SCIENTIFIC AMERICAN

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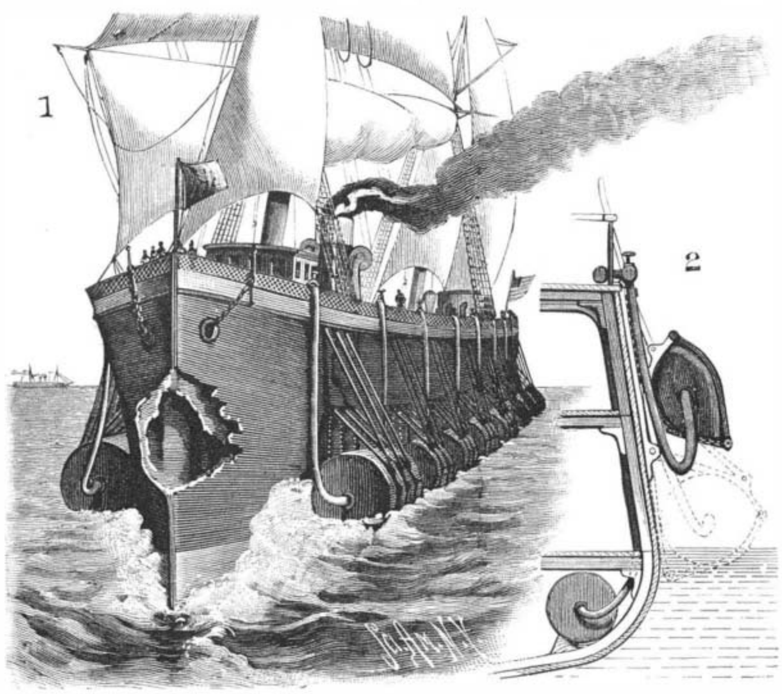
IMPROVED MEANS FOR BUOYING UP VESSELS.

A novel system of buoying up vessels by means of collapsible buoys attached thereto, and connected with a compressed air or other gas supply on the vessel, whereby the buoys may be inflated when needed, is illustrated herewith, and has been patented by Mr. B. D. T. Travis, of Burlington, N. J. Along both sides of the vessel, exteriorly and interiorly, are arranged buoys of rubber or similar material, connected by flexible branch pipes to a common main pipe, the main pipes being all connected to a common receiver, to be supplied with air under pressure by means of an air pump operated by a steam or other motor. All the pipes leading into the receiver have valves whereby the distribution of the compressed air may be controlled by a single person, so as to inflate such of the series of buoys as may be desired, and each branch pipe communicating with an outside buoy has a valve by which it may be cut out of the circuit in case such buoy is disabled. Over each outside buoy is a curved cap, and a hinged curved shield protects the under side of each buoy when inflated, being connected to the cap by a chain, and the collapsed buoy, when emptied of air, is closely embraced between the cap and the shield folded upon it. The buoy caps are hinged on the lower ends of hangers hinged on the ship's sides, or on knees, the hangers being fastened low down on the ship's side. The braces are caught by locks on the upper part of the hangers, and so remain fixed when the buoy is lifted against the side of the vessel, or high above deck, as demanded when in port. By this plan of lifting the buoys they can be readily removed from any point where they would interfere with the work aboard ship. When the buoys are lifted up, they can also be turned to catch the wind and aid the speed of the ship.



TRAVIS' DEVICES FOR BUOYING UP VESSELS.

THERE are 621 newspapers printed in Berlin. Fifty-four are official papers, 70 political, 165 have to do with literature, science, and art, 217 are commercial, and 30 religious.

A REMARKABLE RAFT.

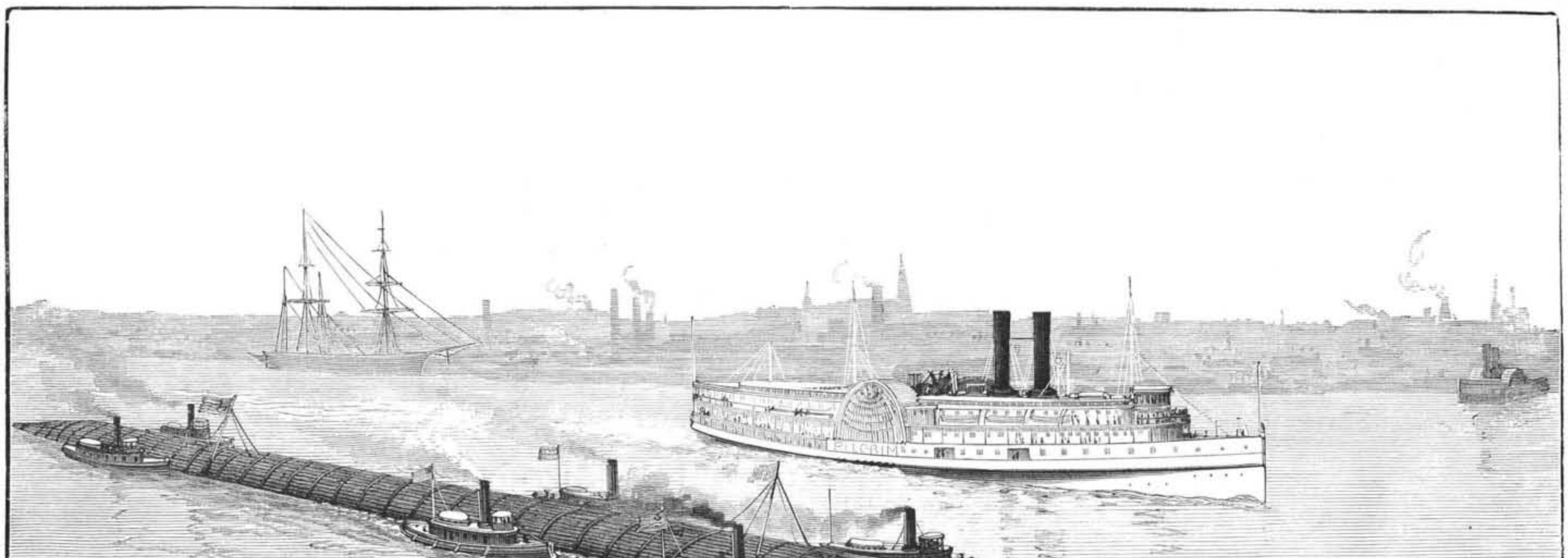
On the 11th of August, after a voyage of eleven days, distance 700 miles, there arrived in New York harbor, from Nova Scotia, a timber raft of gigantic proportions, remarkable in being the largest of the kind that ever made a successful sea voyage. Several months ago an attempt was made to tow a similar structure to this city, but it was broken up and scattered by a storm upon the ocean. This second effort met with no serious obstacles.

This great float was called the "Joggins Raft," after the Joggins—a jog in the Bay of Fundy—famous to scientists the world over. For a distance of four miles along its shore, says the *Home Journal* (Gardner, Me.), is the most wonderful exhibition of the carboniferous period of the world's formation known in America.

The Joggins shore is on the eastern side of Cumberland basin, called by the old French settlers Beaubasin, or beautiful basin. The whole of this shore is a coal and stone mining region, thickly covered with thin, tall trees, which are in great demand in Boston and New York for piling. Twenty miles down the shore a low cove forms the mouth of a valley, flanked on either side by two high hills. In this cove the great raft was built.

The annual shipment of over 100,000 piles from this region of country, in two hundred or more vessels, suggested to Hugh R. Robertson, of St. John, the idea of towing 20,000 at a time in a monster raft. The idea was not original. It was first attempted from Quebec half a century ago, but failed. Two years ago Mr. Robertson patented his

(*Continued on page* 132.)



THE GREAT TIMBER RAFT FROM JOGGINS, NOVA SCOTIA.

A REMARKABLE RAFT.

(*Continued from first page.*)

idea of fastening with chains, and, indeed, induced James O'Leary, one of the largest importers of piles in New York, to advance money to carry out the experiment. The first raft was built in the summer of 1886, and the ways partially collapsed under the enormous weight.

Nothing daunted, Robertson, aided by O'Leary's money, pulled that raft to pieces, built a new cradle, and constructed another raft much larger than the first. The second one weighed some 8,000 tons. This was successfully built and launched, and would doubtless have reached New York in safety had it not been for unnecessary delay in towing, but it was lost at sea. The feasibility of the construction, launching, and towing of the monster rafts had been established, and Mr. Robertson immediately went to work to build another.

This one was successfully launched and brought to New York. Its appearance in the water is shown in our engraving. It is the shape of a cigar, and is of the following dimensions; length, 595 feet; width, 55 feet; girth, 150 feet; depth, 38 feet; weight, 10,000 to 15,000 tons.

The girth of 150 is for a length of nearly 400 feet. Within 100 feet of either end the raft tapers off to a girth of forty-eight feet. It is built on an enormous cradle resting on rows of pillars. The piles, which average forty feet in length, are fourteen to sixteen inches thick at the butts, and taper off to a few inches in thickness at the ends. They are laid in tiers, lapping over one another, to the depth of thirty-eight feet.

A massive chain runs through the center of the raft for its whole length. This chain is made of iron 1¾ inches thick. Its links are eleven inches long and seven inches wide.

At distances of ten feet are cross chains of one inch iron and links four inches long and three inches wide. These run in all directions, and are clamped on the outside tier of piles by cross arms of wood.

The raft was towed by the main chain, the cross chains being so arranged that the draught on the main chain binds the whole mass together in such a grip that it is next to impossible for it to go to pieces. The greater the strain on the main chain, the tighter will the raft be held together. But still further precautions were taken. Half way between the cross chains were attached three strands of steel wire, each one inch in diameter.

Thus the raft was bound together by iron chains and steel wire at distances only five feet apart. There were 22,000 sticks in the raft. When bound together as described, it was almost as compact and solid as though it was the trunk of a gigantic tree. The weight of the raft is estimated at 10,000 tons.

A ship is launched stern first, but this raft was launched bow first. At high tide 100 feet of the bow rested in the water. On either side of the cradle were heavy timbers, something like the bed of a tramway. When ready for launching, the cradle and raft were raised on ways laid along these timbers, and gracefully slid into the water.

The piles are worth five cents per foot in New York, or say $2 each. They cost sixty cents each at the point of shipment. An ordinary schooner will carry 500 or more in a cargo, at a freight of $1 each stick, or $1.60 laid down in New York. The 22,000 sticks in the raft would afford cargoes to forty-four vessels, and a freight of $21,000. The actual cost of the piles on the shore is $13,000. They will realize $44,000. That gives a profit of $9,000 if shipped by the vessels. Competent authorities say the whole cost of construction and towing will be inside $10,000, thus leaving a profit of at least $21,000.

Great opposition existed among the people along the shore to the experiment of rafting. They have urged the Canadian government to declare the piles so exported to be logs, and to enforce the export duty provided by statute at $2 a thousand. Estimating the quantity of lumber in the raft at 3,000,000 feet, this would mean a duty of $10,000, the payment of which to the Canadian government would place the cost of the rafting experiment on the same level as the export of piles in vessels, and, of course, would kill the rafting business.

The great raft was towed from Joggins across the ocean to and through Long Island Sound to Flushing, at the entrance of the East River, near New York, by two powerful tugs, the Ocean King and Underwriter. At the above point five additional tugs were attached to the raft, and the monster was then started down through the tortuous channel of the East River and Hell Gate, under the Brooklyn Bridge to the Erie Basin below Governor's Island.

Our engraving shows the appearance of the great raft during its progress down the East River. Our illustration was drawn from a photograph taken by Dr. J. J. Higgins, of this city, on the extra-sensitive Seed plate, No. 26, with a Gregg instantaneous lens shutter and rectilinear lens F—12 as the raft, having passed safely through Hell Gate, was now coming into the broad expanse of water at the southern end of Blackwell's Island. Time 12:30 P. M. Sun vertical.

The Beds of Rivers Arcs of Cycloids.

BY F. E. OPPIKOFER, CIVIL ENGINEER, PANAMA CANAL.

At the present time, when all over the world rivers are overflowing their banks, causing loss of life and property, and when millions every year are spent to prevent or alleviate the evil, we should like to call attention to a natural law of rivers, which has been suspected for twenty years by some, and which the writer of this has pursued further and has finally proved convincingly.

It has been found by leveling that the mean surface of the water of the Rhine from Lake Boden (Switzerland) up has a regular rise, notwithstanding some great turns, so that at the end of the first kilometer the fall is 0·04 per cent, at the end of the second 0·08 per cent, at the end of the third 0·12 per cent, at the fourth 0·16 per cent, and at the end of the thirtieth 30 times more than at the first—just 1·2 per cent. Such a line of descent is almost a perfect cycloid; that is, the line in which a body goes in the shortest time from a higher point to a lower and farther one, for instance, from a mountain to a valley or lake. It is a wonderful proof of how nature likes to take the simplest and shortest way, and exhibits the same accuracy as can be found in the most skillful work of man, for the Rhine profile is much more exact and regular than that of the railway near it.

An example still more surprising is found in the river Aare, where the engineers laid out a specific channel. After some years the river itself changed the artificially determined bed by raising it in places to the extent of a meter, and deepening it elsewhere to the extent of 1·7 meters, into a regular curve, a part of a cycloid.

It will be evident to any one that this remarkable and simple law will take a prominent place in river engineering, as soon as it will be thoroughly studied.

Grate Surface of Boilers.

One of the greatest mistakes that can be made in designing boilers, and the one that is most frequently made of any, consists in putting in a grate too large for the heating surface of the boiler, so that with a proper rate of combustion of the fuel an undue proportion of the heat developed passes off through the chimney, the heating surface of the boiler being insufficient to permit its transmission to the water. This mistake has been so long and so universally made, and boiler owners have so often had to run slow fires under their boilers to save themselves from bankruptcy, that it has given rise to the saying: "Slow combustion is necessary for economy." This saying is considered an axiom, and is regarded with great veneration by many, when the fact is, if the truth must be told, it has been brought about by the wastefulness entailed by boiler plants proportioned badly by ignorant boiler makers and ignorant engineers, who ought to know better, but do not.

Let us consider the matter briefly: Suppose we are running a boiler at a pressure of 80 pounds per square inch. The temperature of the steam and water inside will be about 325° F. The temperature of the fire in the furnace will, under ordinary conditions, be about 2,500° F. Now, it should be clear to the dullest comprehension that we can transmit to the water in the boiler only that heat due to the difference between the temperature in the furnace and that in the boiler. In the case of the above figures, about seven-eighths of the total heat of combustion is all that could by any possibility be utilized, and this would require that radiation of heat from every source should be absolutely prevented, and that the gases should leave the boiler at the exact temperature of the steam inside, or 325°.

To express the matter plainly, we may say that the utilization of the effect of a *fall* of temperature of 2,175° is all that is possible.

Now suppose, as one will actually find to be the case in many cases if he investigates carefully, that the gases leave the flues of another steam boiler at a temperature between 500 and 600 degrees. The latter temperature will be found quite common, as it is considered to give "good draught." This is quite true, especially as far as the "draught" on the owner's pocketbook is concerned, for he cannot possibly utilize under these conditions more than 2,500 − 500 = 2,000° of that inevitable difference of temperature to which he is confined, or four-fifths of the total, instead of the seven-eighths, as shown above, where the boiler was running just right, and any attempt to reduce the temperature of the escaping gases by means of slower "combustion," as he would probably be advised to do by nine out of ten men, would simply reduce the temperature of the fire in this furnace, and the economical result would be about the same. His grate is too large to burn coal to the best possible advantage, and his best remedy is to reduce its size and keep his fire as hot as he can.

This is not speculation, as some may be inclined to think. Direct experiments have been made to settle the question. The grate under a certain boiler was tried at different sizes, with the following result:

With grate six feet long ratio of grate to heating surface was 1 to 24·4.

With grate four feet long ratio of grate to heating surface was 36·6.

The use of the smaller grate gave, with different fuels and all the various methods of firing, an average economy nine per cent above the larger one, and when compared by burning the same amount of coal per hour on each, twelve per cent greater rapidity of evaporation and economy were obtained with the smaller grate. —*The Locomotive.*

The Siberian Railway.

According to *Engineering*, the Russian government would appear to have decided to push on the Siberian railway with energy; Mr. Balinsky, the engineer who constructed the bridge over the Oxus, having passed through there on his way to Siberia to construct by contract 1,000 versts or nearly 700 miles of permanent way, at a cost of 400*l.* a verst. This seems to indicate that the government will construct the railway itself, and in the cheap rapid manner that has proved so successful with the Transcaspian undertaking. The larger proportion of Siberia consists of flat country, resembling the prairie lands of America, and well adapted therefore for the construction of a cheap line. In connection with this a question of policy is involved of interest not only to Russia, but to England and her colonies also—that is, whether it is better to construct an expensive railway slowly across countries like Siberia or Central Asia, spreading the cost over a number of years, or build a rough line rapidly at a limited expense, improving it by degrees after the communications are complete. For the most part the railways of Russia were solidly built, their construction was slow, and the cost of most of them was heavy. Now that the confines have been reached, however, Russia seems inclined to adopt a totally different policy—running railways across large expanses rapidly, and thinking little of intermediate finish so long as important points are linked together, and better means of locomotion are provided than that of the *tarantass* or *telega*. In many parts of Siberia traveling in autumn and spring is absolutely impossible, owing to the absence of well-kept roads. It is obvious that in this case a railway on which, owing to rough workmanship, trains could only go at 10 or 15 miles an hour, would be deemed a godsend to the inhabitants, no matter how much the tourist from Europe might turn up his nose at the speed. The Transcaspian Railway, of which three miles a day were often laid, is roughly constructed, and the trains at present do not run at a greater speed than 15 or 20 miles an hour; but this continuous speed is rapid and luxurious traveling to the officials and troops previously compelled to ride on horseback the whole distance or perform it on the backs of camels. The object the Russian government aims at in connection with the Siberian railway is not so much to provide the country with a good solid line as to link the Pacific coast with Russia proper, as rapidly as possible, with anything better than the present means of communication. As Russian finances would not stand the former alternative just now, there would appear to be sound policy in adopting the latter. After the line is built throughout, it can be rapidly improved.

A New Spectro-Telegraph.

The spectro-telegraph is not a new invention, but a Danish physicist, Dr. Paul la Cour—surnamed "Denmark's Edison"—has constructed a new spectro-telegraphic apparatus on a principle of his own, which promises to become important, and which he now exhibits at the Copenhagen exhibition. On the high roof of the establishment National, some distance from the exhibition, he has placed an apparatus which, when seen from the exhibition grounds, shows a vertical steady spectrum. On being examined by a specially constructed telescope, a number of red and blue dots and lines are seen to appear and disappear exactly in the same manner as the dots and lines on the tape of a Morse telegraphic apparatus. This is spectro-telegraphy, and, by the aid of this apparatus and a telescope, messages may be transmitted at night with the same exactitude as by the electric wire. The invention will be particularly valuable in navigation, as, for instance, two ships may signal to each other without any fear of being misunderstood, while the beam from a lighthouse or harbor light may be made to flash any message to a passing vessel. The details of Dr. La Cour's apparatus are kept a secret, but it is known that the effect is obtained by the breaking of the spectrum by means of little slits opening and shutting, displaying the colored dots and lines. This is again effected by an electrical apparatus, fitted with keys lettered and numbered.—*Iron.*

ACCORDING to *La Nature*, an immense terrestrial globe, constructed on the scale of one millionth, will be shown at the Paris exhibition of 1889. The globe will measure nearly 13 meters in diameter, and a town the size of Paris will barely occupy a square centimeter of its surface. The globe will rotate on its axis, and thus represent the movement of rotation of the earth.

Peculiar Electrical Phenomena.

Some very singular electrical phenomena, says the *English Mechanic*, were observed on two very dry days at a printing office in Mayence, when the establishment seemed to be converted into a huge electrical battery. Electric sparks several centimeters long could be drawn with the fingers from all parts of the printing machinery, just as may be done from a charged electric machine. The action of the sparks became so pronounced that the layers-on and takers-off (who, it should be remarked, in German printing offices are mostly young women) refused to work, as burning sparks were emitted every time the machines were touched with the hands. The electrical phenomena were most striking in the machines used for lithographic printing. A strong paper made of cellulose was being printed at the time, and the takers-off observed a slight crackling as the sheets, which adhered pretty closely to the oil cloth covering of the cylinder, were being withdrawn. This crackling was finally developed into a loud explosion, accompanied by beautiful flashes from ten to twelve centimeters (from four inches to five inches) in length. The discharges are stated to have been more effective the more quickly the sheets loaded with electricity were withdrawn. A small circular saw mounted about four inches from an iron column discharged at intervals of from 20 to 30 seconds, when driven, powerful electric sparks, accompanied by loud explosions, upon the column. These phenomena were observed for hours, and continued for two days, when the printing office became free from electricity, and has remained so since.

The following explanation is given of the occurrence : The outer walls of the building in which the printing machinery is placed are separated from the surrounding soil by a thick layer of asphalt, serving to keep the moisture arising from the soil from penetrating the walls. In the present case the asphalt at the same time served to isolate the electricity generated within. The floors of the several machine rooms are also laid thick in asphalt, and the machinery is fixed direct to this flooring, so that it is likewise perfectly isolated. There are only a few iron columns having direct connection with the earth. On the morning of the day on which the startling phenomenon described was first observed, all the machine belts had been greased with a mixture consisting of resin and linseed oil, serving to increase the friction between the belts and the pulleys. As soon as the machinery was set in motion, each individual pulley was converted into an electric machine on a large scale, negative electricity being formed on the belt covered with resin, and positive electricity on the iron pulley. The stored electricity, of course, was immediately given off whenever one of the machines, which for the time being were changed into accumulators or secondary batteries, was "tapped."

Worsted Yarn Scouring and Bleaching.

In scouring wool nearly all the natural grease is removed from it. This renders the wool so harsh and dry that it cannot be combed and spun. So it is found necessary to return to it a certain amount of grease or oil. For this purpose olive oil is the most suitable and the most easily removed, but, in many cases, at the present time a mixture of paraffine oil and an animal oil, called a wool oil, is employed. During the spinning the yarn gathers dust and bits of solids, and when the yarn is to be scoured these must be removed as well as the grease. A simple alkaline bath would be sufficient to remove the oil, but the action of a fixed alkali upon wool is considered disadvantageous before bleaching, and even a small quantity should be avoided. Ammonia should be used if any alkali must be employed. The common treatment consists in hot soapings with a neutral olive soap. The ordinary rectangular wooden box should be used, and the yarn manipulated in the usual way upon sticks. The hanks are turned in the usual way during the soaping. Fifty pounds is a convenient quantity to wash in one box. Run into the box 200 to 250 gallons of water, add four to five pounds of soap, dissolve and raise to 120° Fah., and enter the wool, work for fifteen minutes, allowing the temperature to rise, but not to exceed 190° Fah., under any circumstances. Wring, and repeat the treatment, but use three pounds of soap. If any difficulty is found in removing the oil, add a few ounces of ammonia water to each bath. The olive oil is easily removed, the wool oil with more difficulty, but usually perfectly if it contains a sufficient per cent of animal oil. Now wash over with cold water, wring, shake out, and introduce at once into the bleaching chamber.

The bleaching chamber should be built of brick, and the hanks can be hung upon poles. The sulphur should be burned at the bottom, and the fumes circulated up through the chamber. The yarn should be kept in the sulphurous acid for 24 hours. It must then be withdrawn and washed with warm dilute soap (1 pound for 50) containing a little soda. If a treatment for 24 hours does not give sufficient whiteness, then the yarn is wrung and returned to the chamber. After the final wash the yarn can be tinted by passing it through a bath containing a very small quantity of indigo extract if a blue white is desired.—*Textile Record.*

THE SPIRAL SCREW DRIVER.

Since the introduction, by Mr. F. A. Howard, of Belfast, Me., of the original Allard patent spiral screw driver, which on account of its great merit as a labor saving tool has found many imitators, various parties have used different devices to avoid the original patent. The accompanying illustration represents the screw driver with the bit extended and with the bit closed. To drive a screw, as is well understood, the point of the screw driver is placed in the nick of the screw, and held there by the thumb and finger while the handle is gently withdrawn, thus extending the bit, after which it is only necessary to press on the handle in a straight line with the axis of the screw, the spirals on the upper part of the bit causing it to rapidly revolve. The screw is withdrawn as with a common screw driver. This tool is especially designed for light and rapid work, for the use of mechanics, such as machinists, gun and locksmiths, cabinet makers, coffin makers, carriage makers and all who have large quantities of small screws to drive, thereby avoiding the tiresome turning of the hand and twisting of the wrist. The best quality of material is used and superior workmanship employed in the production of the "Allard," which retains its hold on popular favor, and the sales of which are said to exceed those of all its competitors. The New York agents are the Alford & Berkele Co., of No. 77 Chambers Street.

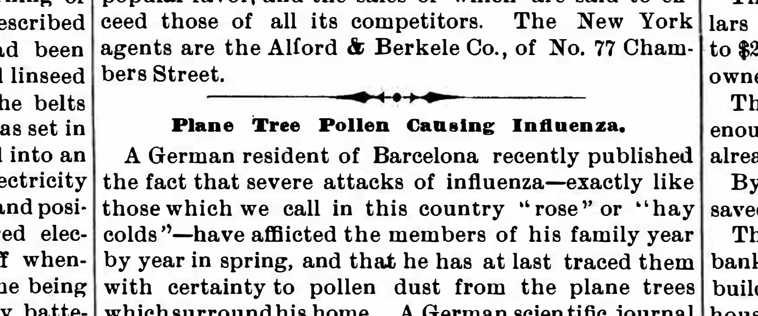
THE "ALLARD" SCREW DRIVER.

Plane Tree Pollen Causing Influenza.

A German resident of Barcelona recently published the fact that severe attacks of influenza—exactly like those which we call in this country "rose" or "hay colds"—have afflicted the members of his family year by year in spring, and that he has at last traced them with certainty to pollen dust from the plane trees which surround his home. A German scientific journal thereupon declares that the evil influence of plane tree pollen upon the stomach, throat, eyes, and ears was a well known fact in antiquity, both Dioscorides and Galen having called attention to it. That German scientific men will acknowledge that an influenza may be produced by pollen dust of any kind will surprise many American travelers; for many must remember their experience with German physicians, who have laughed the idea to scorn, refusing to believe in the periodicity of the attacks from which their foreign patients suffer, or in the potency of the cause to which those patients attribute them.—*Garden and Forest.*

AN IMPROVED CABLE CAR CLUTCH.

An improved system of cable car clutches and switches, designed to enable the cars to turn a corner and exchange lines of cable, has been invented by Messrs. Henry and George Davenport, of Somerville, Philadelphia, Pa., the illustration herewith showing a longitudinal section of the improved car. To the framework of the car are pivoted frames in the outer ends of which are journaled the shanks of the grips, each frame carrying a roller which rides upon a curved track, and the devices at the front and rear of the car being alike. The grip has a sliding bar carrying a lower jaw adapted to move upward, and clamp the cable, the frame having a guide beveled at its ends and carrying guide rollers for holding the cable while the jaws are being brought into engagement therewith. Upon one end of the car are arranged two levers, each connected by a rod with an arm on a shaft adjacent to each of the axles of the car, and to each clutch-supporting frame is attached one end of a spiral spring, the opposite end being connected with the body of the car, the spring acting to draw the frame over to cause the clutch to enter the switch and follow the curve leading from one track to another. To transfer a car from one track to another, the front grip is detached and allowed to follow the curved slot, while the car is pushed forward by the rear grip until the front grip enters the conduit of the second cable and is engaged therewith, when the rear grip is released, and the car moves forward on the second track as before.



DAVENPORT'S IMPROVED CABLE CAR CLUTCH.

Reduction of Low Grade Ores by Electricity.

The Utah Mining and Reduction Company, whose works are located at Bingham, ten miles south of Salt Lake City, are using the new "Meech process" in the reduction of their low grade and rebellious ores with success.

The ore is passed through a crusher and rolls, crushed to 40 mesh fine, thence into a disintegrating machine, four tons at a time, through a valve, with sufficient water and chemicals to treat the sulphur and refractory elements. Steam is then admitted to a pressure of 100 pounds per square inch, and, at the same time, the mullers are revolved at about 30 revolutions per minute, generating electricity in such volume as to greatly assist in the decomposition of the ore.

This is continued for three hours. The ore is reduced to an impalpable powder, many times finer than is possible by other methods, and is thoroughly decomposed and desulphurized.

The water absorbs the chemicals, every atom of gold is made bright, and in condition for amalgamation. The pulp is now discharged into the amalgamator below, a revolving machine seven feet long and five feet in diameter, in which are copper plates placed lengthwise, and, by hydrostatic pressure, quicksilver is thoroughly pressed through the ore, by a "settler" of peculiar shape, having an electric copper wire broom to assist in gathering the fine amalgam before the tailings are discharged.

The cost of the treatment is from two to three dollars per ton, and as the gold ores treated run from $12 to $20 per ton, it leaves a handsome margin for the owners.

The ore veins are large, and thousands of tons, or enough to supply the mill for the next 100 years, are already in sight.

By this process about 90 per cent of the gold is saved.

The works occupy about nine acres of land on the banks of the Jordan River, and consist of two main buildings, 32×64 and 24×34, one two-story boarding house, one blacksmith shop, two 35 horse power engines, one crusher, one roll, and other necessary appurtenances, are connected with the mines by the Denver and Rio Grande and Western Railway, and demonstrate in a practical manner the immense sums that can be realized from the treatment of low grade and refractory ore dumps, that have heretofore been considered absolutely worthless.

What the Cow Gives Annually to the United States.

Under the title of "What the Cow Gives Us," originally from the *American Breeder*, a statistical article is going the rounds of the dairy and trade press showing the extent, value, and importance of the dairy industry. What the cow gives us is declared to be $500,000,000 worth of dairy products, good, bad, vile, poisonous or otherwise, as estimated for last year in milk, butter, cheese, water, acids, chemicals, color, oils, etc. The proportion of milk, butter or cheese produced does not, of course, appear, but taken as a whole the article is intended to show the great money value in cows and cow products, and the importance, commercially and politically, of the 4,000,000 farmers who own them. Whether the figures are correct or not, there is no doubt that the dairy industry is very large, and susceptible of still larger expansion. One thing, however, is very certain, that out of 1,350,000,000 pounds of butter said to be made last year, at least one-third of it ought never to have been permitted to have been sold for food. The same may be said of cheese, a big part of the annual product being skim or filled cheese, and about as nutritious and digestible as sawdust. Competent observers are of the opinion that a large part of the increase, both in production and value of dairy products, represents merely the increased adulteration and dishonesty on the part of the dairymen and farmers. Take from the estimates of "What the Cow Gives Us" the beef and hog fats and vegetable oils, not to speak of the more pernicious adulterants, such as chemicals and acids, salt, water, coloring matter, and other things which are taken from various sources and finally credited to the cow, and the real showing would be much less.—*Produce Exchange Bulletin.*