Mazzanovich	941,527
Car fender, street, G. J. Fleissner	941,984
Car for transporting ore or other material, W. C. Carr	941,405
Car, hand, J. D. Kerr	941,420
Car heater, J. F. McElroy	942,040
Car, passenger railway, L. E. Paden	941,807
Car seats, wear strip and retainer for securing coverings to the frames of, F. H. Henry	941,875
Car wheel, motor, G. B. Winter	942,025
Cars or the like, system of precooling fruit, A. Faget	941,443
Carbureter, A. H. Warmsley	941,393
Carbureter, J. H. Cooper	941,406
Carbureter, C. G. Leonard	941,424
Carriage, folding baby, A. W. Loshbough	941,374
Carrier. See Stereopticon slide carrier.	
Cash register, W. H. Muzzy	941,378
Cataloguing system, R. T. Close	941,499
Cement block for wall structure, W. L. Davidson	941,624
Cement, process and apparatus for artificially aging or seasoning Portland, T. A. Edison	941,630
Chair, Berzon & Goldberg	941,555
Chair, C. L. Greilick	941,919
Check controlled mechanism, F. C. Kainer	941,716
Chocolate confections, machine for the manufacture of, A. H. Savy	941,537
Churn, D. Rees	941,948
Cigar, self-lighting, D. G. Vale	941,966
Cigarettes, etc., machine for packeting, E. L. Bracy	941,490
Clamp, D. A. Ducharme	941,504
Clod crusher, C. G. Stelzer	941,740
Clothes line hanger, G. T. Van Riper	941,898
Clothes rack, suspended, B. B. Bosworth	941,909
Clothes wringer, A. Lovett	942,001
Clutch, G. W. Brubaker, Jr	941,973
Coal, briqueting, C. E. Hite	941,454
Coating machines, holder for liquid, R. A. Beausejour	941,607
Coin collector, A. M. Farnsworth	941,509
Coke drag, S. Richter	941,385
Coke oven door, W. O. White	941,398
Collar, H. C. Miller	941,795
Comb, M. E. Purdy	941,586
Composing and casting machine, typographical, Pearce & Billington	941,384
Concentrator slime feeding device, J. B. Green	941,918
Concrete building construction, R. V. Woods	941,837
Concrete construction, metal tie for, E. Chapman	941,616
Concrete mixing machine, R. G. Leverich	941,998
Concrete pavements, laying, F. S. Lamson	941,886
Concrete pile, reinforcer, T. Stedman	942,018
Concrete wall mold, D. A. Marshall	942,004
Containing can, W. H. Hoyt	941,781
Conveyer, F. Eberhart	941,364
Coop, poultry, J. A. Emert	941,507

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present a big problem to Chicago terminal lines and a popular subject with the people and the newspapers. Although an ordinance was passed by the City Council compelling Chicago railroads to provide other than steam power within two years, it is frankly stated by the authors of the ordinance that they appreciate that the work cannot be done within this time, but that they hope to see a start made toward electrification of Chicago terminals. At present the fight is centered on the Illinois Central Railway, the trains of which run along Chicago's otherwise beautiful lake front. The smoke and noise from the frequent suburban trains on the Illinois Central at the city's front door have accentuated the popular demand for a change in motive power.

It will be pertinent just here to give a few facts illustrating the magnitude of the business done by some Western roads, and the punctuality with which it is carried on. Subsequently to an announcement by one of the leading Eastern roads that one of its crack trains between New York and Chicago had been on time during 123 consecutive days, the Burlington route drew attention to the fact that the Denver Limited ran the distance of 1,026 miles into Denver from Chicago on time for 136 consecutive days, and that it was on time 531 days out of 546 days from January 1st, 1908 to June 30th, 1909. That there has been a gratifying improvement in the safety of railway travel is shown by the fact that this company carried over 19,000,000 passengers during the past year and that not a single one of these was killed. A similar creditable record is reported by the St. Paul, the Northwestern, the Santa Fé, the Rock Island, and the Alton roads. The Burlington system alone employs 42,100 officers and men, owns 1,703 locomotives and 52,403 freight cars, carried during the past year 32,379,520 tons of freight, and its receipts amounted to $78,500,000, an increase of about 100 per cent in ten years. Another instance of the volume of business in and out of Chicago by rail is afforded by the Chicago & Alton Railway, which on a mileage of 998.8 miles moved 9,668,927 tons of freight, carried 3,828,056 passengers, and received and forwarded at Chicago 3,749,920 tons of freight.

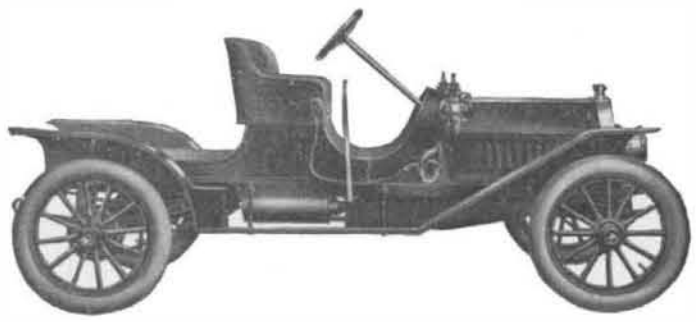
Modern Improvements in Track and Rolling Stock.—The present necessarily brief survey of railroad conditions in Chicago and the Middle West would be incomplete without some reference to the really remarkable improvements which have been made during the past twenty-five years, both in the roadbed and in the rolling stock. The pioneer roads, built when capital was scarce, and extended into countries in which they had to literally create the traffic from which returns upon the investment could be made, were necessarily, if we may be excused the expression, "cut according to the cloth." "Cheap first cost" was the controlling motive of their construction; and the locating engineer was told to lay out his line with as little disturbance of the surface of the ground as possible. Hence, he ran his survey around the hills, or over them by steep grades, instead of through them by cut or tunnel. His line ran down into the valleys, or crossed them by cheap timber trestles. Wood was used in place of costly steel for the bridges over streams and rivers. The ties were frequently laid directly upon the surface of the ground, with practically no ballast beneath them; the steel rail was of the lightest weight which could carry the engines and cars. Twenty-five years ago, fifty tons was the average weight of the engine, and twenty tons was the maximum load for a car. The grades over the mountain were frequently two per cent, and sometimes ran up to three per cent or over, thereby greatly limiting the load which any one engine could haul over a given stretch of land.

With the settlement of the country and the development of the passenger and freight traffic, the various railroad com-

(Continued on page 455.)

The NEW INVINCIBLE SCHACHT

Three Cars In One



NOTE THESE FOUR FEATURES:

FIRST:—**Its price, only $875.** No other car on the market selling at anywhere near this price has the style, the **real automobile** appearance that this car presents. (Most cars at this price belong in the "near-car" class.)

SECOND:—**As a Runabout,** it is an ideal car for the business or professional man, or the farmer who wants a light, handy car for business purposes or cross-country trips.

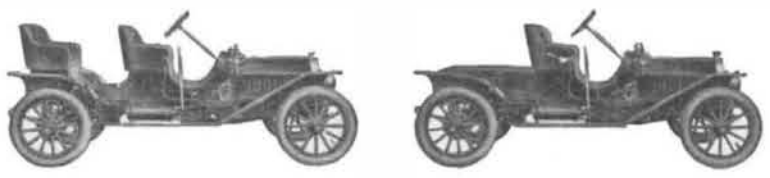
THIRD:—**With surrey-seat attachment** it supplies a roomy four-passenger family car **with no extra cost.**

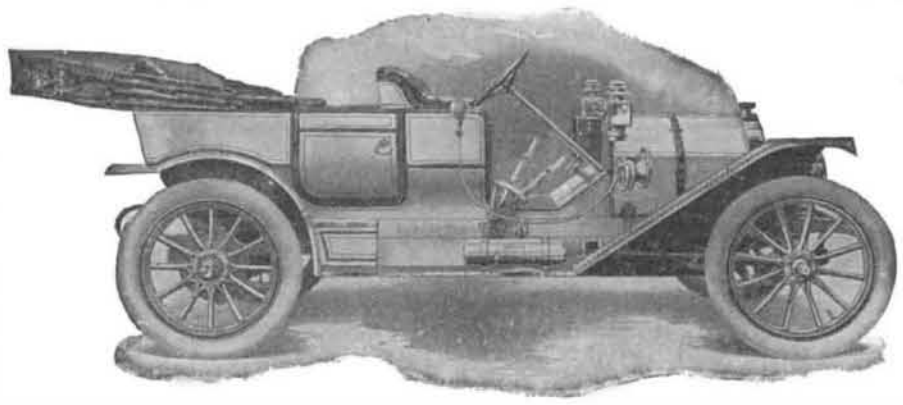
FOURTH:—**With parcel delivery attachment** it becomes the handiest **general utility** car on the market, and will be a big favorite with merchants and farmers who have constant use for a car of this type.

Let us send you additional information about this excellent, **general utility** car.

SCHACHT MANUFACTURING COMPANY

2700 SPRING GROVE AVENUE **CINCINNATI, OHIO**





You will Buy this Haynes Model 19—$2000
If you want Known Quality Without Fancy Price

It is an innovation in automobiles.

No other manufacturer has ever attempted to give so much of real **tone** in a car selling at this price, and the payment of **a thousand dollars** more cannot buy a nicer-running engine or an easier-riding car.

It is the **only** car of **established reputation** selling at a moderate price.

HAYNES

A ride in it will be a revelation to you—especially if you have owned other cars. Its flexibility, the power of the engine, the resiliency of the springs, the upholstering—all are of the character that you would expect **only** in cars carrying a much fancier price.

Some idea of the attitude of both automobile dealers and the public respecting **a Haynes at $2000** can be gathered from the fact that dealers bought up our entire output of 1910 cars **within thirty days** after our first public announcement, and inquiries from over six thousand interested parties have been received. If you contemplate buying a car **of real worth,** we recommend that you communicate either with us or local agents **without delay.**

Haynes Automobile Company, 124 Main St., Kokomo, Indiana

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Cord terminal, F. Parsons 941,808
Corn husking implement, S. B. Dykes 941,505
Corn sheller, W. J. Moore 941,798
Cornice brake, G. C. Keene 941,783
Couch and bed, convertible, L. B. Jeffcott 941,878
Couch, electrovibratory, W. A. Church 941,673
Cradle, C. H. Johnson 941,927
Cream separator, centrifugal, P. L. Kimball 941,881
Cream separators, drum for centrifugal, J. & A. Persoons 941,809
Crib, J. B. Stalter 941,429
Crushing machine, flexible, H. E. Gregg 941,710
Cue, R. J. Preast 941,728
Cultivating machine, Koszegi & Szechenyi 941,422
Cultivator, G. M. Roper 941,589
Cultivator, J. Hobson, Jr. 941,678
Current apparatus, alternating, W. Stanley 941,467
Current collector, underrunning, S. B. Stewart, Jr. 941,390
Current meter, alternating, W. Stanley 941,469
Currents, means for rectifying single-phase, J. L. Woodbridge 941,599
Cutter bar, E. J. Wolfvom 941,400
Cutting tool for applique work, W. Vogel 941,967
Cycle, motor, J. E. Allen 941,903
Dashboard brace, F. H. Hosay 941,711
Dental engine handpiece swivel, A. W. Browne 941,612
Dentistry, M. R. Koons 941,718
Die cutting machine, D. P. Robinson 941,953
Display cabinet, L. W. Welch 942,022
Display rack, inclosed, W. K. Williams 941,483
Display sheets or curtains, frame for, L. C. Davidson 941,622
Distilling wood alcohol and other products, apparatus for, B. R. & M. J. Lyster 941,641
Distributing machines, apparatus for the control and the registration of the operations performed by, G. I. F. Soulage 941,892
Door check, C. L. Butler 941,492
Door check, R. W. Hubbard 941,782
Door closer, W. W. Bjorling 941,907
Door fan attachment, J. N. Hatcher 941,921
Door fastener, B. B. Fairman 941,771
Door fastener, sliding, J. McAllister et al 941,379
Door hanger, W. D. Thompson 941,664
Door, revolving, Clymer & Deffen 941,619
Door, revolving, C. J. Cruyge 941,699
Door stop, W. La Baw 941,885
Doors, automatic control of water-tight, W. L. Merrill 941,428
Dosing device, liquid tight, E. M. Bajon 941,905
Doubling apparatus, P. E. Donner 941,700
Draft applience, F. M. Smiley 941,545
Draft device, C. P. Hansen 941,920
Drawing instrument, C. C. Page 941,687
Dredger, caisson, R. A. Gardner 941,869
Drill and stay bolt cutter, combined, F. Fleming 941,568
Drive, four wheel positive, O. A. Goodrich 941,514
Drying apparatus, hair and fur, E. Deslot 941,980
Drying sheet material, apparatus for, C. E. Moss 941,721
Dyeing wool, H. Winslow 941,399
Egg separator, Heatherington & Long 941,415
Elastic connecting strap, J. J. Shea 941,659
Electric appliances, attachment for, H. W. Denhard 941,979
Electric cable terminal, C. W. Davis 941,859
Electric cell or battery, primary, A. Heil 941,416
Electric circuit controller, H. W. Leonard 941,425
Electric circuits, means for controlling, G. W. Hart 941,777
Electric furnace, C. A. Keller 941,419
Electric furnace for gas reactions, Dieffenbach & Moldenhauer 941,768
Electric machine, dynamo, F. B. Howell 941,456
Electric machines, cross connection for dynamo, R. Siegfried 941,388
Electric meter, F. M. Vogel 941,436
Electric meter, P. C. Morganthaler 941,459
Electric meter, W. Stanley 941,468
Electric switch, F. W. Smith 941,660
Electrical apparatus, wall cabinet for, E. R. Le Manquais 942,002
Electrical cable terminal, C. W. Davis 941,860
Electrical distribution system, R. J. Dearborn 941,362
Electrical distribution system, P. M. Lincoln 941,372
Electrical distribution system, J. L. Woodbridge 941,600, 941,601
Electrical distribution system, W. E. Winship 941,690
Electroplating apparatus, L. Potthoff 941,535
Elliptic spring, H. Jeffrey 941,521
Embossing appliance, L. H. Orr 941,632
Emulsion, producing a mineral oil, S. Knopf 941,785
Engine. See Internal combustion engine.
Engine piston head, A. Starke 941,737
Engines, muffler cut-out for explosive, L. Raffalovich 942,011
Engines, spark timer for internal combustion gas, O. L. Brainard 941,556
Envelop, L. C. Van Riper 941,392
Envelop, R. Landenberger 941,525
Envelop, P. Forschler 941,924
Exhibiting apparatus, S. E. Moscovitz 942,008
Fan, L. J. Wing 941,834
Fastener, J. A. Simpson 941,542
Fastener, C. A. Conrard 941,977
Faucet for cheese apparatus, J. Brensike 941,694
Fence post staple, J. Darling 941,978
Fender or trolley wheel guard, J. A. MacMahon 941,790
Fertilizer distributer, G. E. Alphin 941,603
File box, Keck & Doin 941,681
Film frame apparatus, B. Day 941,500
Finger pad, J. G. Marsh 942,003
Fire hose coupling, H. J. Hickey 941,990
Fire arm, S. B. Smith 941,662
Fishing rod, W. A. Austin 942,030
Flower pot holder, A. Haglund 941,448
Fluid motor, A. Mill 941,582
Fluid pressure brake, W. P. A. MacFarlane 941,684
Fluid pressure regulator, B. H. Petley 942,042
Flushing device, basin, E. Kuhn 941,997
Folding machine, E. D. Wallace 941,747
Frame, L. B. Stetson 941,894
Freezer, G. F. Dickson 941,767
Fuel, artificial, R. W. Howell 941,577
Fuel feeding apparatus, R. Putnam 941,587
Furnace, L. Whittaker 941,480
Furnace, M. W. Sewall 941,657, 941,658
Furnace bridge walls, protecting cap for, J. R. Fortune 941,569
Furnace grate, F. Girtanner 941,572
Furnaces, smoke consuming attachment for, W. P. Choitz 941,496
Gage, R. Atkinson 941,843
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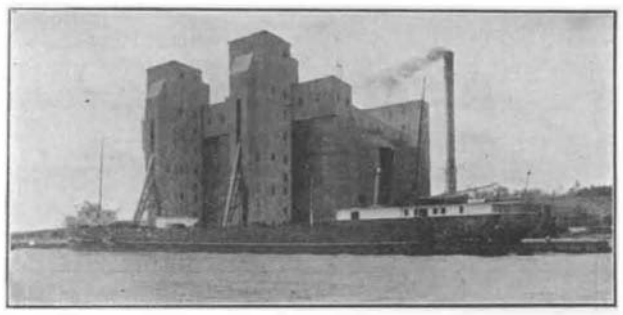
Game apparatus, A. De Meurisse 941,793
Gang edger, U. Anderson 941,751
Garment hanger, W. F. Freeman 941,510
Garment support, movable, L. G. Dodge 941,501
Garment support, movable, L. G. Dodge, et al 941,502
Garment supports, guard for rotary, S. D. Young 941,669
Garment supporter, S. Kopps 941,787
Gas burner, J. Weintz 941,437
Gas burner, B. A. Geurink 941,708
Gas escape, H. H. Fulton 941,917
Gas kiln, E. Schmatolla 942,013
Glases, apparatus for cleaning, Ahlen & Siebert 941,841
Gearing, change speed, F. D. Pouch 941,727
Gearing, friction, G. H. Chisholm 941,856
Glass etching machine, A. B. Knight 941,883
Glass, machine for making wire, J. I. Arbogast 941,842
Glass, method of and apparatus for drawing continuous sheets of, E. Fourcault 941,866
Glass, method of and means for manufacture of window, R. L. Frink 941,512
Glass molding machine, W. J. Miller 941,935
Glass molds, construction of, F. M. McKernan 941,584
Glazing tile, brick, or the like, F. E. Goldsmith 941,635
Governor, fly ball, M. Haeberlein 941,775
Grain treating apparatus, E. Sorenson 941,821
Grates, shaker for fire, Zuech & Diemer 942,029
Grating, screen, screen door construction, and the like, E. McClure 942,039
Grease or lubricant cup, G. W. Bowen 941,849
Gun support, C. O. Lawson 941,640
Guns, range keeper for, Dawson & Horne 941,626
Gymnasium horse, A. J. Thornley 941,665
Gyve, F. C. Nagle 941,942

(Continued on page 456.)



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DESIGNERS AND BUILDERS OF

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(*Concluded from page 455.*)

Southern Pacific, and on the level it would be capable of hauling a train weighing 10,000 tons and carrying about 7,000 tons of freight at a speed of ten miles an hour.

CHICAGO'S SIXTY MILES OF FREIGHT SUBWAY.

(*Continued from page 448.*)

not even excepting New York. The many trunk railroads which center in Chicago have done their best to shorten the haul to and from the freight terminals and the various business houses, for if one looks at a map of Chicago it will be seen that these terminals are located in the very heart of the city, and that they have reached a point beyond which, because of the high value of land, they cannot possibly go.

The credit for the solution of the problem of freight distribution is due to Albert G. Wheeler, who several years ago applied to the City Council for a franchise on behalf of the Illinois Tunnel and Telephone Company for the construction of a system of tunnels which should be used for the transmission of "sounds, signals, and intelligence by means of electricity or otherwise." The franchise was granted and work was commenced in a very unostentatious manner, the necessary capital being found by private parties. The lines as now completed extend from Armour Avenue and Archer Avenue on the south to Chicago Avenue and Kingsbury Street on the north to Green Street on the west. The greater part of the sixty miles of tunnel is six feet in width and seven and a half feet in height, but there are also trunk tunnels which are twelve feet in height and vary in width from ten to fourteen feet. It was stipulated that the floor of the tunnel should be about forty feet below the street level, and as it is generally seven and a half feet high, it follows that the tunnel roof is about thirty-three feet below street level. By constructing the system at this depth all interference with the water and gas pipes and sewers of the city was avoided, and sufficient room was left for the construction of a complete passenger subway system between the street surface and the tunnel whenever the city should be prepared to take up such a work.

It was stipulated in the franchise that the tunnel must be built below the center line of the streets, and this has been done. In prosecuting the work, shafts were sunk, as a rule, in the basements of various buildings, which were rented for the purpose of the tunnel company; and these basements were used for mixing the concrete and for installing the air-compressing plants which supplied the necessary air at ten pounds pressure for the pneumatic system under which the whole work was prosecuted. From the shafts above mentioned the workmen drifted out to the center of the street, where the work of excavation was carried on in opposite directions. In the earlier years of construction the material was hoisted to street level, loaded into contractors' carts, and hauled to the dumping ground on the lake front; this work being done entirely in the night time, to avoid any interference with the already crowded traffic of the day time. In later years the dump cars have been run to the surface by means of an incline and hauled by electric locomotive to the lake front,

(*Continued on page 457.*)

2 H.P. Detroit Engine $29.50

Other sizes at proportionate prices in stock ready to ship. Single cylinder engines, 2 to 8 h. p.; double cylinders 8 to 20 h. p.; Four cylinder 50 h. p. Engines start without crank. No cams, no sprockets, only three moving parts. All engines counterbalanced. No vibration. Special fuel injector burns gasoline, kerosene, coal oil, alcohol, naphtha distillate. Plastic white bronze bearings (no cheap babbitt used.) Crankshaft drop forged steel. Bearing surfaces ground. Adjustable steel connecting rod. Waterproof ignition system. For your launch, sailboat, rowboat, stern wheel boat, or railroad track car. 20,000 satisfied users, free catalog and testimonials. Demonstrator Agents wanted in every boating community. Special wholesale price on first outfit sold.

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THE AUTOMOBILE NUMBER of the SCIENTIFIC AMERICAN

On January 15, 1910, the Scientific American will issue its

ANNUAL AUTOMOBILE NUMBER

this year bigger and even better than it ever was.

It has been our purpose in publishing this annual review to give the automobile owner and the prospective purchaser truly helpful information, and to that end the number will contain the following articles:

1. The Automobile and the Farmer.

An article that shows what the automobile can do and what it is doing for the farmer, in carrying produce to market.

2. How to Overhaul Your Car.

An article that instructs the reader specifically how he should take down, examine and put a machine in first-class condition for a season's work.

3. The Automobile Fire Engine.

All the latest automobile pumping engines, chemical cars, hook and ladder trucks, and hose carts are described.

4. The Automobile and the Road.

The automobile has presented to the road engineer new problems for solution. He must render his roads impervious to water and practically proof against the destructive effect of tires. The United States Government through the Office of Public Road Inquiry is now studying this subject. The article written by Mr. Page, Director of the Office of Public Roads, describes what has been done.

5. Anti "Joy Ride" Devices.

This article is a complete description of devices which have been invented for the purpose of preventing chauffeurs from taking out their owners' machines.

6. The Modern Electric Automobile.

A safe, sane, impartial account of the improvements which have been made in the electric pleasure vehicle and which are destined to stimulate the demand for an inexpensive, clean, smooth-running automobile.

7. Making Your Own Repairs.

In this article the handy man is told how he can circumvent the garage keeper by making his own repairs. Simple mechanical drawings elucidate the text.

8. The Cars of 1910.

Illustrations of the chief cars of 1910, with their leading dimensions and characteristics. A bird's eye view of the entire automobile field for the man about to purchase a car of any price.

9. Automobile Identification Chart.

Sometimes you have wondered what make of car was that which skimmed past your admiring eyes. The 1910 Automobile Number will enable you to identify any car by its radiator and engine bonnet. About thirty-five automobiles are thus illustrated for identification in a sketchy, artistic way.

10. The Inexpensive Car.

Any man with a good salary can now afford to own some kind of an automobile. How the machines are constructed and what may be expected of them is lucidly set forth.

11. The Wonderful Rise of the Automobile Industry.

How the motor-car industry grew from nothing to an industry capitalized at many millions, how the scene of its manufacturing activity has shifted from the East to the Middle West, and how the American car is gradually displacing the imported machine.

12. Automobile Novelties.

In this article inventions are described which increase the reliability of the automobile.

Order from your newsdealer or from

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Hair tonic, S. Tsorones	941,434
Harvester reel support, J. A. Scanland	941,655
Hasp lock, A. J. French	941,511
Hat, felt, E. L. Wales	941,746
Hats and other head coverings, sweat band for, J. W. Kolsch	941,717
Hatch cover and operating means therefor, L. D. Lovekin, et al.	941,526
Heat retainer, F. H. Daniels	941,858
Heater. See Air heater.	
Heater, Bowman & Becraft	941,910
Heating and melting furnace, W. N. Best	941,609
Hinge, invisible, H. R. Canfield	941,672
Hitching and steering device, L. B. McAlpine	941,939
Hoisting appliance, I. C. Moulton	941,722
Hollow bodies, means for extruding, A. P. Hine	941,365
Hopper and soil pipe cleaner, extension, W. H. Cloak	941,558
Horse boot, R. H. Smith	941,819
Horseshoe, T. L. Randall	942,012
Hose coupling, air, F. W. Rock	941,652
Hose coupling, expansion, H. C. Bostian	941,355
Hose rack, G. F. D. Trask	941,410
Hot water house heater, M. A. Wilcox	941,597
Hub attaching device, C. C. Swanson	941,470
Hydraulic jack, E. A. Gathmann	941,870
Hydraulic separator, W. F. Smith	941,663
Ice-making apparatus, D. J. Havenstrite	941,414
Indicator, A. J. Border	941,354
Indicator, H. E. Golden	941,872
Induction furnace, M. Unger	941,435
Insect destroyer, A. Swainson	941,742
Instrument and medicine case, C. B. Benson	941,608
Insulating bodies, producing, Noodt & Gottsche	941,585
Insulating coverings for electric conductors, Phillips & Hutchins	941,810
Internal combustion engine, R. Lucas	941,376
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Jar closure, J. Schies	941,538
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Journal box, L. K. Smith	941,661
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Keyless socket, C. D. Platt	941,811
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Lamp operating device, vehicle, J. P. Stein	941,739
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Lantern, signal, J. J. McIntyre	941,803
Last, H. F. Loewer	941,373
Last, shoe, A. C. Hayden	941,451
Latch bolt for doors, J. R. Potts	941,689
Lathe, L. H. Vold	941,475
Lathe, C. D. Fischer, Jr.	941,701
Leaf holder, loose, E. E. Tait	941,963
Leather staking machine, A. C. Brill	941,851
Ledger, loose leaf, H. F. Bushong	941,757
Level, M. Ichtertz	941,368
Life saving apparatus, M. A. Mueller	942,009
Loading and unloading device, T. Fullbright	941,571
Lock, Foster & Dreska	941,570
Locks and latches, safety guard for, G. E. Hosch	941,877
Locomotive ash pan, F. L. Roberts	941,815
Locomotive track sander, H. L. Lambert	941,457
Loom let off mechanism, J. Northrop	941,380
Loom picking motion, W. H. Ayer	941,844
Lymph, making preventive and curative, S. Krafft	941,423
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Manhole cover plate, E. Oldman	941,531
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Manure spreader, Littlefield & Garst, reissue	13,047
Match scratcher, G. A. Barnes	941,487
Measuring apparatus, G. A. Cowen	941,359
Measuring apparatus, hat frame wire, W. M. Jameson	941,637
Measuring instrument, optical distance, F. Dubenhorst	941,503
Mechanical movement, R. T. Johnston	941,639
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Merry-go-round, C. W. Ott	942,041
Merry-go-round, Powell & Miller	942,010
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Meter, W. L. Gumprecht	941,573
Milk pasteurizer and cooler, W. R. Thatcher	941,964
Milking machine, K. I. Lonstrom	941,789
Miter clamp, J. L. Taylor	941,825
Mixing machine, O. H. Weckesser	941,830
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Musical instruments, note accenting device for, T. P. Brown	941,491
Negative developer, J. S. Miller	941,643
Net frame, landing, F. M. Spiegle	941,961
Nozzle, regulating, W. A. Doble	941,440
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Nut lock, W. W. Senn	941,959
Oar rack, E. G. Hodgkins	941,779
Oil burner, J. Weintz	941,479
Oil burner, J. N. Young	942,028
Optometer, J. H. Martin	941,581
Optometer, H. L. De Zeng	941,766
Ore separating or concentrating apparatus, G. F. Godley	941,634
Ores, treating certain, H. S. Auerbach	941,904
Oven door, bake, J. M. Hoepfl	941,780
Package tie, G. L. Hindman	941,780
Packing machine, F. Rassino	941,444
Packing material, L. H. Baekeland	941,605
Packing, piston rod, A. J. West	941,394
Packing ring, piston, T. H. Renaud	941,536
Packings, lap joint for, J. T. Wilson	942,024
Pad. See Finger pad.	
Pail, dinner, W. A. Edwards	941,915
Paper making apparatus, W. H. Decker	941,561
Paper making machine, J. A. White	941,968
Paper making machine cleansing device, A T. Wyant	941,750
Paper package, toilet, G. T. Johnson	941,715
Paper receptacle, C. F. Jenkins	941,992
Paper sheets together, machinery for separating, feeding, and cementing, W. Fricker	941,868
Paste to cardboard, etc., machine for applying, J. McKibbin	941,530

(*Continued on page 457.*)

(*Continued from page 456.*)

where already an addition has been made to the area of the city's park of about twenty acres. As the average fill is forty feet in depth, it can be understood that, had this enlargement been made by the city itself, it would have cost about $600,000.

The system is operated entirely by electricity, and the equipment consists at present of 175 motors of the Jeffrey and the General Electric types and 3,502 cars. There is a telephone installed on every block, and the movements of the trains are directed entirely by this means.

Although the wording of the franchise would indicate that the tunnels were to be constructed primarily for the installation of telephone and telegraph lines, it will be understood that the greatest revenue-earning power will be derived from the transportation of freight. It is estimated that about one hundred thousand tons of freight are hauled through the streets of Chicago each day; and if the tunnel company should haul only one-third of this, the total for the year would amount to over ten million tons. Hitherto no great effort has been made to push this branch of the business; but now that the system is about completed, it is expected that full connections will be made with the various business houses, and great increase in traffic will follow. Connection between the various warehouses and the tunnels is made by sinking a shaft and equipping it with electric elevators, which run from the track level below to the particular floors of the warehouse upon which the freight is to be delivered. In the case of a big warehouse, such as Marshall Field & Company, the loaded cars are hoisted to the desired floor, unloaded, loaded with the outgoing freight, returned to the tunnel, and drawn to the particular railroad freight station desired. It will not, of course, be possible to have direct connection between warehouse and tunnel in every case, and hence central depots will be provided at various suitable locations throughout the city, so placed that the average haul by team will not amount to more than one or two blocks. One immediate advantage of the system is that the wholesale houses are now able to carry on business throughout the twenty-four hours of the day. Under present conditions, after the teams have gone home for the night, the goods that are ready for shipment have to wait until the following day; and at busy seasons of the year it is not unusual for a delay of several days to occur. By using the tunnel system, the merchant can make immediate shipments of his freight, whether it consists of one truckload or fifty.

The tunnels will serve many useful purposes outside of that of transportation of merchandise. One of these, and a very important one, is that of the hauling away of material from the excavations for buildings within the city. Hitherto, this has been done by teams upon the surface; but the present method is to run a steel chute from the excavation down to the tunnel on an angle of about forty-five degrees. The workmen wheel the material to the mouth of the chute, and dump it; and it is received and drawn away by cars, which are successively moved below the mouth of the chute in the tunnel. When a train has been made up, an electric locomotive hauls it to the dump on the lake front. By this method as much as 2,100 cubic yards of material has been removed from the basement of a single building in one day. The best that has ever been accomplished by teams in the same time is 420 cubic yards. Another important service rendered is that of bringing coal to the boiler plants of the various houses and the hauling away of ashes and other refuse.

In no direction has the tunnel proved more successful than that of the transportation of mail. A twelve by thirteen-foot subway has been constructed below the United States Post Office building, ex-

(*Concluded on page 458.*)

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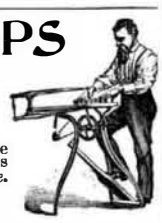

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