Correspondence

Concerning Twin Screws.

MESSRS. EDITORS:—Will you permit me to make a few remarks in your highly interesting and valuable journal upon the subject of "Twin Screws" for steam vessels as compared with the practice of using one only? I observe that this subject is meeting with a good deal of attention in print, as well as in the conversations and discussions of engineers and naval men. In the SCIENTIFIC AMERICAN, of Sept. 3d, I notice a letter from Chicago, signed "R. C. B.," giving you an idea of the history of the subject on our Western lakes, drawing conclusions unfavorable to the use of "Twin Screws," except "for special purposes; such as for short trips, where there is much going in and out of narrow and crowded harbors, or for shoal water, where but little immersion can be had."

Having myself served on the Western lakes as an engineer, I can confirm the truth of the statements made by your Chicago correspondent as regards the general historical facts, and also that he correctly represents the prevailing opinions upon the subject held by experienced men on the lakes, but I wish particularly to call your attention to the fact that all naval vessels ought to come within the exception which he explains, and which I have quoted from his letter. That is to say:—

First, All naval vessels ought to be comparatively light draft, because this quality admits them to a greater number of harbors. And every one will now admit that all naval vessels should be very fast. From these facts it will readily be seen that they should come in the same category as those on the lakes, which are built "for shoal water."

Second, All naval vessels should be able to maneuver with the greatest possible rapidity. The London *Times* said that the *Kearsarge* was victorious over the *Alabama* because she had the greater speed, and could therefore secure the advantage of position. Now although we all know on this side of the water that the *Kearsarge* had other advantages, such as greater skill on the part of the officers in conducting the details of the fight, better discipline among her crew, and better drilled gunners, yet the fact that a paper like the London *Times* should say that it was owing entirely to her greater speed giving her the commanding position shows the great importance which is attached to that power, and I think every one will understand that in case of a conflict between two vessels of equal speed, one of them having one and the other two screws, the twin screw could always assume the commanding position. This then brings the naval vessel into the category of those on the lakes which are intended "for short trips, where there is much going in and out of narrow and crowded harbors."

With regard to the improvement in the speed of the lake steamers effected by using but one screw in lieu of two, although I am aware of the fact, I consider it due to causes which have been little suspected by those making the change. Twin screws require a sharper after body of the vessel than the single screw to give them an equally advantageous action upon the water. When, therefore, you remove the two screws and substitute one, you have in effect given a finer run to your vessel, and where this was pretty full, as I well remember the old *Independence* to have been, the improvement in the speed would necessarily have been marked. With a finely modeled vessel, adapted in its form to the twin screws, and with screws well proportioned to their work, I am satisfied the same speed would be obtained with a given boiler power as with the single screw, and in case the draft of water was light compared to the power applied, the twin screws would assuredly give the greater speed.

With regard to the screws becoming foul from spars and rigging going overboard, the single screw would, in all probability, become foul if no precautions were taken to prevent it, and I think it as easily prevented with two as with one, having seen plans which have proved entirely successful with the single screw, and which are equally applicable to twin screws. NAVAL ENGINEER.

[Our correspondent attaches more importance to the opinions of the London *Times* than we do. Since its course on the Armstrong gun question, intelligent mechanics regard it as the poorest of all authorities on any questions connected with mechanics or engineering.—EDS.

Aerial Navigation.

MESSRS. EDITORS:—I am a firm believer in the practicability of "Aerial Travel," and that the crowning scientific triumph of this eventful century, will be the accomplishment of this much-sought-for and long-desired object. According to my views no aerial machine can be of any practical value unless it combine these essential properties:—It must exert within itself force sufficient to overcome the resistance of opposing winds. Ballooning machines, floating in the current, are only dangerous toys, of no utility, but as objects of curiosity to the multitude, or as a limited means of investigation to the scientific.

Aerial machines must be driven at a very high speed, not less than 50 miles an hour, and as much over that velocity as can be attained. They must possess the power of rising and lowering at all times, so that favorable currents of wind blowing above and below may be made available The point to which I would call the attention of experimentalists at present, is the construction of their model machines with huge gliding surfaces, so that they will glide upwards. An arrow is made long and slim, convert its materials into a ball, and the bow which made the arrow travel hundreds of yards, will scarcely force it out of your hands. The paper kite held by a string is elevated by the wind sliding against it, roll its materials into a lump, and you cannot place it in any position where any ordinary wind will hold it suspended. Birds of prey and water-fowl glide round and along for hours without any apparent weariness.

In my ultimate views of "Aerial Travel," I entirely discard all inflation. Would space admit of it I would send a description of a model machine, which I will construct this coming year, and also the machinery for driving it. Allow me to make a suggestion before closing. Let us have in New York an "Aerial Ship Convention," where the different parties who are "thinking" on its accomplishment may meet together, try models, and exchange views. I am satisfied it would excite a great deal of public interest both in this country and in Europe, and that it would be largely attended. J. T. D.

[Our correspondent will excuse us for shortening his communication somewhat. We have retained all that we thought would be of interest to any of our readers.—EDS.

High and Low Velocities.

MESSRS. EDITORS:—In your issue of the 27th inst., under the head of "Iron Plates not Invulnerable," commenting upon the reports of experiments made at Shoeburyness with the 600-pounders, you propose to show that the "complete destruction of a most massive iron-plated target by a 600-pound shot," fired from the 13½-inch Armstrong rifle gun, proves conclusively the soundness of the views which our ordnance officers have urged for many years, viz:—that very heavy shot, at moderate velocity, are more destructive in their effect than lighter shot at high velocity.

Does this experiment, as reported, prove this theory to be correct? To my mind it proves directly the reverse. What are the facts as given in your account taken from the London *Mechanics' Magazine* and the London *Times?* It is stated that a 600-pound shot fired from the 13½-inch Armstrong shunt gun with a charge of 40 lbs. of powder ($\frac{1}{15}$ the weight of the shot) would produce an initial velocity of 840 feet per second at 200 yards. Will our ordnance officers contend that even this low velocity can be given to a 600-pound shot with so small a charge as 40 lbs. of powder? I have it from pretty high English authority that the proportion of charge of powder to the weight of shot usually used at Shoeburyness in these experiments is about $\frac{1}{5}$, and many times a much heavier charge is used. It appears from the report of this experiment that after the "initial velocity or speed at which the 600-pounder moves has been taken by Narvaez's electric apparatus," it is ascertained to be 860 feet per second on leaving the gun. "The gun, therefore, was loaded with a 40-pound charge and a steel shot weighing 303 pounds," leaving exactly 297 pounds, a very fair weight for a shot to be fired at another time. It will be seen that the proportion of charge in this instance was greater than the $\frac{1}{5}$ usually used. Now if, as is shown by "Narvaez's electric apparatus," a velocity of 860 feet per second is given to a shot weighing 600 pounds with a charge of 40 pounds of powder, what will be the velocity given to a *steel shot weighing 303 pounds with the same charge?* It appears from the report that it was the 303 pound shot with the high velocity, and not the 600-pounder at low velocity that did the smashing.

I am an advocate of high velocity, and cannot accept such comparisons in proof of the greater destructive effect of shot fired at low velocities, as is given by Major Barnard in his "Notes on Sea Coast Defense," such as "a leaden bullet fired from a pistol will penetrate a pane of glass by a clean hole; the same being thrown by the hand will smash it to fragments."

There can be no doubt but the pane of glass would be smashed by the leaden bullet thrown by hand; glass is known to be a very brittle substance and easily shattered into fragments, and such comparisons do not illustrate the effect of shot fired against iron plates at high velocity. But instead of the glass we use a plate of sheet iron, which would more correctly illustrate the actual result produced upon the iron plate. To throw the leaden bullets with the hand against a plate of sheet iron would be very much like throwing peas against the wall; it would be difficult to tell where they hit. While the same leaden bullet fired from a pistol would penetrate the plate clear through, fracturing it more or less. Now is it the weight of the bullet that produces the destructive effect upon the plate, or is it the velocity?

I am decidedly in favor of the Government making 20, and even 30-inch guns. No doubt they will have their "mission" as the "Ericsson monitors" have had theirs. But in my humble opinion lighter guns, possessing greater strength, throwing shot of less weight, with high velocity, will win the battles in actual contest, and decide the fate of the nation.

H. F. MANN.

Pittsburgh, Pa., Aug. 29th, 1864.

[If our correspondent will read the account of the London *Times* carefully, he will see that it is stated distinctly that the shot tried—the 303-pound steel shot—moved at the velocity mentioned—840 feet per second.—EDS.

A Whitewash that will Keep.

MESSRS. EDITORS:—How can I make a whitewash that will always be ready for immediate use.

J. C. B.

Albany, Sept. 3, 1864.

[If whitewash, made of lime and water, is brought in contact with carbonic acid, the lime enters into combination with the acid, forming carbonate of lime. Water usually contains carbonic acid, for if brought in contact with carbonic acid gas it absorbs its own bulk of the gas. When whitewash is made, therefore, a portion of the lime is immediately converted into carbonate of lime. The water being thus freed from its carbonic acid, gradually absorbs a fresh supply from the atmosphere and the process of converting the lime into carbonate continues. This carbonate of lime is not adhesive, and its mixture in the whitewash impairs the quality of the wash. In order to make a whitewash that will keep, the carbonic acid should be expelled from the water before the lime is introduced, and the wash should then be excluded from the atmosphere. The acid may be expelled by boiling the water, and it may be prevented from returning by keeping the whitewash in a tightly corked bottle.—EDS.

1,000-Pounder Cannon.

MESSRS. EDITORS:—I take pleasure in informing you that after a great many delays the great 20-inch sea-coast gun has arrived at its destination. On the morning of the 25th the Bishop's derrick was towed down the bay with the gun on board, at 11 A. M., it landed at the United States wharf at Fort Hamilton. The gun was raised about 9 feet, and landed in safety in 30 minutes on an oak cradle prepared for that

purpose. The engineers have commenced to move it to solid ground for fear of its great weight crushing the stone dock. It is moved on 4-inch iron rollers on oak ways which, like the cradle, are plated with iron, the power is a four-fold tackle with two successive luff-tackles, it will be moved about 40 or 50 yards a day. The platform will be ready in time to receive the gun. A CONSTANT READER.

New York, Aug. 28, 1864.

A Singular Steam Engine.

We have seen a number of novel steam engines in our time, but the one described in the following account by the *Herald* reporter rather exceeds any we ever met with.

"I cannot refrain from giving an account of the building of a very small steam engine, the materials of which were picked up in different parts of the State and suited to their proper places at the leisure of the builders. A description of the materials used, and where procured, will be of interest, and any one anxious to procure relics of the war would find in this small engine a whole cabinet of curiosities. The length of this piece of Yankee ingenuity is fourteen inches, and its height ten inches, and, though so small, yet it works beautifully. The bedplate, a small brass plate, was taken from a mill at Port Royal. The cylinder bed, on which the builder's name is generally engraved, was taken from a small engine used for washing gold at the gold mills on the Rapidan river. The way stand is made from a piece of the balance beam of Fairbanks' scales. The cylinder is from a piece of musket barrel. The steam pipe is a silver pen-holder, as also the exhaust pipe. The steam whistle is composed of several pieces; the head the mouthpiece of a bugle, the cap a cartridge of Spencer's repeating rifle, and the knob the tip of a bayonet scabbard. The hub of the flywheel is the plug of a shell fuse, The four spokes are made from a Springfield musket ramrod, the rim from a center table taken at the Spottsylvania Court House. The safety valve is another piece of bugle, helped out by a piece of lightning rod taken from a mill at Rappahannock station. The beam of the valve is a cavlaryman's buckle filed down; the weight a knob of a bureau drawer from Spottsylvania Court House; two try cocks from Fairbanks' scales, taken at Rappahannock station. The boiler is made from a common oil can; the furnace from a camp kettle, as also the smoke-stack. The frame upon which the whole rest is mahogany, made from a piano taken from the house of a major in the rebel army. The rests or legs to the frame were taken from a pair of andirons from the same house The rests of the boiler came from a snare drum. The builders of this beautiful little engine are W. E. Hawkins, of Newport, N. Y., and A. R. Evans, of Utica, N. Y., both of Company H, Forty-fourth regiment New York Volunteers. When we take into account the scarcity of materials and tools to make such a nice piece of mechanism, and the length of time taken to complete it—being under process of construction nearly three years—it certainly becomes quite a curiosity, and one that would prove a valuable acquisition in the way of historical records and relics.

A New Submarine Boat.

The *Herald* of the 9th inst. speaks of a new torpedo boat recently invented by Chief Engineer Wood, U. S. N. This vessel is designed to explode a torpedo in contact with a ship's bottom, and is an entirely new conception. The following description of the vessel is taken from the *Herald* reporter's account.

She is a wooden vessel, seventy-five feet in length, twenty feet beam, and seven feet depth of hold. She is built in the most substantial manner, with heavy beams supported by hanging knees, securely bolted and fastened. The deck is crowned about two feet fore and aft, and about as much athwartships, and this will be covered with a thickness of iron armor sufficiently strong to make it shot and shell proof.

The vessel will sit very low in the water under any circumstances; but when not actively employed she will float some twenty odd inches above the surface; but when approaching a vessel to destroy her or engage in blowing up obstructions, only the crown of her deck will be above water. There are but three objects above the decks—viz: pilot-house, smoke-stack and ventilator. These only show a few inches at the most. These articles are perfectly shot-proof, and their openings are protected in the most secure manmanner.

The novelty of the affair is not seen until a visit is made below the deck. Away aft is placed the engine, with a cylinder of eighteen inches in diameter, and eigteen inches stroke of piston. This engine works a screw of a size capable of forcing the vessel through the water at the rate of say twelve miles per hour. Next comes the boiler which furnishes steam for the main engine as well as for the auxiliary engines, which work the submerging pumps, and the mechanism by which the torpedo arm places the torpedo beneath the ship. Everything connected with these machines is of the most simple and durable kind, and not at all liable to get out of order. Forward of the boiler is the steeringwheel, located beneath the pilot-house, and then comes the torpedo machine. It must not be expected of us to explain in detail how this machine works.

Important Letter from General Grant.

While a portion of our citizens at home are endeavoring to create a division in favor of the rebels by sowing the seeds of disunion among us, that right arm of the nation—General Grant—in the midst of his arduous labors writes an able and inspiriting letter which every one should read. The last hope of the secesh is to hold out until the election trusting, as the General says, that something will "turn up."

HEADQUARTERS, ARMIES OF THE UNITED STATES,
City Point, Va., Aug. 10, 1864.

Hon. E. B. WASHBURNE:—

Dear Sir,—I state to all the citizens who visit me, that all we want now, to insure an early restoration of the Union, is a determined unity of sentiment North. The rebels have now in their ranks their last man. The little boys and old men are guarding prisoners, guarding railroad bridges, and forming a good part of their garrisons for entrenched positions. Any man lost by them cannot be replaced. They have robbed the cradle and the grave equally to get their present force.

Besides what they lose in frequent skirmishes and battles, they are now losing, from desertion and other causes, at least one regiment per day. With this drain upon them the end is not far distant, if we will only be true to ourselves.

Their only hope now is in a divided North. This might give them reinforcements from Tennessee, Kentucky, Maryland and Missouri, while it would weaken us. With the draft quietly enforced the enemy would become despondent and would make but little resistance.

I have no doubt but the enemy are exceedingly anxious to hold out until after the Presidential election. They hope a counter revolution, they hope the election of the peace candidate; in fact, like Micawber, they are hoping for something to "turn up."

Our peace friends, if they expect peace from separation, are much mistaken. It would but be the beginning of war, with thousands of Northern men joining the South because of our disgrace in allowing separation. To have "peace on any terms," the South would demand the restoration of their slaves already freed. They would demand indemnity for losses sustained, and they would demand a treaty which would make the North slave-hunters for the South. They would demand pay for the restoration of every slave escaping to the North.

Yours truly, U. S. GRANT.

The 600-Pounder.

The *Mechanics' Magazine*, London, never fails to prick any mechanical bubble that looks unsound. The new 600-pounder gun is perhaps not a bubble in any sense, but the article subjoined shows that the conductors of the journal alluded to regard it with suspicion:—

"Day by day new facts leak out to prove that the 600-pounder is by no means worthy of the laudation which it has received in certain quarters. The truth is, that the gun is so wanting in precision that it has little in common with a true rifle. The experiments at the 'Warrior' floating target proved that, out of five rounds with shell, fired at only 500 yards range, but one hit could be obtained, and even that followed on a ricochet. A good deal of privacy has been observed in conducting the experiments; but facts are very troublesome things, and possess a strange faculty for finding their way to the ears of the public. The 600-pounder is a gun capable of burning charges of 70 lbs. of powder, and so far it is a very good gun, but no further. We have already alluded to its want of accuracy, and the following data will show that matters are in this respect worse rather than better than we said. The result of a large number of experiments may be stated thus:—

"At two degrees elevation the common shell (blind) attained a maximum range of 921 and a minimum of 818 yards, the least deflection being 7·2 yards, the higest 8·8 yards. The real difference in range thus amounted to 103 on an average of 870 yards. At three degrees the same shell attained a maximum of 1,244 yards, and a minimum of 1,090, the greatest lateral deflection being 13·8, the least 6·4 yards. The real difference in this case rose to 154 on an average range of 1,167 yards, or between one-seventh and one-eighth of the latter.

"Nor is the aspect of things changed materially by using the very short 512 pound solid shot. In fact, the highest and lowest ranges made at three degrees elevation were respectively as 1,662 and 1,480 yards, giving a plain difference of 182 yards, between the two. Out of ten successive shots fired for this purpose only two were in line, the extreme deflections being to the right 2·2, and to the left 8·2 yards.

"It has been stated that a vote has been taken for the construction of four more of these guns, but this is simply a mistake. Four 600-pounders have been ordered, it is true, but they will not be similar to 'Big Will.' The bore will be but 13 inches instead of 13·3, and we believe that the barrels will not be of wrought iron, but of steel. The order, too, will in all likelihood be executed partly at Woolwich, and partly at Elswick. The report of the select committee is, we have every reason to believe, unfavorable to the gun."

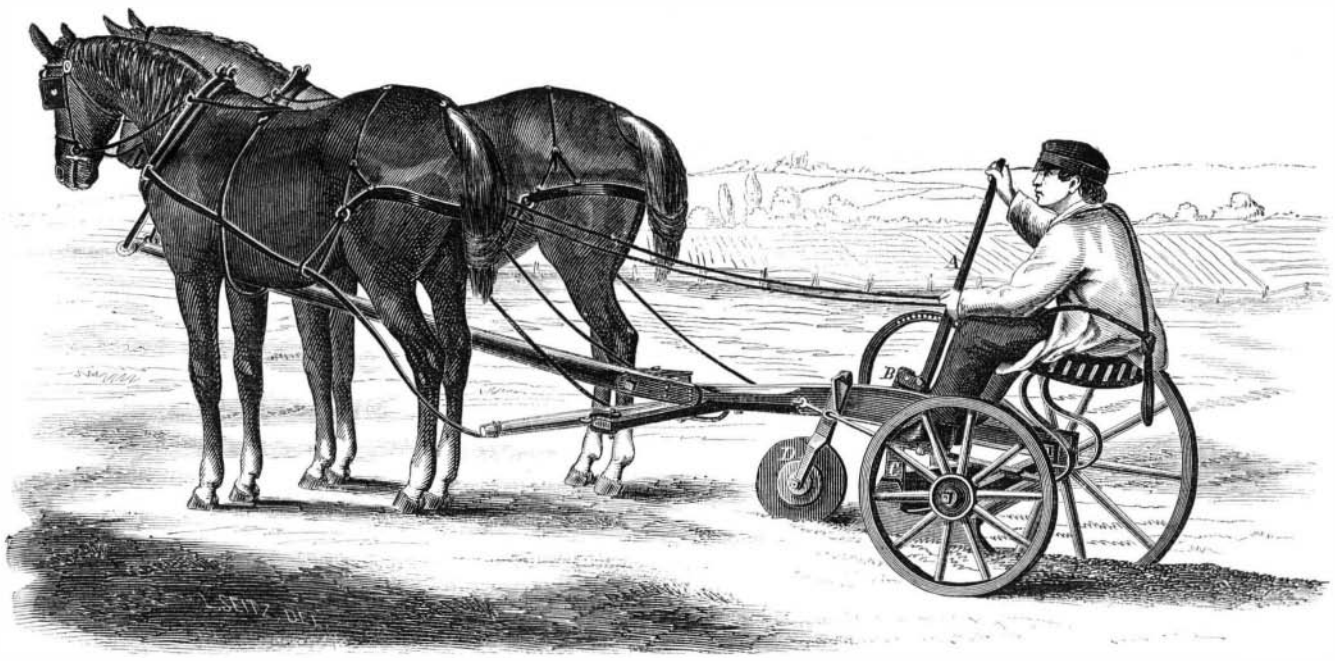
Telegraph Across British North America.

The Montreal *Gazette* says:—"The Hudson's Bay Company lately appointed the Arctic explorer, Dr. Rae, to visit the country between Red River and the Pacific coast, to select the proper line for the telegraph. That gentleman reached Fort Garry about a month ago, and is now far on his way across the plains of Saskatchawan; and we are now enabled to make the further announcement that seventy-seven tuns of the wire, nearly half the quantity required, have arrived in Montreal, and the balance will be here very shortly. The wire is to be forwarded at once by the Grand Trunk Railway Company to Sarnia, and by steamboat to the head of Lake Superior, whence it will be transported during the next winter to Fort Garry or the Red River, at which place the whole of the wire instruments, insulators, etc., will be collected by the beginning of spring. The poles will be got ready during the winter; as soon as the fine weather of next spring sets in, active operations will be commenced, and by the close of the year 1865 there is every reason to expect that telegraphic communication will be in operation from Fort Garry to the shores of the Pacific. The telegraphic system of the United States is now in operation to within about 400 miles of Fort Garry. This gap will certainly be at once filled, and the messages can pass from any part of Canada to British Columbia. Will not Canada be prepared to complete the communication between Fort Garry and Montreal by the Ottawa Valley, so as to have an unbroken line of telegraph stretching from the Atlantic to the Pacific through British territory? This active prosecution of the Pacific telegraph by the Hudson's Bay Company is the best evidence of their intention to inaugurate a new policy in their affairs. The progress of the telegraph with the company's posts every forty or fifty miles will be the surest means of opening up the country, and directing to the fertile territories of the Saskatchawan, the Assiniboine, and the Red River, a tide of settlement and population which will ultimately complete the chain of British colonies from one ocean to the other."

PRIZE TO MR. SOREL.—The prize founded by the Marquis d'Argenteuil for the most useful discovery for the perfecting of French industry, has been awarded to Mr. Sorel, the inventor of the process of the "zincage of iron," known under the name of *galvanizing iron.*—*Les Mondes*,

Adjustable Sulky Plow.

This plow is novel in its design and construction and is intended to reduce the fatigue attending the performance of this portion of farm labor. It will be seen that the plowman rides instead of walks, and guides the plow by the team instead of tugging at the handles as usual. When an obstruction is found in the path of the furrow, the plow itself is easily and quickly elevated by the lever, A, at the right of the plowman. This lever has a short toe, B, at one end which connects to the plow by means of the bar, C, so that by working the lever the depth of cultivation can be fixed or the plow raised entirely, to avoid stones, etc. A rotary coulter, D, is attached to the plow beam, which turns as the team advances and makes a clean incision with much less friction than the ordinary coulter. The inventor claims for this plow that while it is quite as efficient as any other it is much easier to operate, and that a lame or otherwise infirm person can do a good day's work with it. The off-wheel runs in the furrow and is made slightly larger on that account. A patent for this plow was obtained on the 15th of September, 1858, through the Scientific American Patent Agency, by B. B. Scofield. For further information address Charles Foster, Box 260, Rockford, Ill.



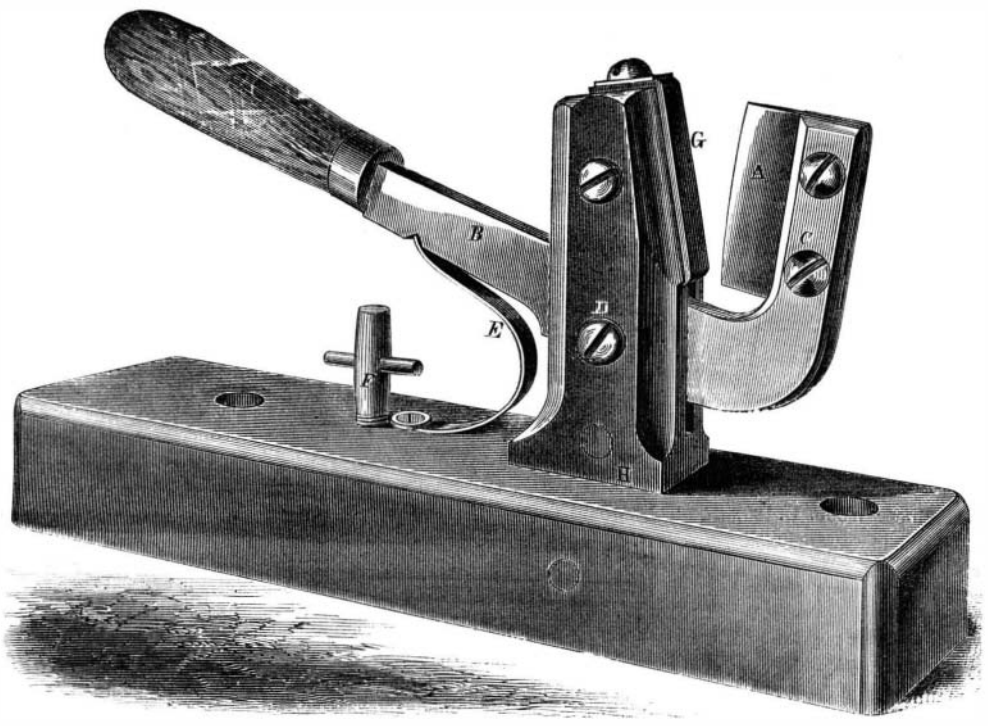
SCOFIELD'S ADJUSTABLE SULKY PLOW.

Grafting Knife.

This instrument is intended for preparing grafts or tree-cuttings for nurserymen and gardeners. It is so arranged as to attain the object without injuring or bruising the grafts or destroying their vitality. The mechanical construction of the several parts is such that they are easily kept in order and are always efficient. The instrument consists of a knife blade, A, set in the lever, B. This blade is independent and is kept in place by the screws; when these are slacked off the knife can be taken out and sharpened. The lever has a handle at one end and works on a center at D; there is also a spring, E, on the under side, and a screw stop, F, which can be raised or lowered to adjust the cut of the blade. At G a leather pad is placed which the knife edge works on and thus preserves its edge unimpaired. The upper part of the standard, H, is sloped off, and the knife works against it in a corresponding manner. By reason of this the operator is enabled to adjust the "cutting" properly between the pad and knife, and also make a smooth, clean incision. Any lateral or side play of the knife is avoided by screwing up the standard, H, at its sides as they wear.

This instrument may be worked either by hand or foot-power, and a patent is ordered to issue through the Scientific American Patent Agency to S. S. Jackson, of Cincinnati, Ohio.

For further information address the inventor as above.



JACKSON'S GRAFTING KNIFE.

A Perpetual Motion Swindler Detected.

The Stanstead (L. C.) *Journal* says:—"Our readers will recollect some notice taken in these columns about a year since of a small machine exhibited through the country, which its inventor claimed to contain the principle of self-motion, or perpetual movement. The machine was a metallic wheel with a system of cords and falling balls suspended to the arms of the wheel, which was supported on a thick base of wood. It turns out that the affair is a very ingenious deception. The base or platform contains a system of clock-work, with a spring running up to the axis through one of the standards supporting the wheel. When 'wound up,' it would run some twelve hours. The inventor of this wonderful 'perpetual motion' is said to have made quite a sum by humbugging persons, and then imparting the secret. Of course parties who have invested are anxious to get their money back by sale or exhibition, and have had a motive in keeping his secret."

[There is no "principle of perpetual motion," and it is a waste of time and money to look for it.—Eds.

Lighting Mines.

The London *Mining Journal* says the Rev. W. R Bowditch, of Wakefield, England, proposes to condense air by a pump, or other suitable means, and convey it in pipes to a receiver, and thence to the light, to be supplied, or directly from the condenser to the light. The light, naked or in a safety-lamp, is placed in a lantern, which has an aperture for the admission of the pure air, and one or more apertures for the exit of the air and products of combustion. The condensed air is conducted through a pipe, which fits tightly into the lantern, and by this air combustion is supported. The surplus air, and the products of combustion pass out through the apertures made for that purpose in the lantern. The air being supplied to the lantern under pressure, prevents the entry of firedamp or any other dangerous gas that may surround the lantern. Air under pressure is apt to extinguish lights supplied with it, and to flow to waste if the current be not regulated; to prevent this he passes it through a pipe or pipes, obstructed by screw-plugs, or taps, or wire, or by combinations of these, or by other suitable impediments, so that its flow may be regulated according to the supply needed. He also uses the waste air blown off from engines worked by compressed air. In this case, the air which is blown off is received into a suitable box, with a valve, before it is allowed to mingle with the atmosphere, and it is conducted from the box to the light through a pipe or pipes, as described. He also allows the air to escape around lights without its closing them, but this plan is not so efficient, and has the additional disadvantage of being much more expensive, two important drawbacks to its adoption.