

## Chicago and the Railroad System of the Middle West.

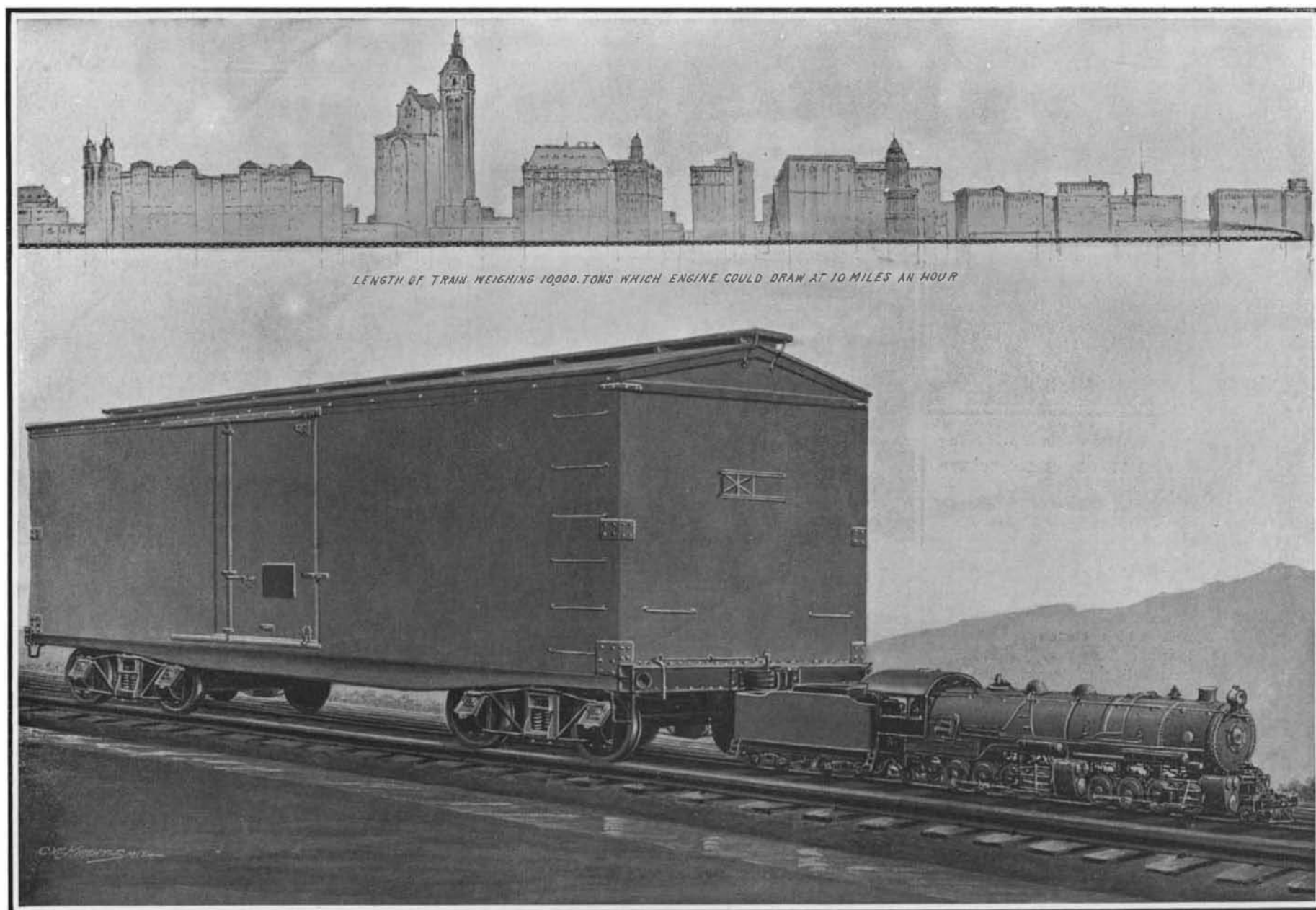
**THE CAPITAL OF THE MIDDLE WEST.**—When the first American settler, John Kinzie, the Indian trader, established himself at the mouth of the Chicago River in the year 1803, he little imagined that he was responsible for the beginnings of one of the greatest cities in the world, nor did he know that he had accidentally hit upon the very spot which, by virtue of its geographical location, was destined to become the greatest railroad center in the world. On the other hand, to do justice to this first settler, it should be mentioned that the spot which he chose for the home of himself and family was a center, even at that early day, well adapted for such trade as came his way; for as far back as the early days of French exploration, the Chicago river formed part of a line of travel by which the Indians reached the Mississippi River. By journeying up the river and its south branch, a portage of some four or five miles brought the Indians

nois and Michigan Canal, and the State was granted alternate sections of land on both sides of the canal route. The commissioners proceeded to lay out towns, one of which was Chicago, which was located at the eastern terminus of the canal. The lands were thrown open for purchase in the year 1830. Buildings were erected, and a movement of settlers at once commenced, chiefly by way of the lakes and largely from New York and the New England States. In 1833 Congress made an appropriation for a harbor at Chicago; a channel was cut through the sandbar at its mouth; and in 1834, for the first time, a schooner sailed up the river. Three years later the town was incorporated as a city with a population of 4,170.

The canal failed to fulfill the high hopes with which it had been constructed, and indeed it was not finally completed until the year 1848; but a new method of transportation was at hand, which was destined to do for Chicago and the surrounding country all and far more than had ever been promised by the canal. In the year 1847 the first mile of railroad (running toward Galena, Ill.) was commenced, and three years later there were forty-two miles of connecting lines. In February of 1852 the city was connected with the

population had more than doubled, the census of 1890 showing 1,105,540. In 1900 it had grown to 1,698,575 souls; and the city's area, which in 1837, the year of its incorporation, was 2.55 square miles, had increased to 190.638 square miles. To-day the population of Chicago is estimated to be 2,572,900, and the assessed valuation of all taxable property is \$477,921,976.

**CHICAGO THE GREATEST RAILROAD CENTER IN THE WORLD.**—It takes but a look at the railroad map of the United States to understand why Chicago is to-day, and has been for many years, the greatest railroad center in any country. Situated at the southern end of Lake Michigan, which projects far down into the great empire of the Middle West, it not only intercepts all the great trunk railroads, which reach with their connections from the Atlantic to the Pacific, but it forms a natural meeting and transfer point for those products of the West, which seek the advantage of water transportation to and from the East afforded by the chain of Great Lakes. In the opening up of the vast unoccupied regions of the West and Middle West, Chicago, in common with St. Louis, formed a natural starting point for the pioneers and immigrants who were seeking to better their fortunes in a new and undeveloped



This huge Baldwin freight engine, weighing 300 tons, was built for the Southern Pacific Railroad. It is capable of hauling at 10 miles an hour a train of 100 cars weighing, with load, 72 tons each. The train, weighing 10,000 tons, would reach for over a mile or, say, from City Hall Square to the Battery, New York. The lower cut represents the size of a single car, 200 feet by 45½ feet by 62 feet, that would be necessary to contain the load of wheat handled.

### THE MOST POWERFUL FREIGHT ENGINE AND THE LOAD IT CAN HAUL.

across the divide, and enabled them to launch their canoes on the Des Plaines River, down which they could pass to the Illinois River and so to the great Mississippi. It is interesting to note in this connection that the Chicago Drainage Canal, a splendid waterway 22 feet deep and from 110 to 202 feet wide, follows approximately this old Indian trading route.

Whether or no John Kinzie had any conception of the great strategical importance of the place which he had selected to make his home and drive his bargains, subsequent history has shown that this lonely spot in the remote wilderness was destined to become the greatest meeting and distribution point of that wonderful network of railways which has grown up so rapidly over the whole face of the United States. On the opposite bank of the river from the Kinzie home the United States government located Fort Dearborn, a mere stockade containing two blockhouses, the first garrison of which consisted of one company of infantry of the First Regiment. The settlement at Fort Dearborn made but little growth until after the war of 1812, and in 1830 it consisted of a hamlet of log houses tenanted by less than one hundred people. In 1827 Congress authorized the construction of the Illi-

East by the Michigan Southern Railway, and in the following May by the Michigan Central. The effect upon the growth of population was instantaneous. Although between 1837, the year of its incorporation, and 1840 the city had increased only from 4,170 to 4,479 in population, the inception of railroad construction proved such a powerful stimulus, that by 1850 Chicago had a population of 28,269; by 1860, of 109,206; and by 1870, of 306,605. Then, in 1871, came the Great Fire. That terrible disaster, by all the logic of human events should have dealt a death blow to the city, or at least have retarded its growth for many a decade to come. Three and a third square miles of the city were swept out of existence, and property valued at \$187,000,000 was destroyed; but so far from checking the growth of Chicago, the disaster served merely to demonstrate the latent resources of the city, and the unbounded faith both of its people and the country at large in its future destiny. The wreck of the wooden city was quickly swept away, and within two years the burned area was covered with buildings of the most modern type; furthermore, nine years after the disaster Chicago had passed the half million mark with a population of 503,298. In the next ten years, the

country. In this work of development, the railroad was always the predominant factor. Starting from Chicago, lines began to radiate out over the wide and fruitful areas of the great Mississippi Valley, across the vast prairies, which awaited only the plowshare and the husbandman to develop their latent fertility; and into the far-distant Rockies, where lay hidden a vast store of mineral wealth. On the other hand, the eastern railroads, as they pushed their way across the range of mountains which separates the older eastern States from the great Middle West, naturally laid their course for Chicago as the natural point of connection with the rapidly extending railroad systems of the West. Meanwhile, the discovery of gold in California, and the increasing enlightenment as to the natural resources in timber and agricultural land of the country lying between the Rocky Mountains and the Pacific coast, had led to an extensive immigration by sea and overland into that country. Railroads were built upon the Pacific coast; and it was not long before the systems of the Middle West began to push boldly through the Rocky Mountain range, with a view to securing transcontinental connections. The completion of the first road of this character, the Union Pacific, was fol-

lowed by the building of the Northern Pacific, the Atchison & Santa Fé, the Great Northern, and this year the Chicago, Milwaukee & St. Paul completed its trans-continental connection. Meanwhile, a great north-and-south route was being built in the Mississippi Valley, which ultimately developed into the present Illinois Central Railway, by which direct communication is afforded from Chicago to the Gulf.

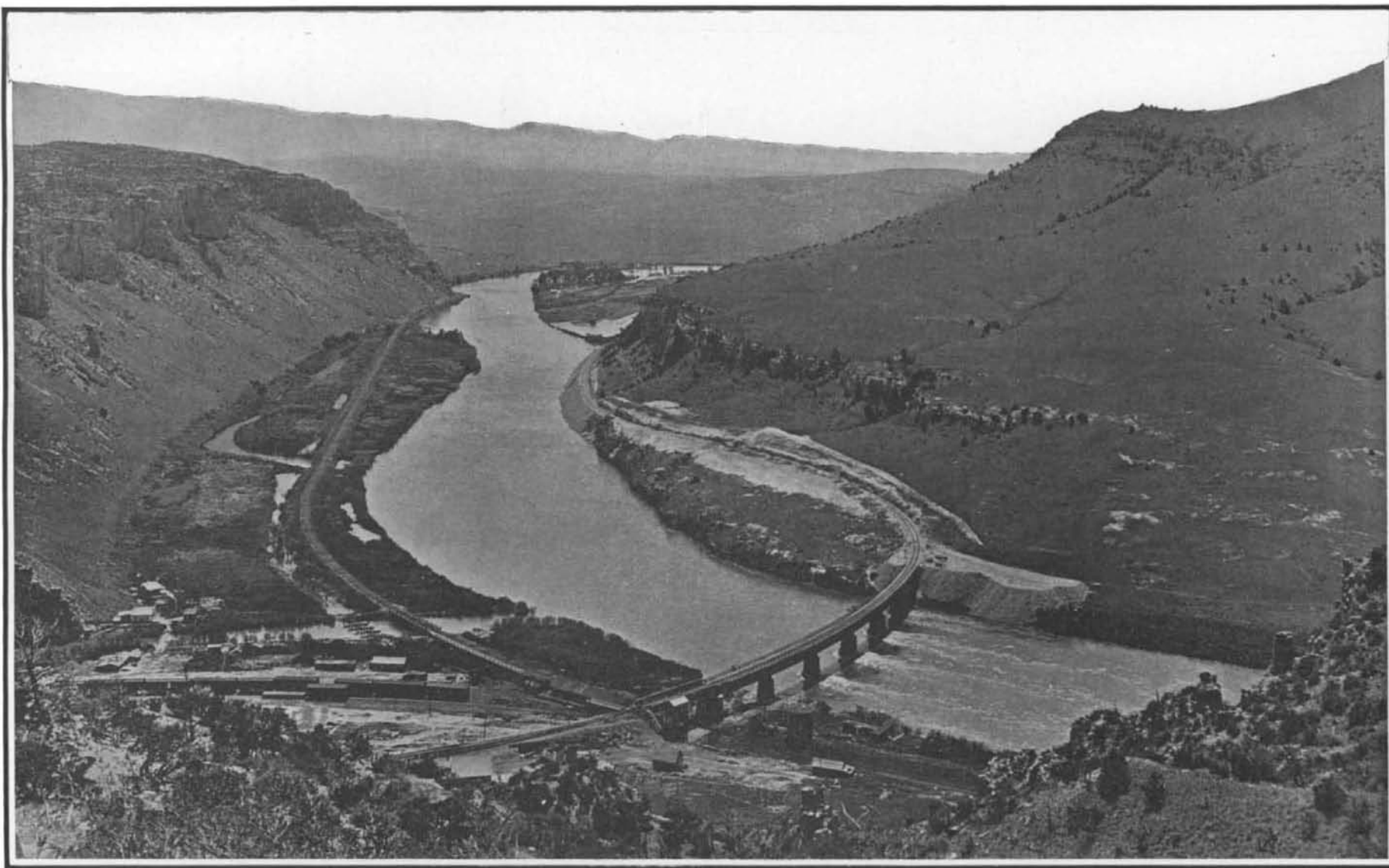
It is impossible within the limits of the present article to enter into the history of the development and growth of the complicated network of railroads which is directly tributary to Chicago; but the claim of the city to be the leading railroad center is suggested by the following table, which gives the number of through and suburban trains into and out of Chicago and the name and mileage of the various tributary roads. It will be seen that out of a total mileage of about 225,000 miles of the whole of the United States, nearly one-half, or 100,123 miles, is directly tributary to the city, and that, over these roads, a total of 1,294 trains enter and leave the city daily:

RAILWAYS TRIBUTARY TO CHICAGO.		
Number of Trains In and Out of Chicago.	Name of Railway.	Mileage.
Thro. urban.		
19	Atchison, Topeka & Santa Fé.....	9,976
10	Baltimore & Ohio .....	4,447
29	Chicago & Alton .....	998

RECEIVING AND DISTRIBUTING THE FREIGHT.—Elsewhere in the present issue we have spoken of the productiveness of that great empire of the Middle West of which Chicago is the capital. Spread out over the twelve States, which in government reports are known as the North Central Division of the United States, with their area of 753,550 square miles, and their population of over 30,000,000, are between 85,000 and 90,000 miles of track. Within this area is more than one-half of the wealth invested in improved farms in the United States, and over one-half of the live stock and neat cattle. It produces 78 per cent of the total food products and more than one-half of the butter, cereals, potatoes, and poultry that are raised in the entire country. Although distinctly an agricultural district, it is rapidly moving forward to its ultimate position as the leading manufacturing center. Already it possesses 190,000 manufacturing establishments, representing an invested capital of over \$3,000,000,000, which pay out annually between \$700,000,000 and \$800,000,000 in wages, and the value of whose annual products is about \$4,500,000,000, or about 35 per cent of the value of the products of the whole country. As far back as 1905, the total output of bituminous coal was 81,000,000 tons, or over 33 per cent of the total amount of bituminous coal mined in the United States. That Chicago is the center to which the products of the West and Middle West are carried for distribution and reship-

the track communicates by switches with scores of parallel tracks, on which the separate trains are made up. This railroad is a complete organization in itself, possessing its own locomotives, train hands, and office staff; and the system of distribution is probably the most efficient of its kind in the world. In this connection it is interesting to note that within the limits of the city of Chicago are more miles of railroad track than some States contain within their borders. Altogether 2,494.59 miles of track are owned by eighteen of the twenty-six lines which center in Chicago.

CHICAGO'S SIXTY MILES OF FREIGHT SUBWAY.—The Illinois Tunnel Company owns and operates sixty miles of subway for freight traffic under the business heart of Chicago. Connections are made with all of the principal freight and passenger stations of the city, and with the docks on the three branches of the Chicago River. There are also connections with the basements of many of the leading wholesale, retail, and manufacturing industries of Chicago. A disposal station is situated on the west bank of the Chicago River, from which vast quantities of excavated material, refuse, and other waste are loaded on scows and transported to final dumping grounds away from the city. The direct connection of the freight subway and this disposal station saves hauling through the streets of Chicago thousands of tons of waste material. The tonnage of freight handled to and from the railways through the



This line, the latest to be constructed to the coast, is 2,175 miles in length, was built within the brief space of 36 months.

Bridge across the Missouri River at Lombard, Montana.

THE EXTENSION OF THE C., M. & ST. P. RAILROAD TO THE PACIFIC COAST.

37	76	Chicago, Burlington & Quincy.....	8,950
84	206	Chicago & Northwestern Line.....	9,665
10		Chicago Great Western .....	1,457
	12	Chicago Terminal & Trans. Co.....	258
12		Chicago, Indianapolis & Louisville..	578
4		Chicago, Cincinnati & Louisville....	284
	21	Chicago & Western Indiana.....	50
11		Chicago & Erie .....	2,383
81	14	Chicago, Milwaukee & St. Paul.....	8,659
11	12	Grand Trunk System .....	6,212
46	253	Illinois Central .....	6,201
45	91	Chicago, Rock Island & Pacific.....	7,525
		New York Central Lines, including:	
25	46	Lake Shore & Michigan Southern.}	12,524
31		Michigan Central .....	
6		Chicago, Indiana & Southern.....	3,889
10		Minneapolis, St. Paul & Sault Ste Marie .....	
		Pennsylvania Lines, including:	
24	22	Fort Wayne Route .....	11,235
16		Pan Handle Route .....	
8		Pere Marquette .....	2,318
22		Wabash Railroad .....	2,514
541	753		100,123

ment is shown by the statistics of the Chicago Board of Trade for 1908, from which we learn that in that year the railroads brought into the city over 10,000,000 barrels of flour and 239,000,000 bushels of wheat, corn, oats, rye, and barley, of which over 9,000,000 barrels of flour and over 180,000,000 bushels of cereals were reshipped by lake and railway. In the same year over 3,000,000 cattle and 8,652,000 hogs were received at the stockyards by rail. Of potatoes over 12,500,000 bushels, and of hay some 300,000 tons were brought in, mainly by rail. Limits of space prevent any further statement of statistics, but enough has been quoted to give an adequate impression of the enormous quantity of freight which day by day enters the city, either for home consumption or for reshipment to other ports.

Chicago has solved the problem of redistribution and reshipment admirably by the construction of a belt railroad, which extends around the city, and connects with each of the railroad freight terminals. As the trains roll into the various yards, they are broken up, and the various cars sorted out and rearranged according to the particular railroad over which their journey is to be continued, or the particular point within the city at which delivery is to be made. The resorting of the cars is done in some cases by gravity, the cars being started down a gentle incline, at the bottom of which

tunnel has shown a steady increase during the last six years, and has decreased the hauling by teams through the city. Whether the bore of this tunnel will be enlarged to accommodate passenger traffic, as well as freight traffic, is one of the problems now under consideration; but it seems reasonable to expect that a start will be made in the near future on some plan to handle the immense passenger business within the city underground, and thereby relieve the congestion of the streets.

RAILWAY TERMINAL FACILITIES.—Until recently the terminal facilities for passenger service in Chicago have not been commensurate either with the importance of the city or with the size of its passenger traffic. This condition, however, is being fully corrected. The president of the Pennsylvania Railroad recently announced that a new station would be built in Chicago, and that the work would be started at an early date, and pushed to completion as rapidly as possible. The cost of the new Union Station is to be about \$25,000,000, and it will be occupied by the same railroads that now use the Union Station—the Pennsylvania, the Chicago, Milwaukee & St. Paul, the Chicago & Alton, and the Chicago, Burlington & Quincy.

The Northwestern Railway is completing a \$20,000,-  
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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.

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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.)

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Bed, invalid, J. H. Comer	941,620
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Bottle caps, device for removing, Forsyth & Wallace	941,865
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Bottle neck protector, V. Durand, Jr.	941,769
Bottle, non-refillable, E. B. Barner	941,551
Bottle, non-refillable, Jensen & Weitzel	941,394
Bottle receptacle, milk, A. G. Brodhead	941,853
Bottle stopper, D. Landau	941,788
Bottle, telltale, Midbo & Gulbrandsen	941,890
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Brake apparatus, fluid pressure, M. Corrington	941,914
Buckle, L. H. Fishel	941,702
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Cab signal circuit, P. J. Simmen	941,541
Cabinet, envelop, H. K. Smith	941,756
Cableway, T. S. Miller	942,038
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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
Cancelling machine, letter, L. Blessing et al.	941,848
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Canopy frame having doors, W. S. Davidson	941,765
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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, L. E. Railway	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. Paget	941,443
Carbureter, A. H. Wamsley	941,443
Carbureter, J. H. Cooper	941,406
Carburetor, 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
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Chair, C. L. Grelick	941,919
Check controlled mechanism, F. C. Kainer	941,716
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Clamp, D. A. Ducharme	941,594
Clod crusher, C. G. Stelzer	941,740
Clothes line hanger, G. T. Van Riper	941,598
Clothes rack, suspended, B. B. Bosworth	941,909
Clothes wringer, A. Lovett	942,001
Clutch, G. W. Brubaker, Jr.	941,973
Coal, briquetting, C. E. Hite	941,454
Coating machines, holder for liquid, R. A. Beausejour	941,607
Coin collector, M. Farnsworth	941,500
Coke drag, S. Richter	941,385
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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

(Continued on page 454.)

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ANDERSON, INDIANA

(Continued from page 453.)

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.

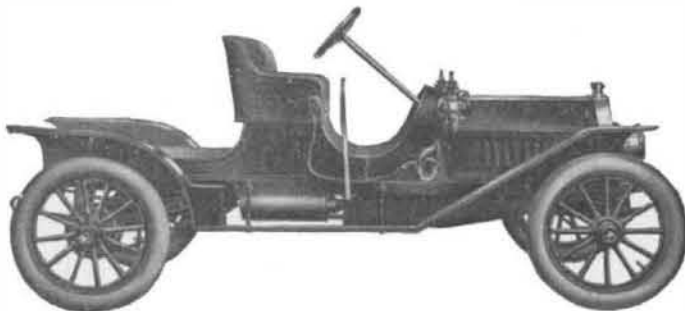
**MODERN IMPROVEMENTS IN TRACK AND ROLLING STOCK.**—The present necessarily brief survey of railroad conditions in Chicago and the Middle West would be incomplete without some reference to the really remarkable improvements which have been made during the past twenty-five years, both in the roadbed and 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.)

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

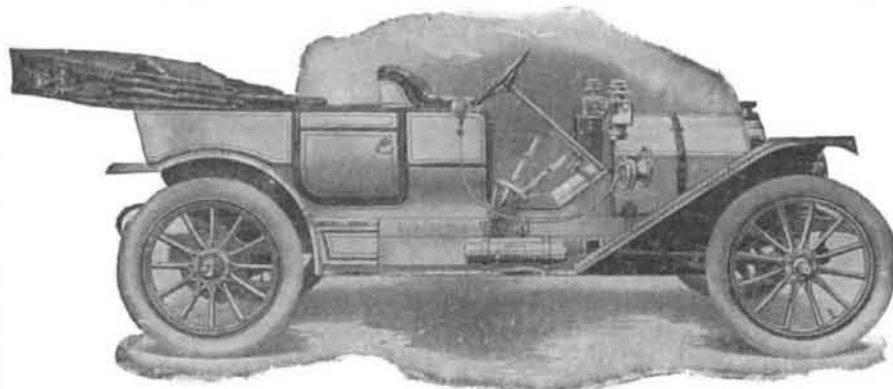
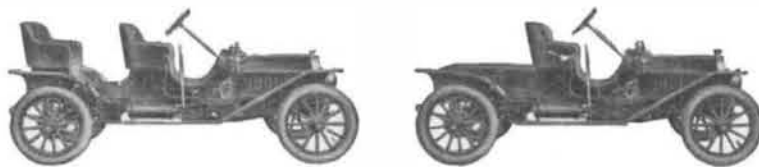
**FOURTH:—With parcel delivery attachment** it becomes the handiest **general utility** car on the market, and will be a big favorite with merchants and farmers who have constant use for a car of this type.

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.

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 upholstery—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

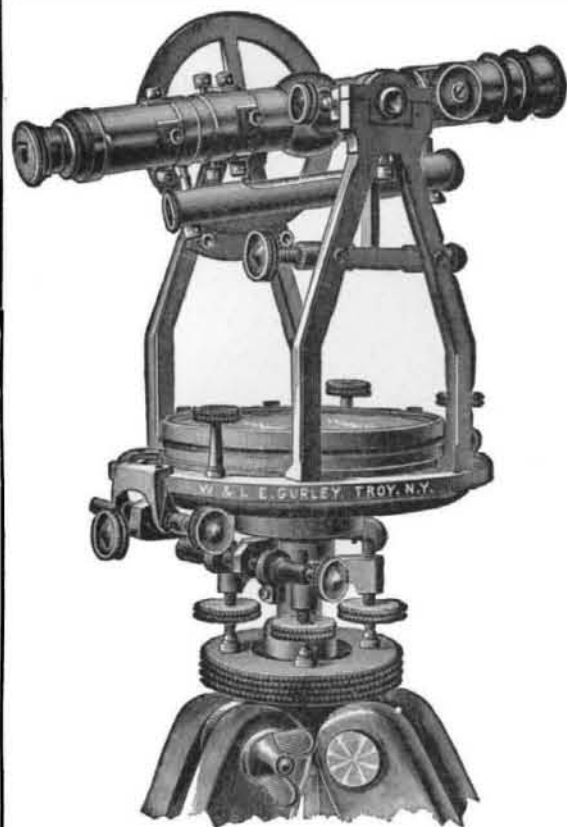
LICENSED UNDER SELDEN PATENT

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. Parsons.....	941,800
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, under-running, 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. Wolfvorn.....	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. Soulague.....	941,892
Door check, C. L. Butler.....	941,492
Door check, R. W. Hubbard.....	941,492
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. Bajan.....	941,905
Doubling apparatus, P. E. Donner.....	941,700
Draft appliance, 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. Bestot.....	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. Hell.....	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
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.....	941,737
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. B. Moscovitz.....	942,008
Fan, L. J. Wing.....	941,834
Fastener, J. A. Simpsen.....	941,542
Fastener, C. A. Conrad.....	941,977
Faucet for cheese apparatus, J. Breake.....	941,614
Fence post staple, J. Darling.....	941,978
Fender or trolley wheel guard, J. A. MacMahon.....	941,790
Fertilizer distributor, 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.....	941,690
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. E. 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
Furnace bridge walls, protecting cap for, J. R. Fortune.....	941,569
Furnace grate, F. Girtanner.....	941,572
Furnaces, smoke consuming attachment for, W. F. Choitz.....	941,496
Gage, B. Atkinson.....	941,843
Game apparatus, W. B. Beckley.....	941,488
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, et al.....	941,501
Garment support, movable, L. G. Dodge, et al.....	941,502
Garment supports, guard for rotary, S. D. Young.....	941,690
Garment supporter, S. Kopps.....	941,787
Gas burner, J. Weintz.....	941,437
Gas burner, R. A. Geurink.....	941,708
Gas escape, H. H. Fulton.....	941,917
Gas kiln, E. Schmatolla.....	942,013
Gases, 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. Hachemleim.....	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
Gyre, F. C. Nagle.....	941,942

(Continued on page 456.)



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Transits, Levels, Plane Tables, Current Meters, Physical Laboratory Apparatus,  
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**WRITE FOR INFORMATION**

(Continued from page 454.)

panies began to find themselves in a position to bring their roadbed and rolling stock up to a higher standard, suitable to the rapidly increasing movement of freight and passengers; and during the past fifteen years hundreds of millions of dollars have been expended in this work. Much of the track has been relocated; curves have been eased or eliminated altogether; grades have been cut down; timber trestles have been replaced by solid earth or rock embankments; wooden bridges have given place to massive structures of steel; heavy grades over the mountain summits have been eliminated by the simple but enormously costly process of tunneling right through the solid mountain itself; millions of tons of rock ballast have been distributed and tamped beneath the ties; and the light rails of 56 to 60 pounds weight to the yard have given place to rails weighing from 75 to 90 pounds.

Furthermore, many of the important western railroads are double-tracking their lines. The Santa Fé is building double track for its main line between Chicago and Kansas City, and beyond as far as Newton, Kansas. Between Chicago and Newton 644 miles of second track are now in operation, having been recently built at a cost of \$22,500,000. Between Chicago and St. Paul and Minneapolis, the St. Paul road has been pushing to completion the double-tracking of its main line; and between Chicago and Omaha the Northwestern Railway has already completed its double track, and the Burlington road will complete the same work at an early date.

The transcontinental roads which have been built during the past few years will, of course, be spared these costly expenses for betterments. In a recent issue of the SCIENTIFIC AMERICAN SUPPLEMENT we gave a complete description of the Pacific Coast extension of the Chicago, Milwaukee & St. Paul. On the afternoon of March 29th of this year the last rail of

## American Homes and Gardens

FOR DECEMBER, 1909

*Here are some of the articles it contains:*

### MAKING SOIL

A helpful paper by E. P. Powell in which he tells some of the simple methods employed by farmers in adding to the value of their soils. A practical note of unusual interest.

### COLONIAL FIREPLACES AND FIRE-IRONS

Mary H. Northend contributes an entertaining and suggestive essay on Colonial fireplaces and fire-irons, which is richly embellished with many beautiful photographs taken expressly for this paper. Miss Northend briefly traces the early history of the fireplace in America and has prepared a paper of great interest.

### ART AND HOUSEHOLD DECORATION

An editorial comment on the true relationship between the home and its artistic decoration. Some useful facts put in a strong and forceful way.

### DEPARTMENTS

Problems in Home Furnishing. Conducted by Alice M. Kellogg.

Garden Notes. Conducted by Charles Downing Lay.

New Books.

Grafting for Boys. A practical article telling how boys may engage in this interesting work and the successes some of them have attained in it.

### The First Prize in the Garden Competition

The garden adjudged the first prize in the recent garden competition conducted by this magazine forms the subject of the opening article in the December number. This is a charming and delightful place abounding in picturesque developments very ably utilized and beautifully developed. The illustrations, which include several full-page plates, are very numerous and of the deepest interest.

### A New Artists' Home

The beautiful, yet modest, home of Mr. and Mrs. Robert V. V. Sewell at Oyster Bay constitutes a notable contribution to Barr Ferree's series of papers on the homes of American artists. This house easily stands among the most notable private dwellings in America. Mr. Sewell, a painter of national renown, has lavished of his genius and his work in a remarkable enrichment of hand wood-carving, all executed by himself, which gives an intensely personal character to the house and is its distinguishing characteristic. This house has not been published heretofore.

### Hammering and Piercing Metal

Mrs. Mabel T. Priestman contributes a valuable and practical paper on the craft of hammering and piercing metal. This is an interesting and fascinating form of craftwork that any one, with Mrs. Priestman as a guide, can readily follow. The illustrations show exactly how this work is done, and offer some interesting practical designs.

### Bungalow Furnishing

Kate Greenleaf Locke, whose article on four California bungalows is a distinguishing feature of the present number, opens up a new theme in bungalow literature with an eminently readable and suggestive paper on interior bungalow detail and furnishings. Miss Locke offers a number of helpful and valuable suggestions on the treatment and equipment of bungalow interiors, and illustrates her paper with numerous and beautiful photographs taken expressly for this article.

### A Concrete Fence

Ralph C. Davison's series of papers on concrete garden ornaments and how to make them is brought to a close in an interesting paper on the methods of building a concrete fence. The text is very precise and definite, and is especially intended to enable any one to build his own fence from the directions given. The illustrations are especially numerous, and include both diagrams and half-tones. It is a fine article of great practical value.

### Some New Western Homes

Francis Durando Nichols, who has been gathering material for the magazine in the West, offers the first fruit of his work in a valuable paper on some new Western homes. The illustrations are chiefly of Chicago houses and open up an entire new school of architecture to our readers. Mr. Nichols will have more to say on this subject in future numbers, but the first article should not be missed.

Price 25 cents on all newstands

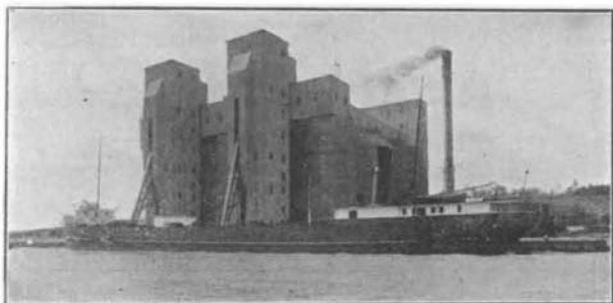
**MUNN & COMPANY, Inc., 361 Broadway, NEW YORK**

this extension was laid. It is now known as the Chicago, Milwaukee & Puget Sound Railway. The first shovelful of earth on this enterprise was turned in April, 1906, so that the whole of this \$100,000,000 enterprise was completed in three years' time.

The improvement in railway track has been fully matched by the development of the rolling stock. Freight cars have increased in capacity from 20 tons to 50 tons; passenger engines have increased in weight from 50 tons to 135 tons; and freight engines from 60 to 70 tons have gone up to a weight of 213 tons—the above being the weights merely of the engines alone. The largest passenger engines are the magnificent six-coupled, ten-wheel engines used on the New York Central and allied roads, and built by the American Locomotive Company. They have cylinders 22 inches in diameter by 28 inches stroke, coupled to three pairs of 79-inch driving wheels. The boiler, 6 feet in diameter, has 4,195 square feet of heating surface. The engine alone weighs 130.7 tons, and the maximum tractive power is 16.7 tons. These engines can haul as many as fourteen Pullman cars, or say about 800 tons of train, on the level, at 55 to 60 miles an hour.

Even more striking has been the growth in weight and power of freight locomotives, especially since the introduction of the articulated type. The largest and most powerful of these is a mammoth affair built by the Baldwin Locomotive Works for the Mountain Division of the Southern Pacific Railway. It is a compound with two high-pressure cylinders 26 inches diameter by 30 inches and two low-pressures 40 inches in diameter by 30 inches stroke. The boiler has 6,393 square feet of heating surface. The engine alone weighs 213 tons, and the engine and tender together weigh just under 300 tons. This engine is capable of taking a 2,000-ton train over the heavy grades of the Mountain Division of the

(Concluded on page 456.)



2,000,000 Bushel Concrete and Steel Grain Elevator, Built for the Grand Trunk Pacific Railway, Tiffin, Ontario.

# John S. Metcalf Co.

DESIGNERS AND BUILDERS OF

## Grain Elevators

Chicago, Ill.—Montreal, Que.

(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.)

### 2HP Detroit Engine \$29.50

Other sizes at proportionate prices in stock ready to ship. Single cylinder engines, 2 to 8 h. p.; four cylinder 8 to 20 h. p.; four cylinder 20 to 30 h. p. Engines start without crank. No cams, no sprockets, only three moving parts. All engines counterbalancing. Special fuel injector. Gasoline, kerosene, coal oil, alcohol, distillate. Plastic white bronze (no cheap babbit used.) Crankshaft bearings. Aft drop.

forged steel. Bearing surfaces ground. Adjustable steel connecting rod. Waterproof ignition system. For your launch, railboat, 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 Edison Concrete House

How it is constructed, how much it will cost, is it practical from an architectural and engineering standpoint? These and other important questions relating to the structure are discussed in a good, thorough, illustrated article published in SCIENTIFIC AMERICAN SUPPLEMENT 1685. Price 10 cents by mail. Order from your newsdealer or from

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361 Broadway, New York, N. Y.

## 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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Harvester reel support, J. A. Scanlan	941,655
Hatch 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	941,507
Hub attaching device, C. G. Swanson	941,470
Hydraulic jack, E. A. Gathmann	941,870
Hydraulic separator, W. F. Smith	941,663
Ice-making apparatus, D. J. Havenstrife	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, Noott & Gottsche	941,585
Insulating coverings for electric conductors, Phillips & Hutchins	941,810
Internal combustion engine, R. Lucas	941,376
Ironing board cover, E. Stone	941,430
Jar closure, G. Henderson	941,417
Jar closure, J. Schies	941,538
Jewel setter's tool, F. C. Wiemann	941,831
Jewelry box, J. R. Sundee	941,741
Joint connection, universal, Jourdain & Dextraze	941,928
Journal box, K. Smith	941,661
Keyhole illuminating device, Hardin & de Saussure	941,576
Keyless socket, C. D. Platt	941,811
Kinematograph apparatus for the production of colored pictures, G. A. Smith	941,960
Kitchen rack, foldable, R. Hothengatter	941,853
Knob fastener, door, F. E. Beardsley	941,906
Lamp adjustable support, electric, L. Erikson	941,833
Lamp, incandescent, R. D. Tiffany	941,592
Lamp, miner's, J. & A. M. Van Liew	941,887
Lamp operating device, vehicle, J. P. Stein	941,739
Lamp socket switch, incandescent, W. A. McDonald	941,941
Lamps, sealing filament carriers into bulbs of electric incandescent, J. Kremenzky	941,906
Land roller, E. Englund	941,770
Lantern, O. R. Henson	941,822
Lantern, signal, J. J. McIntyre	941,802
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	941,968
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	941,570
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. Kraft	941,423
Mail, express, and train orders, despatches, etc., apparatus for effecting the interchange of, N. J. Nelson	941,461
Manhole cover plate, E. Oldman	941,531
Manure spreader, D. Garst	941,513
Manure spreader, Littlefield & Garst, re-issue	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
Medicine dispenser, F. M. Beverly	941,489
Merry-go-round, C. W. Ott	942,041
Merry-go-round, Powell & Miller	942,010
Metal sheets, manufacturing, C. W. Bray	941,850
Meter, W. L. Gumrecht	941,573
Milk pasteurizer and cooler, W. R. Thatcher	941,964
Milking machine, K. I. Lonstrom	941,769
Miter clamp, L. Taylor	941,825
Mixing machine, O. H. Weckesser	941,830
Molding machine, Kerlin & Bowen	941,930
Molding machine, W. Lewis	941,900
Motor control system, H. E. White	941,397
Motor generator set, W. A. Danielson	941,430
Motor more especially applicable for driving barges, wherries, flatboats, and the like, G. Trouche	941,827
Motor starter, M. R. Hanna	941,412
Music record sheet for automatic piano playing mechanism and the like, A. R. Trist	941,433
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
Nut lock, R. & B. Nagyvathy	941,804
Nut lock, W. W. Senn	941,659
Oil rack, E. G. Hodgkins	941,779
Oil burner, J. Weitz	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. Hoeph	941,780
Package tie, G. L. Hindman	941,780
Packing machine, F. Rassinio	941,444
Packing material, L. H. Baekeland	941,605
Packing, piston rod, A. J. West	941,394
Packing ring, piston, T. H. Remond	941,534
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	941,888
Paste to cardboard, etc., machine for applying, J. McKibbin	941,530

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