THE FIRST PROPOSED ELEVATED RAILROAD FOR NEW YORK.

In the accompanying cut we publish a view of an elevated railroad for New York which is reproduced in facsimile from a comic paper published in 1846.

THE TRAMWAYS OF LAUSANNE.

The idea of the installation of tramways at Lausanne dates back to 1869-1872, that is to say, to the establishment of the Lausanne-Ouchy et Lausanne-Echalleus lines. The honor of it is due to Mr. Gossin, cantonal engineer. The system thought of then was that of Mr. Mekarski, which consisted in the actuating of automobile cars by compressed air. In 1882, Mr. Bergaron, another engineer, thought of exploiting a cable tramway of the Hallidie type in use in San Francisco, not only to do service for Lausanne, but also to radiate in different directions. In 1888, Mr. Vautier was charged with the study of a project based upon the Abt rack and steam propulsion system. The huge size of the engines caused the committee that had proposed the idea to reject it, and the conclusion was reached that the only system admissible in a city like Lausanne was electricity.

In the first project of Engineer Palaz the motive power was to be borrowed from the waters of the Bret, and the generating works were to be established under one of the arches of the great bridge. But as the conditions of this would have been too onerous, it was transferred to the Pontaise, and the choice was limited to either petroleum motors or those using poor gas. Finally, on December 21, 1894, Mr. Palaz obtained from the Federal Assembly the concession of a system subdivided thus:

Urban system comprising the lines: Tour de Ville, L. E. Monsquines station, J. S. St. Francois station, Riponne-Pontaise, Ecole de Medecine-Chailly.

The system comprised also the Monsquines-Lutry line.

Electric propulsion by aerial conductor, contact trolley and return by rails, prevailed for reasons entirely peculiar to the city of Lausanne. Accumulators were rejected on account of the strong declivities. They would have given rise to considerable dead weight. Steam propulsion, too expensive with so broken a profile, would even have been impossible upon the Chailly and Pontaise sections. The advantage of electric propulsion, such as it has been conceived, is that it permits of the use of light rolling stock and satisfies the exigencies of an active circulation. The only serious motive, moreover, for not taking some other mode of propulsion into consideration was the newness of such systems as those working by compressed air, which, however, have been greatly improved, especially by Messrs. Popp and Conti. Then again, there was the matter of fashion, the majority of the Swiss tramways recently constructed being operated by electricity.

It was a question of finding a source of electric energy. Should the hydraulic power of the Jura or Alps be utilized at Lausanne, or should a special generating works be created for the tramways? After long discussions, the latter was the solution adopted. The works decided upon consist of two parts: one of them, fronting upon Saint Martin Street, is 56 feet square, 26 feet in height, and contains the engines, dynamos and regulating apparatus. Its frame is metallic, and a fifty foot rolling bridge of five tons power is arranged in it. The other measures 41 × 37 feet and contains space for three gas generators and accessories. The accumulator room, which is 42 feet in length, 41 in width and 11½ in height, adjoins that of the gas generators. The apparatus for refrigerating the water and cooling the motors are placed at the extremity of the engine room in an annex reserved for them.

The motor using poor gas had the preference. It is supplied by a special gas produced at the works by blowing a mixture of superheated steam and air into what are called gas-generating furnaces. In this way a minimum expense of two ounces of anthracite per horse hour in current service has been reached.

At first there will be installed but two gas generators and two 130 horse power motors, one of which, represented in our engraving, will run, upon an average, from 18 to 20 hours a day. A battery of accumulators, serving as regulator and reserve, will be of about 200 horse power.

The track, which is of 3·28 foot gage, will be formed of Phenix 32 pound rails, laid upon 16 pound metallic ties in the unpaved portions and of 47 pound Phenix rails laid upon ballast and cross-braced in the paved portions.

The feed lines are now subterranean and now aerial. Those of contact are supported by poles or stretching cables.

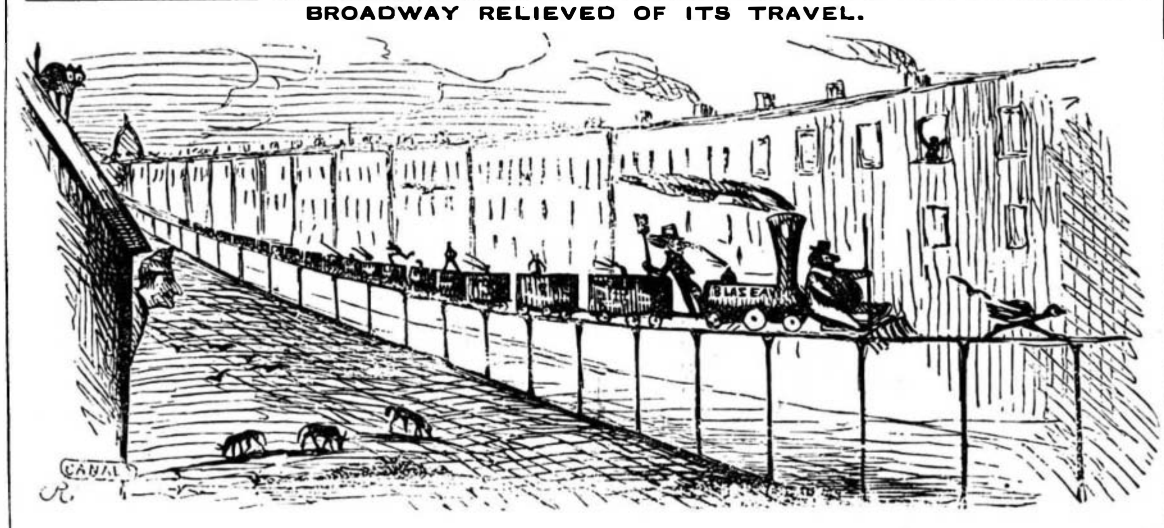
The car has a capacity for 30 passengers. It is actuated by two electric motors of 20 horse power each, that drive the axle through a single train of gear wheels. It is provided with block brakes, electric brakes, and safety drag brakes acting upon the rails.

The 39 × 105 foot car houses will receive 20 cars.

The cost of the first establishment, which is doubt-

158 YANKEE DOODLE.

BROADWAY RELIEVED OF ITS TRAVEL.



A Report signed "many citizens of Watertown" has recently demonstrated, as far as logic can demonstrate, that, "all things considered, a Plank Rail Road is the most advantageous and *cheapest* that can be constructed over a soil not naturally fitted for road-making." To prevent the mortification of being beaten by an obscure country town, YANKEE DOODLE calls upon the city authorities at once to take this matter in hand—not the road—but the feasibility of adapting it to our thoroughfares. As, by the common practice, Broadway would seem totally unfit for road-making, many dollars might be annually saved to the city treasury, and the wayfarers of that over-crowded artery gratefully relieved of the danger and inconvenience of traveling in omnibuses, by the novel plan set forth above. The road should be constructed of good solid plank, elevated about fifteen feet to admit the passage of the tall turn-outs of the upper ten,—the only turn-outs on the road,—without knocking off the hats of the drivers and footmen; supported in the centre of the street by locust uprights, which are very durable. Along this elevated plane a double stream of cars might fly with the velocity of a lie on the Magnetic Telegraph wires and without any very great danger to those cautious pedestrians who may take the side-walks. Depots might be established at suitable distances—say one at Trinity and the other at Grace Church, thus uniting the two extremes of Broadway in commerce and piety. A star policeman should be stationed at each end to see that the exercises are not disturbed, and now and then to look into Wall street. By this plan, the inhabitants of the upper Wards might just step into Grace Church and hear the singing and arrive at Trinity time enough to hear the text; and after dozing through the sermon, return to Grace in time for the last voluntary. The Magnetic Wires might also be elevated on the plane of the Rail Road, and thus rid Broadway of that picturesque absurdity.

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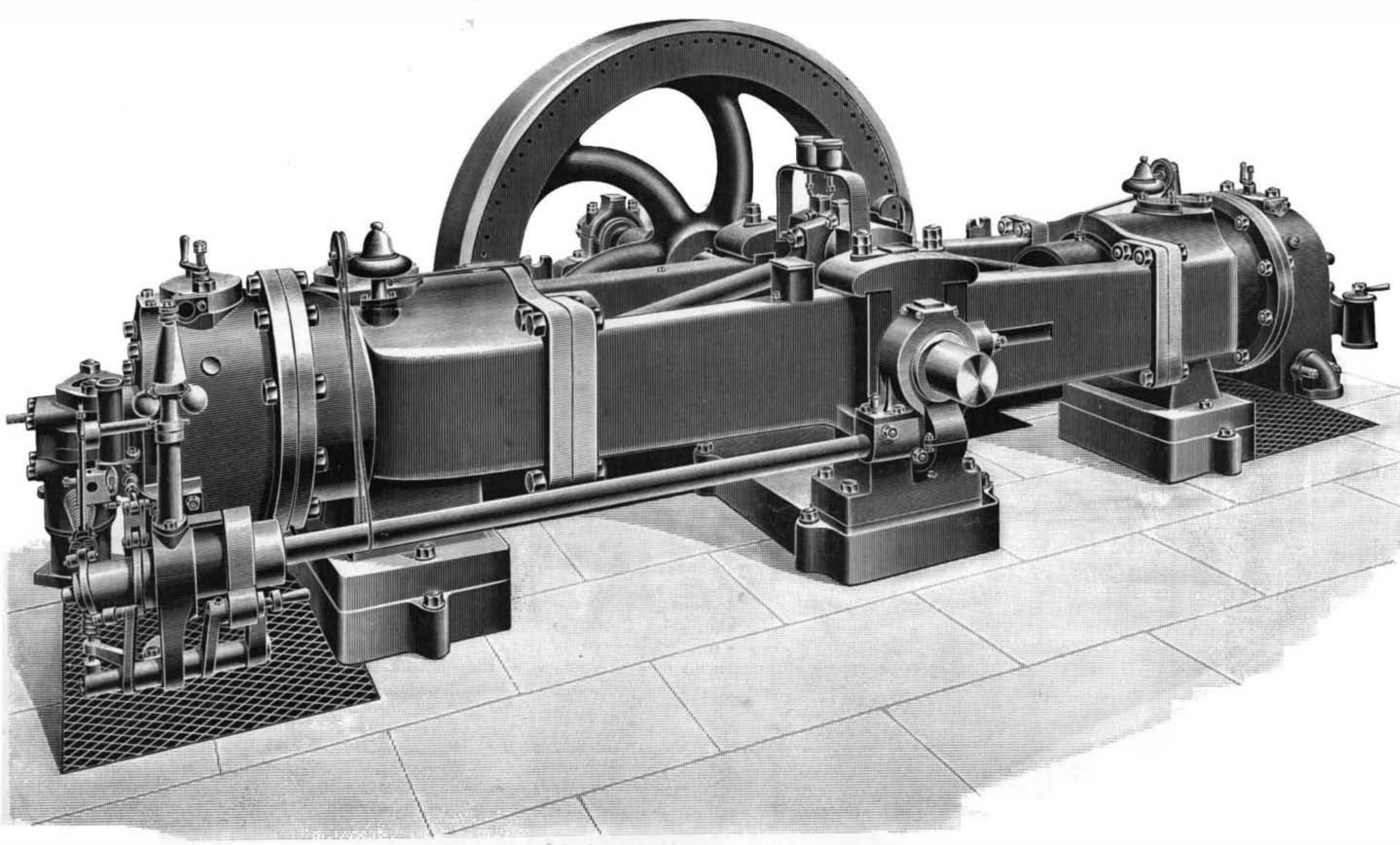

130 HORSE POWER MOTOR USING POOR GAS—CONSTRUCTED FOR THE CENTRAL STATION OF THE LAUSANNE TRAMWAYS.

less quite high, as a consequence of the topography of the city, is thus distributed:

Land and outbuildings	$44,000
Generating works	54,000
Track and electric railway	73,000
Rolling stock	45,000
Administration, etc	30,000
General total	$246,000

As for the service, that will be 8 or 16 minutes, according to the lines.

As expense of motive power, one reckons about 2 cents per mile car, and an output of about two and a half pounds of anthracite per same unit.

For the water supply, a reservoir of from 2,880 to 3,600 cubic feet is proposed, and a double intake of water from the city mains and the Bret, the washing of the gas and the cooling of the motors requiring quite a large quantity of water.—La Revue Technique.

ELECTRIC IGNITERS FOR GAS ENGINES.

BY GEORGE M. HOPKINS.

Gas, gasoline and petroleum oil engines are daily becoming more popular, and not only is the number of regular manufacturers becoming very large, but many amateurs are trying their hands at the production of engines of this class. The field is very fascinating to mechanics, but noone knows the amount of experiment required, or the vexation experienced in bringing out a motor of this class, who has not already experimented in this line.

One of the most difficult problems is that of providing an efficient means of igniting the explosive charge in the cylinder at the proper instant without intermissions or failures. A red hot tube into which the gas is admitted at the right moment is simple, good and reliable, so long as the tube lasts, but the tube speedily burns out and requires renewal. Ignition by means of a traveling flame necessitates intricate and delicate devices which require constant care to prevent failure.

The electric spark, taken all in all, is probably the best igniter, but even that has its objections. It is largely used and is simple. As many amateurs are seeking information on the subject of ignition for gas engines, we have prepared illustrations showing the principle of the electric igniter, leaving it to the engine builder to make the adaptation to the particular engine to which it is to be applied.

The essential feature of the electrical igniter is the spark coil. This does not differ from the spark coil used in connection with an ordinary illuminating gas burner, and the electric lighting attachment to the gas burner embodies the principle of the igniter for gas engines, but it does not possess the required stability and lasting quality. The smallest practical coil is made by filling a paper mailing tube 7 inches long and 1⅜ inches in diameter with annealed iron wires of any size from No. 16 to No. 9, the wires being arranged in three or four layers around a ⅜ wooden core. Upon the paper tube are wound four layers of No. 16 cotton-covered magnet wire. Before winding the coil, wooden heads are secured to the ends of the core, as shown, to form a spool. The inner and outer terminals of the coil are connected with binding posts projecting from one of the heads.

The ratchet burner in connection with which the coil is intended to be used is shown in Fig. 2. The plug of the gas cock is provided with two transverse holes at right angles to each other, and the outer end of the plug carries a ratchet having eight teeth. On the shell of the gas cock is placed an angled lever carrying a spring-pressed hooked pawl, which engages the ratchet on the plug, and a spring is provided for returning the angled lever to the point of starting after it has been operated. By pulling the angled lever the plug of the cock is turned one-eighth of a revolution, so that the gas is turned on or off according to the position of the holes in the plug. To the upper end of the burner tube adjoining the tip is attached a collar which supports a wire contact near the slit of the burner. The collar is insulated from the burner by a piece of asbestos paper. The upper arm of the lever carries a spiral spring terminating in a wire contact arm which makes an electrical contact with the wire supported by the insulated collar whenever the angled lever is swung.

It will thus be seen that by swinging the lever the passage in the burner is alternately opened and closed. The collar at the top of the burner is connected with one pole of the battery and the burner or the bracket to which it is attached is connected with one terminal of the spark coil, the other terminal of the coil being connected with the remaining pole of the battery.

When the angled lever is pulled in the manner described so as to let on the gas, the spring arm at the upper end of the lever comes into contact with the wire supported by the collar, thus completing the electrical circuit through the coil and connections, causing the core of the coil to be strongly magnetized. The further movement of the angled lever draws the spring arm off from the wire contact supported by the collar, and at the breaking of the circuit the extra or induced current generated in the coil, being of very high potential, leaps across the space between the contact wires and produces a brilliant spark which ignites the gas issuing from the burner.

When it is desired to extinguish the light the angled lever is again pulled, revolving the plug of the cock ⅛ of a revolution, cutting of the gas supply. A spark is again produced at the points of contact, but this is of no consequence.

In Figs. 3 and 4 is shown the adaptation of this principle to the ignition of the explosive mixture in a gas engine. In the passage which admits the explosive mixture to the cylinder is inserted a hollow shaft the bore of which is eccentric, and in the shaft is inserted a spindle which is insulated from the shaft and carries at its inner end a finger piece which is capable of coming into contact with a stud projecting inwardly from the casing of the engine. The finger on the spindle is held in the proper position for contact with the projecting stud by a spiral spring surrounding the spindle and connected with the hollow shaft, but insulated therefrom. The hollow shaft is provided with a spur wheel by means of which it is turned, and the spindle extending through the hollow shaft is in electrical connection with one terminal of the spark coil, the other terminal being connected with the battery, the battery in turn being connected with the engine cylinder. When the hollow shaft is rotated in the direction indicated by the arrow in Fig. 4, the finger forms a contact with the projection, and the further rotation of the hollow shaft, by virtue of the eccentric arrangement of the spindle, causes the finger to slip from the projection and thus cause a spark at the moment of separation, as in the case of the electric gas burner. This construction permits of using heavy parts which do not readily wear out or burn out.

In Fig. 5 is shown a modification, in which the igniter is operated by reciprocating movement. The sliding rod to which is attached a contact piece is carried by a sleeve having an insulating lining. When the rod is drawn back the movable contact piece slips off from the stationary contact, as indicated in dotted lines, and a spark is produced, the arrangement of the circuit being the same as in the case just described. In this case, if the charge is not to be ignited at every revolution, a commutator or switch will be connected with the rotating parts of the engine which will intermit the current as may be desired.

There are many ways in which the making and breaking of the electric circuit in the chamber containing explosive mixture may be effected. The coil might have one, two or more additional layers of magnet wire. The main difficulty with this igniter is the failing of the battery. A battery consisting of four or six Fuller cells should operate the igniter for several weeks. Leclanche cells may be used, but they should be connected up so as to produce a quantity of current rather than high voltage.

A small dynamo has been used successfully for the ignition. In this case no spark coil is required, the extra spark from the machine itself being all that is necessary.

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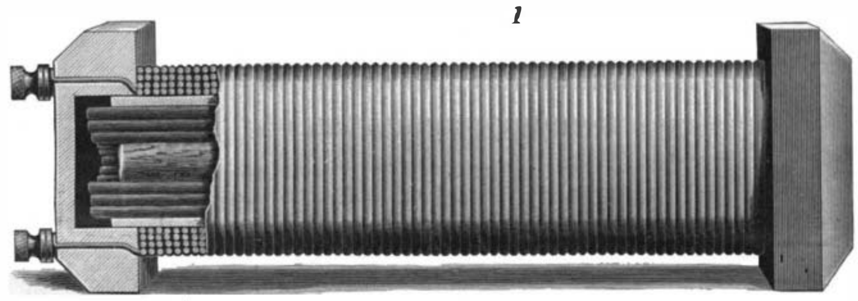


Fig. 1.—THE SPARK COIL.

2

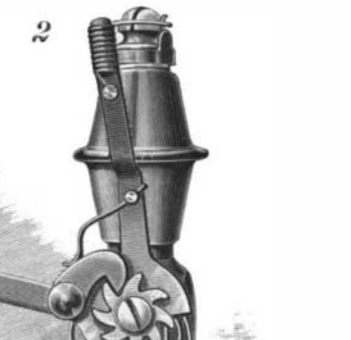
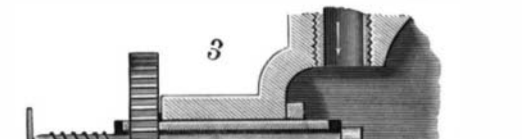


Fig. 2.—GAS BURNER WITH ELECTRIC IGNITER.



Figs. 3 and 4.—IGNITER FOR GAS ENGINE—REVOLVING FORM.

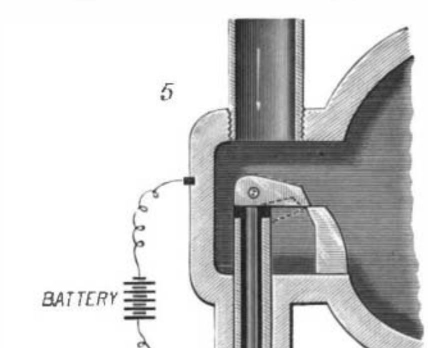


Fig. 5.—IGNITER FOR GAS ENGINES—RECIPROCATING FORM.

Japanese Demand for Cotton.

Regarding the recent heavy shipments of cotton from this country to Japan, Edward Atkinson, an authority on the cotton manufacture in New England, says: "There is no doubt that Japan will establish cotton spinning with considerable rapidity, and in the course of some years will probably be enabled to supply the increasing wants of the modern world, heretofore mainly supplied by England. But in order to make any of the fabrics which would have any considerable sale in this country merely as cotton fabrics, without regard to the design of the weaving or the printing, and in order to supply that part of the demand of China for what are known as gold end and red end shirtings, made of medium fine yarns, it will be impossible for Japan to use her own limited supplies of cotton or any of the cotton of China, which, although produced in very large quantities and admirably handled, is so short in staple as not to make it fit for the work, or even the India cotton, which is only fit for coarse, low numbers. Her whole supply of cotton must be found in this country. Hence it follows that the progress of Japan may to some extent check the demand for American cotton for English mills and may, at least, prevent the increase, if it does not work a reduction, in the export of cotton fabrics from Great Britain, but will have no influence whatever upon the cotton manufacturers of this country so far as the making of the fabric is concerned. What we have to fear, if there is anything to fear, in getting the goods which people desire, are the skill, taste, and aptitude of the Japanese in devising both woven and printed cotton fabrics. The influence of this demand upon the South will be very beneficial in hastening improvements in ginning, handling and baling, which have lately attained great prominence among the cotton growers of the South."

THE New York Carbide and Acetylene Company was incorporated at Albany December 24, to manufacture and sell gas-producing materials and acetylene gas, and to distribute other than by the use of mains, liquefied gas, and to manufacture and deal in gas apparatus in Milbrook, Dutchess County.

The capital is $7,000,000, divided into 70,000 shares. The directors are: E. C. Benedict, Anthony N. Brady, Edward N. Dickerson, J. Bertschmann, Charles F. Dietrich, Walton Ferguson, John Fox, R. Somers Hayes, Erasmus J. Jersmanowski, Frederick P. Olcott, Arthur B. Proal, John Sloane, and Samuel Thorne, of N. Y. City. Julius J. Suckert, of New York, subscribes for 69,988 shares of the capital stock of the company.