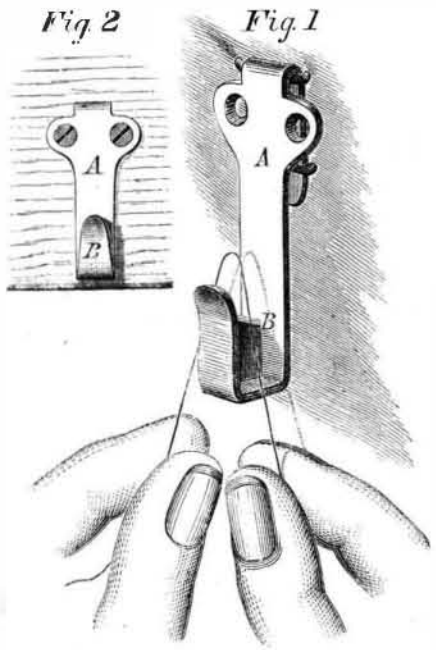
THREAD CUTTER.

Our engraving illustrates a very simple device intended to replace scissors in the cutting of thread while sewing, and for use on counters for cutting twine, etc., in the tying of packages. Fig. 1 shows it attached to a lady's dress, and Fig. 2 shows it attached to a counter. When fastened to the dress, it is secured by sewing, or by a hook formed for that purpose on the upper end. Screws are used to fasten it to the counter.



It consists of a metal hook, A, formed as shown, with a small blade, B, the vertical sides of which fit in recesses formed in the bent part of the hook, and are held there by the springing together of the opposite sides of the hook. By springing the hook open slightly, the blade is easily removed for sharpening The upper and cutting edge of the blade is inclined backwards, as shown, so that the thread slides along over the edge of the cutter, and is thus more easily severed than if pulled straight down over the edge. The implement may be attached to the waist of the dress of the operator.

To avoid using the scissors, which necessitates the releasing of the work with one hand, ladies have very generally adopted tho injurions process of biting off threads. This practice damages the teeth, and ought never to be employed. The device herewith presented will enable the thread to be severed without releasing the work, and thus obviate the bad habit alluded to.

Patented through the Scientific American Patent Agency, by J. J. Henry, assignor to Henry & Williams, corner Pearl and Baltimore streets, Baltimore, Md., whom address for further information.

APPARATUS FOR CARB REETING HYDROGEN GAS.

Jacob Ambuhl, of Morristown, N. J., has invented an apparatus for carbureting hydrogen gas. A tank in which the hydrogen gas is generated, of a capacity which depends upon the amount of gas to be supplied, or, in other words, to the number of burners to be supported, has a top plate or cover connected with the top of the tank by a rubber connection, so that the cover may yield to, or raised by, the pressure of the gas which is forced out by the weight of the cover.

From a hook attached to the cover is suspended a wooden basket to receive iron filings or turnings. The bottom of the basket is perforated to allow water or dilute sulphuric acid contained in the tank to have free access to the iron contained in the basket. Beneath the perforated bottom is placed a close bottom to receive any small pieces of iron that may drop through the holes in the upper bottom, in order to prevent pieces from dropping to the bottom of the tank.

The tank is filled and emptied through a stop cock as may be required, and is provided with a glass gage pipe, in which the water or acid stands at the same hight as in the tank, so that it may be conveniently seen when the tank has been sufficiently supplied.

The hydrogen gas passes from the generator to the carbureter through a pipe connected with the tank by a three-way cock; one of its openings being connected with the tank, the second with the pipe, and the third being left free; and so arranged as to point towards a stand attached to the cover and holding a platinum sponge.

When the tank has been charged, the cock is so adjusted that the air in the tank and the hydrogen gas, as generated, may escape through the open way or branch, and impinge upon the platinum sponge, which will become red hot when the air has all escaped from the tank and pure hydrogen is escaping. The cock is then adjusted to cause the hydrogen to pass through the pipe to the carbureter.

The body of the carbureter is formed of a series of ten, more or less, shallow rectangular pans, set parallel with each other, securely soldered together, and filled with granulated charcoal. The pans have openings formed through them, near the ends of their upper sides, and the first pan or compartment is connected by a short return pipe with the second pan or compartment. The first compartment is filled with granulated charcoal and soda, and with this compartment is connected the pipe leading to the generator. The carbureter is supplied with gasoline or other suitable light hydrocarbon oil, which passes through the middle part of the pans near one end, through a pipe perforated with numerous holes, opening into all the pans except the first one.

The hydrogen enters the first compartment, is purified by the soda, and passes thence into and circulates through all the compartments, where it becomes carbureted, and escapes from the last compartment into a pipe, through which it passes to the burners.

Any water that may form in the first compartment, or any surplus oil that may remain in the other pans or compartments may be drawn off through suitable cocks.

IMPROVEMENT IN STOCK CARS.

George Washington Fox, of Laramie Territory of Wyoming, has invented a new and useful improvement in stock cars, which will, we think, commend itself to stock shippers, and as a sanitary benefit to the public at large.

The invention provides for the better transporting of beef cattle, from the western prairies, mountains, and valleys, to the seaboard markets, without suffering, or having to unload or reload them, thereby delivering them to the markets in a sound, healthy condition.

The invention will be valuable, also, for shipping horses or mules. Water buckets or troughs are supplied by hose, connected with a tank, the hose connecting with pipes to receive and conduct the water through the car, and connecting with sections of pipe or hose to conduct the water to the troughs.

The timbers for the roof are framed together, so that the rafters and the cross pieces form openings for doors on the roof, one half of which are over a loft floor, and one half over a feed rack, giving space to reach the provender and fill the feed racks from the top of the car, over which openings are made through the floor of the provender space at the top of the car.

A pipe extends from the bottom of each trough or bucket, down through the floor, with a cock at the end to hold the water, or to draw off the surplus water in freezing weather. The water is forced to each trough or bucket at the same time, by the pressure of water in the tank with which the hose is to be connected at the stations.

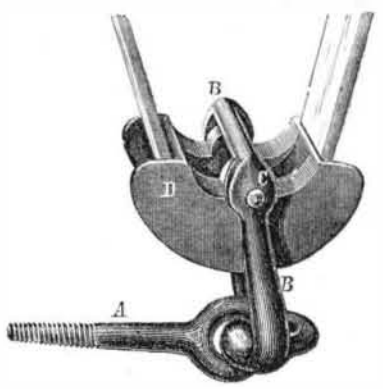
Wire nettings are employed to keep out sparks of fire, and flies during warm weather, while affording the required ventilation.

The partitions between the stalls are made of hard wood plank, the ends of which slide in the grooves of the posts. The partitions have a hand hole at either end, by which they can be removed without entering the car by using the pike hooks, one man being at each side of the car to place a pike hook in the hand hole, raise the partition to the top of post, and take it out of the groove at the niche for that purpose.

Gentle stock may be loaded in this car all at one door, by having the partitions down, and putting them up as the animals are led to their places; they may be unloaded in the same manner, by taking the partitions down as they are led out. In shipping valuable stock, every alternate partition may be taken out, thus giving them double stalls. Wild, ferocious stock can be put through the doors in their respective stalls, after which there is no need of entering the car to take care of them. In unloading ferocious animals, it is necessary to use the pike hooks and remove the partitions, held by the posts, for letting out two animals at a time, each passing out at the door the other came in at, or passing nearly directly forward through the car, instead of backing them out; the next are led out in the same manner, and so on to the last.

REAT'S IMPROVED DESIGN FOR NECK-YOKE RING AND SLIDE.

The design shown in our engraving possesses advantages over the old style ring, which will appear on reference to the engraving, in connection with the accompanying description.



The part, A, screws into the end of the neck yoke, in the usual manner. The ring, B, is made of an elongated angular shape, as shown, and has pivoted to it, at C, a slide, D. This slide is made with a broad surface, upon which the breast strap draws; the method of pivoting allowing any ordinary motion of the ring to take place without any sliding of the strap on the ring and consequent wear. The strap is, moreover, kept smooth and flat on the slide, which also adds to its durability.

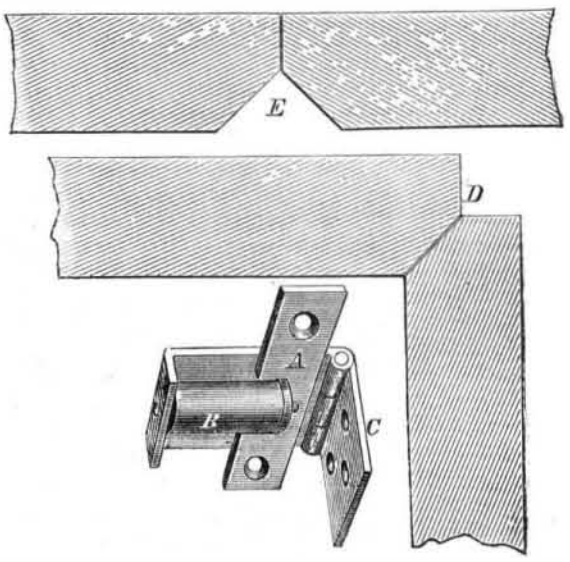
Patented, August 9th, 1870, through the Scientific American Patent Agency, by Robert L. Reat, of Charleston, Ill, whom address for state, county, or other rights.

THE recent dry weather has had the effect of producing such a demand for hose pipe that the New York Belting and Packing Company find it difficult to supply the demand although they turn out over one mile a day.

HIRE'S PATENT TABLE HINGE.

Our engraving represents an improvement, patented April 25, 1871. It consists of a wrought or malleable cast iron hinge for table leaves. One end, C, is of the same size and shape as the hinge now in use, and is screwed to the leaf in the same manner; the other part, A, is fastened to its place by a cast iron plate, and slides on a gum or spiral spring, B, as shown.

The joint is made by cutting down a square bevel on the table and leaf, thus entirely doing away with the knuckle, the only troublesome and expensive part of the table as now made, and the only part that gets out of order. The cost of



the hinges over those of the old style is trifling, and the bevel can be worked and the hinge put on, thereby completing the joint, in a very few minutes, by any ordinary mechanic. The positions of the joint when the leaf is dropped and extended are respectively shown at D and E.

For rights, or other information, apply to Hires, Ringo & Co., Columbus, Ky.

PLOWING AND CULTIVATION OF CROPS BY STEAM. IMPROVEMENTS WANTED.

We publish in another column an interesting description, by Horace Greeley, Esq., of the practical operation of steam power in agriculture, as now worked in Louisiana, near New Orleans. Mr. Greeley is at present travelling in the South, and his letters to the *Tribune* contain much useful information.

The importance of steam in plowing is well illustrated in the example which Mr. Greeley describes, whereby the furrows are turned to a depth of two feet, when before, without steam, a depth of six inches only was attainable. The practical result of the steam plowing is 2,000 pounds of sugar per acre, against 800 pounds by mule plowing.

He shows that an equally important gain results from the use of steam in the cultivation of the crops.

The general adoption of steam for the purposes of agriculture would add incredibly to the wealth of the nation. If it works so well and profitably in the hands of the colored laborers of the South, we see no reason why it may not be be adopted with equal success in all parts of the country. But it is clear that the mechanism needs to be simplified and reduced in cost.

We call the attention of our readers to the subject in the hope that it may be carefully examined and studied. A great and important field for invention is here opened for the ingenious. Steam plows, steam seed planters, steam cultivators, and steam harvesters, are wanted everywhere. But our farmers must have small, strong, simple, and reliable machines.

What is a Carat?

The carat is an imaginary weight, that expresses the fineness of gold, or the proportion of pure gold in a mass of metal; thus, an ounce of gold is divided into 24 carats, and gold of 22 carats fine is gold of which 22 parts out of 24 are pure, the other two parts being silver, copper, or other metal; the weight of 4 grains, used by jewelers in weighing precious stones and pearls, is sometimes called diamond weight —the carat consisting of 4 nominal grains, a little lighter than 4 grains troy, or $74\frac{1}{16}$ carat grains being equal to 72 grains troy. The term or weight *carat* derives its name from a bean, the fruit of an Abyssinian tree, called *kuara*. This bean, from the time of its being gathered varies very little in its weight, and seems to have been, from a very remote period, used as a weight for gold in Africa. In India also the bean is used as a weight for gems and pearls.

ARTESIAN WELL.—Great trouble and expense has heretofore been experienced by the Union Pacific in supplying their stations and cars in the alkaline district with water. The extent of territory from Rawlins to Green river—136 miles—had to be provided for entirely by water transported in cars. Mr. T. E. Sickels, the General Superintendent, was of the opinion that purer water might be had if a well were sunk deep enough, and a recent experiment has justified his view. The Omaha *Daily Herald*, May 10, '71 says it has a specimen of soft, pure water, from a well which has been sunk 350 feet deep, at Point of Rocks. This is 805 miles west of Omaha, and is in the heart of the alkali district. The supply of water is plentiful, and it rises to within eleven feet from the top of the well.

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NEW YORK, SATURDAY, JUNE 10, 1871.

Contents:

(Illustrated articles are marked with an asterisk.)

PAINE'S ELECTRO-MOTOR.

In recent numbers of the SCIENTIFIC AMERICAN, we have given accounts of the extraordinary claims put forth by Henry M. Paine and friends, concerning his improvements in electro-magnetic machinery. They assert that his engine, now running at Newark, N. J., develops two horses' power by the use of a battery of only four ordinary telegraph cups; and, further, that any desired degree of power may be obtained with the same four cups, simply by multiplying the number of magnets.

In other words, Mr. Paine has discovered the perpetual motion, and found the long sought philosopher's stone.

This absurd proposition has been received, yea, swallowed whole, by persons who have heretofore enjoyed reputation for common sense, if not sagacity, in things scientific. But this easy credulity in the present case, shows that they have been over-rated. They belong to that large class of individuals, intelligent and sound in ordinary matters, but in whose minds there runs a vein of lunacy upon the perpetual motion question; the result of careless and deficient training in scientific principles. From this class, Mr. Paine will draw followers and money; in fact, he has already done so, with much success, unless we are misinformed.

The exhibition of the original machine, which, for a time, was open to a favored few who had money to invest, is now closed, for the purpose, it is stated, of perfecting preparations to show the improvements on a more grand scale.

Mr. Paine's patents have been assigned to a joint stock company, capital three millions of dollars, called the Paine Electromagnetic Engine Company; and they are now busy, at Newark, in building a new machine, by which they expect to convert all such doubters as the SCIENTIFIC AMERICAN, and bring the world in general to a realizing sense of the astounding nature of their discoveries.

The company is said to be composed, for the most part, of gentlemen of wealth, who are abundantly able to lose any amount of money that they choose to subscribe. It is to be hoped that they will be liberal in their estimates, and give us an example of the mechanism on a scale sufficiently large and brilliant to attract the attention of the world. It is only by the exhibition of the most striking examples of absurdity and failure, that the malady to which we have alluded can be reached or suppressed.

We understand that the new machine is to be of five hundred horse power, and is to run, as before stated, with only four cups, at a cost of about twenty cents a day, and is to be ready for operation about the 4th of July next; after which date, unless the company should be disappointed, steam boilers will be no longer wanted, horses may be turned out to grass, and workmen may take things easy. Their places will be supplied by electric engines, electric horses, and magnetic laborers.

During the brief interval that remains before the inauguration of this great electromagnetic revolution, we have thought it best to prepare and enlighten the minds of our readers concerning the nature of the mechanism by which the Paine Company expect to accomplish so much. We have, accordingly, provided a series of engravings, representing the salient points of Mr. Paine's improvements, which we print on another page, together with his own explanations of them, as presented in his patents.

These patents embody several apparently good improvements in electro-dynamics; but we are unable to detect in them anything that is likely to turn the world upside down, in the astonishing manner that Mr. Paine and his worthy coadjutors so confidently predict.

THE NEW SYSTEM OF PIERS FOR NEW YORK.

It seems at last that the Dock Commissioners have resolved upon definite action in the matter of the improvement of the docks and piers. Many plans have been submitted to them, but it is finally announced that the one adopted will be that of a magnificent street, completely surrounding the water front, to be in width not less than 150 feet in any part. The river front is to present a solid wall of granite masonry, in combination with *bêton*, which has proved its value for this purpose in many European harbors.

The plan is a very expensive one. Its cost is estimated at about two and one half millions of dollars per mile. The building of docks and piers is, however, essentially a costly undertaking, and we are inclined to believe that the plan proposed could hardly be replaced by another, embracing greater durability and convenience at less cost.

In any system of public works, durability is an element that should be considered of primary importance; especially in structures where frequent repairs entail interruption to business.

The depth of water along the frontage is to be not less than twenty feet. From the granite wall will project piers, from three hundred to five hundred feet in length, and from sixty to one hundred feet wide, according to situation. The superstructures will be, for the most part, of timber, supported on iron, stone, or timber pillars, but having at the head of each pier a column of solid granite masonry the full width. It is stated that some of the piers will be constructed wholly of iron, and a limited number entirely of stone.

The iron columns are to be hollow and six feet in diameter, so that men may enter them to work, while sinking them to their permanent foundation. Each pier will have three rows of these columns, which, when sunk to bed rock, will be filled with a concrete of stone and cement. The spaces between the piers will be two hundred feet in width. The sewers are to be carried through under, and made to discharge their contents at the outer ends of the piers, so as not to fill up the slips.

The completion of this work is not intended to be accomplished at present, but it is designed to at once carry out the system from Grand street to East Fourteenth street, on the East River, which, it is stated, will give a pier length of twenty-one and one half miles, and will for a long time to come amply accommodate the commerce of the port.

It seems to be the general opinion among those qualified to judge of the merits of this plan, that it is one of the best that could have been adopted, and it is estimated that the additional rents will pay the interest on the bonds to be issued, without advancing the rates at present demanded.

The completion of this great work, and that of the East River suspension bridge, together with the removal of the Hell Gate obstructions, will render the East River famous for the engineering skill devoted to its improvement.

There is, however, one point which the system proposed does not cover. It makes, so far as we can see, no provision even in anticipation of any disposal of sewage, other than its discharge into the river as now practiced. The results attained by several processes, particularly that known as the "A. B. C. process," in which sewage is treated by the use of alum, blood, and clay, indicate that the time is coming when the discharged filth of cities will be used to restore fertility to impoverished lands instead of being allowed to poison the water about docks and piers. In constructing a work of such permanence as the one under consideration, it would have been wise to have anticipated the future employment of improved methods of treatment in such a way that their application would not entail expensive alterations. This could be done without increase of first cost to any noticeable extent.

DOCTORING IRON.

The attempts made, from time to time, to obviate the process of puddling, in the manufacture of iron by doctoring, are, while they have some warrant in chemistry, still entirely empirical. The two principal substances sought to be removed—carbon and phosphorus—possess strong affinities, and form combinations in the metal, very difficult to break up. Their presence in undue quantity produces qualities in iron which unfit it for many purposes; and, practically, only oxygen, administered in large doses, has, as yet, been able to remove these undesirable elements. The introduction of oxygen mixed with nitrogen, as in atmospheric air, is the essential feature of puddling and of the more recent Bessemer process. In the Heaton process, which has now ceased to attract much attention, the oxygen was introduced in the nitrate of soda employed, the salt, being decomposed by the heat, yielding its oxygen to the crudities contained in the metal, and forming with them gases which passed off. In the Ellershausen process, oxygen is introduced in the oxide of iron employed in making the pig blooms. The Peters process, which, we understand, is soon to be put into practical operation in Rhode Island, is a new way of introducing and controlling the admission of oxygen.

Thus we find that oxygen is the giant of the chemistry of iron. This fact, however, is not, and should not alone be, a bar to experiments with other materials, although the uniform failure which has attended dosing with chemicals, is, to say the least, discouraging. There would be more hope in this direction were our knowledge of iron more complete than it is. There is scarcely a field of industry more beset with difficulties and perplexities, than that of the iron manufacture. So manifold have the varieties of iron and steel become, that no one knows where to draw the line of distinction between them, and the terms have become entirely too indefinite. There are so many things called steel, that no one knows where to say iron leaves off and steel begins.

There are also mysterious reactions and physical changes, in the condition of these metals, yet unexplained, upon which more light must be shed before the use of chemicals, salts, etc., can be intelligently applied.

To attempt to doctor iron is, then, to grope in the dark The attempts may add to our stock of knowledge, but there is little prospect of their revolutionizing the processes now employed. For this reason we accept with much allowance the glowing statements indulged in by some English journals, in regard to the Sherman process, and also that of a central New York paper, which now lies on our table, containing an enthusiastic encomium of what it calls the "Bendell" iron, which, it states, is produced by dosing, the drugs and medicines employed being exceedingly cheap, but the names of which are not given. The sanguine author of the article in question regards the process as destined to revolutionize iron working throughout this country. We hope it may—but for the reasons above assigned, we doubt it.

MENTAL EMACIATION.

A strange title, do you say? What new disease is this? Not by any means a new disease, dear reader, but one astonishingly prevalent. The number of men whose minds are weaker and smaller at forty or fifty than when they were were twenty-five, is legion. Their bodies are sleek and plump, their purses, many of them, are fat; both have been well nourished; but their minds are in a feeble, emaciated condition, unable to cope with the great questions of this pre eminently advancing age.

Engage them in conversation upon any topic involving much grasp of thought; propound to them any one of the great problems of vital importance to the human race; you shall see how their minds shrink from effort they are incapable of performing; and how they fall back upon the supports of old superstition and prejudice, and there find rest from the labor such questions involve. This general mental emaciation is one reason reforms move so slowly. The best and strongest minds are tugging at the mysteries of nature, and expending their energies in physical researches. Some intellectual giants are also grappling with problems of social construction, political economy, and morals, but, as their teachings are directed mainly to the mentally emaciated, they make but little headway in correcting existing evils. Men, in the hot pursuit of wealth, which is the most absorbing of present human aims, neglect systematic thought, feed their minds upon little else than the sloppy pabulum of sensational daily papers, and become mentally starved. How few there are that can safely think for themselves upon any subject not immediately related to their profession or calling! What millions might be counted, who might far better shut their eyes and accept without thought the conclusions of such men as Mill and Spencer than even to attempt to reach a conclusion or form a definite opinion from their own thinking!

Talk with men engaged in professions which imply greater breadth of thought than ordinary business occupations, and how often you will hear the admission, that their habits of thought have unfitted them for correct thinking upon topics which require systematic thought, and strictly logical method! Ask nine out of any ten, selected at random, what is their religious belief? and you will find that they either have none, or that they accept a creed they cannot comprehend or explain. If they vote at general elections, they are guided by hastily formed opinions, for which they have never sought good and sufficient reason. Somebody's plausible speech, or some half conceived principle of right or wrong, is enough to influence their action; and so they give their minds the rest they crave, and trust to luck that it will all come right in the end. Many are going on through life, similarly trusting that their future will all come out right—hoping that it will—which they call having faith; and when they suppose themselves to be trusting in God, they are simply trusting in luck.

Hence it follows that sects and creeds multiply, charlatans prosper in politics, religion and medicine, and false teachers only find it necessary to assert, with show of authority and with simulation of knowledge, to win numerous disciples.

The majority of men prefer to have other people think—or pretend to think for them. Glittering generalities that either mean nothing, or mean falsehood, are accepted as formulas of action, and repeated as maxims for the guidance of individual conduct. If such a formula be attacked by