VARIOUS

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Содержание

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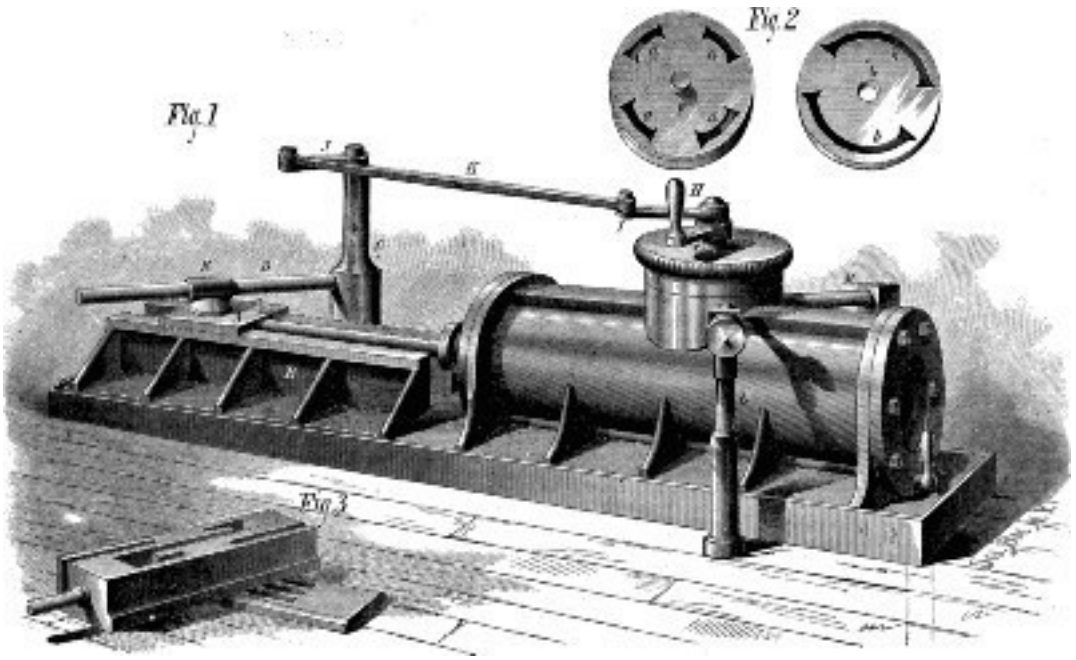
A NEW STEAM TILLER

Steam is now made to perform almost everything in the way of heavy labor, to the saving of muscle and energy that may be more profitably employed; and since inventive genius has devised means of governing steam with absolute accuracy, there seems to be no limit to its economical application.

A recent invention in steam engineering, which exhibits in a marked degree the controllability and adaptability of steam, is Mr. Herbert Wadsworth's steam tiller, an engraving of which we present herewith.



This machine (Fig. 1) is provided with a steam cylinder, similar to the cylinder of a steam engine, containing a piston, the rod of which is attached to a crosshead, A, that slides on ways, B, secured to the bed supporting the cylinder.

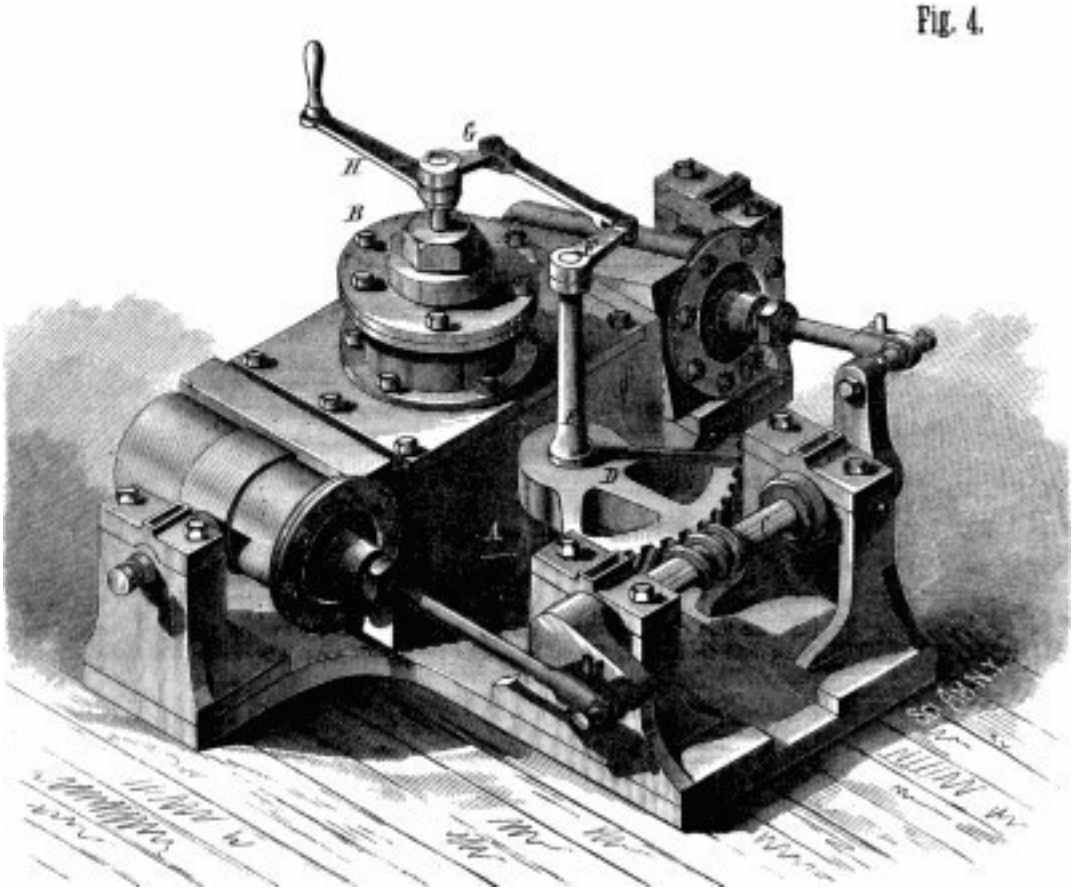
The tiller, D, as it is carried to starboard or port, slides through a socket, E, pivoted to the crosshead.

The motion of the rudder is communicated to the steam cut-off by means of the shaft, C, crank, J, rod, K, crank, I, and the hollow valve spindle. When the tiller is amidships the valve handle, H, is at right angles to the cylinder, and parallel to the tiller. By moving the lever, H, to right or left, steam is admitted to one end or the other of the cylinder, which, acting on the tiller through the piston, piston rod, and crosshead, moves the rudder; and when the rudder reaches the desired position the cut-off will have been moved the amount necessary to prevent further entrance of steam. When the rudder is influenced by the waves or by the expansion or contraction of steam, the cut-off alters its position in relation to the valve and automatically arranges the steam passages so that the piston is returned to its proper position. The details of the cut-off are shown in Fig. 2; the valve, G, which covers the cut-off, F, acts like a four way cock. The spindle of the cut-off, F, is connected with the lever, I, and is moved by the rudder, as already described. By enlarging or gradually narrowing the ends of the steam ports great rigidity or elasticity may be given to the hold of this engine, according to the requirements of the particular vessel.

Few and simple as are the parts of this machine it is possible, by balancing the valves and suiting the diameter of the cylinder to the work to be performed, to overcome great resistances with a slight effort. The inventor says that this system of valves is considered by experts to be novel and very valuable.

In Fig. 3 is shown a pattern of a slide valve suited to special purposes. Its working is essentially the same as that of the valve already described. The ports are set side by side, parallel with the sides of the valve. The supply port is in the middle, the other ports lead to opposite ends of the cylinder.

Fig. 4.



In Fig. 4 is shown another application of the controlling valve and cut-off described above. Two oscillating steam cylinders are employed in working the rudder. They are placed on opposite sides of the chest, A, and are supplied with steam through the controlling valve, B. The piston rods of the two cylinders are connected with cranks placed on opposite ends of the shaft, C, at right angles to each other. Upon this shaft, half-way between the pillow blocks which support it, there is a worm which engages a toothed sector, D, on the rudder-post, E. To an extension of the rudder-post is secured an arm, F, which is connected with the arm, G, of the controlling valve. By shifting the lever, H, the supply of steam to the two cylinders may be increased or diminished, or its direction may be changed, so that the engines will be reversed or stopped. This engine is remarkable for its simplicity. The cylinders may be detached and changed if required, one size of bed answering for three different sizes of cylinder, which may vary only in diameter, the stroke being the same, so that the castings for engines of different power are the same except in the matter of the cylinders and pistons, and all the parts are interchangeable—a feature of modern engine building that cannot be too highly valued.

Further information may be obtained from Herbert Wadsworth, 26 Merchants' Bank Building, 28 State street, Boston, Mass.

HOW OUR PATENT LAWS PROMOTE AND IMPROVE AMERICAN INDUSTRIES

On another page we print in full a most suggestive paper recently read before the Manchester (Eng.) Scientific and Mechanical Society, by Mr. Frederick Smith, a prominent builder of that city, contrasting the qualities, styles, and prices of American and English builders' hardware—a paper which the *Ironmonger* pronounces one of the most serious indictments yet preferred against British workmanship in that department.

The field covered by the paper—the supplying of house builders' hardware—embraces a multitude of conveniences, but no real necessities. Why is it that America has been prolific in novel devices and clever improvements in this department of manufacture as in so many others, while England has gone on stolidly copying ancient forms, changing only to cheapen by the introduction of poor material and sham construction? Mr. Smith mentions several reasons that English manufacturers have given him for the state of things he, as an Englishman, so greatly deplores; but evidently he is not satisfied with any of them, and very justly; for none of them touches the real cause—the radically different attitude of the public mind toward inventions, characteristic of the two countries.

In England the user of household inconveniences accepts them as matters of fact; or if he grumbles at them he never thinks of trying to change them. It is not his business; and if he should devise an improvement, ten to one he could not get it made. To patent it is practically out of the question, for if it were not condemned off-hand as trivial, the patent fees would make it cost more than it was likely to be worth. The mechanic who makes such things is trained to work to pattern, and not waste his time on experiments. Besides, if he should make a clever invention he would not be able to raise the necessary fees for a patent, or to get any one to help him thereto. The manufacturer "makes what his customers call for." Why should he spend his money and spoil his plant to introduce improvements? So things go, until some pestilent Yankees flood the markets with better articles at a lower price; and British consumers suddenly discover that they want something that the native manufacturer cannot make. The need was there; but invention did not follow. How happened it that the American manufacturer did not pursue the same uninventive course? What produced the radically different attitude of the American mind toward newfangled notions out of which inventions proceeded and flourished?

No doubt several causes have been at work: freedom of thought and action; popular education; a blending of races; and the tide of adventurous spirits naturally resorting to a new and free land. These have had their influence undoubtedly; but all these have existed, more or less completely, in other new lands, without that outburst of creative energy which has made America the nursery of inventions, great and small. The determining cause, the one condition that prevailed here and not elsewhere, was the circumstance that almost from the start new ideas were given a market value in this country. Unlike all others, the American patent law directly encouraged independent thinking in all classes. The fees were low and the protection offered fairly good. Men soon found that it paid to invent; that one of the surest roads to competency was a patented improvement on something of general use. If a household utensil or appliance went wrong or worked badly, every user was directly interested in devising something better; and, more than that, he was interested in making his invention known and in securing its adoption. The workman at his bench had an ever-present inducement to contrive something at once cheaper and better than the article he was hired to make. He could patent his improvement, or the wholly original device he might hit upon, for a few dollars; and his patent would count as capital. It would make him his own master, possibly bring him a fortune. The manufacturer could not rest contented with the thing he set out to make, for the meanest hired man in his employ might suddenly become a competitor. He must be constantly alert for possible improvements, or his

rivals would get ahead of him. The result is a nation of inventors, at whose hands the newest of lands has leaped to the leadership in the arts, almost at a bound.

There is talk of changing all this; of emulating the conservative spirit of the Old World; of putting inventors under bonds; of stopping the rush of industrial improvement—to enable a few short-sighted yet grasping corporations to get along without paying license fees for such inventions as they happen to approve of. They profess to want inventors to go on making improvements. They are willing to ascribe all honor to the successful inventor; but they are determined not to pay him for his work. Still more they are determined to change the attitude of the public mind toward inventors and inventions, if such a change can be wrought by plausible misrepresentations. The fact that they were able to inveigle one branch of the American Congress into assenting to their unjust and mischievous scheme is one of the anomalies of our recent history. It should be taken as a timely warning of impending danger to all the industrial interests of the country. It is outrageous that the inventors of the land, after having raised their country to the first rank among industrial nations, should have to defend their constitutional rights against Congressional invasion; but the fact exists; and the defense should be made a matter of personal interest and effort not only by every inventor and manufacturer, but by every honest citizen.

PLEURO-PNEUMONIA

The cattle plague, which is creating so much anxiety throughout the Eastern States, is a contagious fever, affecting cows chiefly, characterized by extensive exudations into the respiratory organs, and attended by a low typhus inflammation of the lungs, pluræ, and bronchia. It has prevailed in Europe for ages, at times developing into wide-spread scourges, causing incalculable loss. It was imported into England in 1839, and again three years later; and it was estimated that within twenty-five years thereafter the losses by deaths alone in England had amounted to $450,000,000. In 1858 the disease was carried to Australia by an English cow, and, spreading to the cattle ranges, almost depopulated them.

In 1843 an infected Dutch cow brought the disease to Brooklyn, where it has since lingered, slowly spreading among the cattle in Kings and Queens counties. In 1847 several head of infected English cattle were imported into New Jersey, and, spreading among a herd of valuable cattle, made it necessary for them all to be slaughtered, the only certain method of stamping out the disease. In 1859 four infected cows were imported into Massachusetts from Holland; the plague spread rapidly, and was stamped out only by persistent effort, the State paying for over 1,000 slaughtered cattle. Since 1867 the disease has not been known there. Meantime the pest had invaded Eastern Pennsylvania, Delaware, and Maryland, where it has since prevailed in isolated localities. The absence of large herds of moving cattle in these districts, except for speedy slaughter, has prevented the disease from developing into a general plague.

The recent action of the British Council in forbidding the importation of American live cattle is likely to prove of inestimable benefit to this country, in forcibly calling attention to the grave risk that the presence of the disease on Long Island and elsewhere constantly entails. Fortunately the drift of the cattle traffic is eastward, and as yet there has been no propagation of the poison in the great cattle ranges of the West. Unless summarily arrested, however, the disease will surely reach those sources of our cattle supply, and occasion losses that can be estimated only in hundreds of millions of dollars.

The experience of all countries into which this disease has gained access appears to prove that there is only one way of getting rid of it—namely, the immediate killing of all infected cattle, and the thorough disinfection of the premises in which they are found.

The disease is purely infectious, and is never found in regions where it has not gained a foothold by importation. Palliative measures have in every instance failed to eradicate the disease, and are only justifiable, as in Australia, after the plague has reached dimensions utterly beyond the reach of any process of extermination.

Professor Law, of Cornell University, one of our best informed veterinary surgeons, most emphatically opposes every attempt to control the disease by quarantining the sick or by the inoculation of the healthy. "We may quarantine the sick," he says, "but we cannot quarantine the air." To establish quarantine yards is simply to maintain prolific manufacturers of the poison, which is given off by the breath of the sick, and by their excretions, to such an extent that no watchfulness can insure against its dissemination. Besides, the expense of thorough quarantining operations would amount to more than the value of the infected animals whose lives might be saved thereby. Inoculation is still less to be tolerated at this stage of the pest.

The Professor says: "Germany, Holland, Belgium, France, and England, have been treating the victims of this plague for nearly half a century, but the result has only been the increase of disease and death. Our own infected States have been treating it for a third of a century, and to-day it exists over a wider area than ever before. Contrast this with the results in Massachusetts and Connecticut, where the disease has been repeatedly crushed out at small expense, and there can be no doubt as to which is the wisest course. As all the plagues are alike in the propagation of the poison in the bodies of the sick, I may be allowed to adduce the experience of two adjacent counties in Scotland

when invaded by the rinderpest. Aberdeen raised a fund of £2,000, and though she suffered several successive invasions, she speedily crushed out the poison wherever it appeared by slaughtering the sick beasts and disinfecting the premises. The result was that little more than half the fund was wanted to reimburse the owners for their losses, and the splendid herds of the county were preserved. Forfar, on the other hand, set herself to cure the plague, with the result of a universal infection, the loss of many thousands of cattle, and the ruin of hundreds of farmers. Finally the malady was crushed out in the entire island by the method adopted by Aberdeen and other well advised counties at the outset."

And again, "Cattle have been inoculated by the tens of thousands in Belgium and Holland, and of all Europe these are the countries now most extensively infected. France, Prussia, Italy, Austria, and England have each practiced it on a large scale, and each remains a home of the plague. Australia has followed the practice, and is now and must continue an infected country. Our own infected States have inoculated, and the disease has survived and spread in spite of it, and even by its aid. Whatever country has definitively exterminated the plague (Norway, Sweden, Denmark, Holstein, Mecklenburg, Switzerland, Massachusetts, and Connecticut), that country has prohibited inoculation and all other methods that prevail on the principle of preserving the sick, and has relied on the slaughter of the infected and the thorough disinfection of their surroundings. So will it be with us. If any State adopts or allows any of these temporizing measures, that State will only repeat the experience of the past alike in the Old World and the New, will perpetuate the disease in the country, will entail great losses on its citizens, will keep up the need for constant watchfulness and great expense by the adjoining States for their own protection, and will indefinitely postpone the resumption of the foreign live stock trade, which, a few months ago, promised to be one of the most valuable branches of our international commerce."

We are persuaded that the position taken by Professor Law, and other similar-minded veterinary surgeons, is the only safe one. The disease can be stamped out now with comparatively small loss. If trifled with, and tolerated, it cannot but result in a great national calamity.

SPAIN A FIELD FOR MACHINERY AND PATENTS

From a too lengthy communication to admit in full to our columns, a resident of Madrid communicates to the Scientific American some facts relative to the fertility of the soil of Spain, her necessity for improved agricultural and other implements, and closes with the assertion that it is a good field withal for patents. We cull from the letter as follows:

I have lived, says the writer, for a number of years in this beautiful country, so little understood by foreigners, so little appreciated by its own inhabitants. The Spain of romance, poetry, and song, is the garden as well as the California of Europe. But it stands in great need of the health-giving touch of the North American enterprise. We have here the same mineral treasures, the same unrivaled advantages of climate, that made Spain once the industrial and commercial emporium of the world.

But Spain is awakening. She is endeavoring to shake off her lethargy. The late Exhibition of Paris has proved this; and those who are familiar with the past history and present condition of Spain have been astonished at the result of this effort. A new era has commenced for the country, and it is everywhere evident that a strong current of enterprise and industry has set in. But it is with nations, as with individuals, when they have remained long in complete inaction, brain and muscles are torpid and cannot at first obey the will. Spain needs the assistance of other nations hardened and inured to toil.

The plows now used to till the land are precisely such as were those left by the Moors in the unfinished furrow, when with tears and sighs they bade farewell to their broad fields, their mosques and palaces, whose ideal architecture is still the wonder of the world, to go forth as outcasts and exiles in obedience to the cruel edict that drove them away to the deserts of Africa.

I doubt whether there is an American plow in Spain, much less a steam plow. Sowing and reaping machines are here unknown, and grain is tread out by oxen and mules just as it was in Scripture times, and cleaned by women, who toss it in the air to scatter the chaff. Everything is primitive and Oriental here as yet.

Spain could supply all Europe with butter and cheese, and, on the contrary, these articles are imported in large quantities from England, Holland, and Switzerland. The traveler crosses leagues and leagues of meadow land where not a tree is to be seen, nor one sheep pasture, and which are nevertheless watered by broad rivers that carry away to the ocean the water that would, by irrigation, convert these fields into productive farms. There are many places in Spain where the wine is thrown away for want of purchasers and vats in which to keep it. In the Upper Aragon, the mortar with which the houses are built is made with wine instead of water, the former being the most plentiful. Aragon needs an enterprising American company to convert into wholesome table wine the infinite varieties there produced, and which our neighbors the French buy and carry away to convert into Bordeaux.

We want American enterprise in Galicia and Asturias, where milk is almost given away, to convert it into the best of butter and cheese; and also in those same provinces, where delicious fruit is grown in such abundance that it is left on the ground for the swine.

Spain needs many more railroads and canals, all of which, when constructed, are subsidized by the government; the railroads at the rate of $12,000 a kilometer, and many more additional advantages are offered for canals.

With regard to commerce with Spain, we have to lament the same indifference on the part of the Americans. I have, for instance, an American double-burner petroleum lamp. All who see it admire and covet it, but they are not to be had here. If we except one American in Madrid, who brings mostly pumps and similar articles on a very small scale, we have no dealers in American goods here. Wooden clothes pins, lemon squeezers, clothes horses, potato peelers, and the hundreds of domestic appliances of American invention, elsewhere considered indispensable, are in Spain unknown.

We had confidently expected that the new Spanish law on patents would draw the attention of American inventors toward this country, that to-day offers a wide field for every new practical

invention, but I am sorry to see that, with the exception of Edison and a few others, the Americans have not yet availed themselves of the easy facility for taking patents for Spain, where new inventions and new industries are now eagerly accepted and adopted. And while the Americans are thus careless as to their own interests, the French take out and negotiate, in Spain, American patents with insignificant variations.

Let American inventors be assured that any new invention, useful and practical, and above all, requiring but little capital to establish it as an industry, will find a ready sale in Spain.

I could enlarge to a much greater extent upon the indifference of American inventors, merchants, manufacturers, and business men, as to the market they have in Spain in their respective lines, and upon the importance of building up a trade with this country, but to do so would require more space than I think you would feel justified in occupying in your columns.

PETER COOPER AS AN INVENTOR

The successes of Peter Cooper's long and useful life are well known. Not so many are aware of his varied experience in the direction of failure, particularly in the field of invention. More than once he has found his best devices profitless because ahead of his time, or because of conditions, political or otherwise, which no one could foresee. He possessed the rare qualities, however, of pluck and perseverance, and when one thing failed he lost no time in trying something else. Before he was of age he had learned three trades—and he did not make his fortune at either.

In a familiar conversation with a *Herald* writer recently, Mr. Cooper related some of his early experiences, particularly with reference to enterprises which did not succeed. His father was a hatter, and as a boy young Cooper learned how to make a hat in all its parts. The father was not successful in business, and the hatter's trade seems to have offered little encouragement to the son. Accordingly he learned the art of making ale. Why he did not stick to that calling and become a millionaire brewer, Mr. Cooper does not say. Most probably the national taste for stronger tipple could not at that time be overcome, and ale could not compete with New England rum and apple-jack. The young mechanic next essayed the art of coachmaking, at which he served a full apprenticeship. At the end of his time his employer offered to set him up in business, but the offer was not accepted, through fear of losing another's money. He felt that if he took the money and lost it he would have to be a slave for life. So he quit coachmaking and went to work for a man at Hempstead, L. I., making machines for shearing cloth. In three years, on $1.50 a day, Cooper had saved enough money to buy his employer's patent. Immediately he introduced improvements in the manufacture and in the machine, which the war with England made a great demand for by excluding foreign cloths. At this time Cooper married. In due time the family numbered three, and the young father's inventive faculty was again called upon.

"In those days," said Mr. Cooper to the reporter, smiling as the remembrance came to his mind, "we kept no servants as they do nowadays, and my wife and myself had to do all that was to be done. After our first child was born I used to come into the house and find my wife rocking the cradle, and I relieved her from that while I was there. After doing that for a few days I thought to myself that I could make that thing go of itself. So I went into my shop, and made a pendulous cradle that would rock the child. Then I attached a musical instrument which would sing for it, and at the same time the machine would keep the flies off. The latter was very simple; by hanging something to the cross bar, as the cradle swung under it, backward and forward, it would create wind enough to drive away the flies. The machine was wound up by a weight, and would run for nearly half an hour without stopping. I took out a patent for it, and one day a peddler came along with a horse and wagon, as they do in the country, and saw the cradle. He struck a bargain with me and bought the patent right for the State of Connecticut, giving for it his horse and wagon and all the goods he had with him. They afterward made some there, but nothing like as good as mine. It was a beautiful piece of furniture," said Mr. Cooper regretfully, as he thought of it as a thing of the past. "They afterward substituted springs for the weight movement, but that kind was not so good."

About this time the war with England ended and the market was spoiled for the shearing machines. Then, we believe, Mr. Cooper tried his hand at cabinetmaking, but that failed, and he set up a grocery store where the Bible House now stands. While selling groceries Mr. Cooper made an invention which ought to have made his fortune, but it did not. The story is best told in Mr. Cooper's own words:

"It was just before the Erie Canal was completed, and I conceived a plan by which to tow boats by the use of all the elevated waters on the line of the canal. To demonstrate that that was practicable I made with my own hands a chain two miles long, and placed posts 200 feet apart in the East River from Bellevue dock down town about a mile. These posts supported grooved wheels to lay the chain

in, forming an endless chain. The whole was moved by an overshot waterwheel placed at the Bellevue dock. A reservoir twelve feet square and three deep held the water to turn the wheel."

At the suggestion of Governor Clinton Mr. Cooper tightened his chain and pulled up the end post just before the grand trial of his device was to come off. He succeeded in getting stone enough to anchor the post, however, and the experiment went off swimmingly. The boat was hooked on to the chain, and the passage back and forward—two miles—was made in eleven minutes.

"I ran that boat some ten days," says Mr. Cooper, "to let people see what could be done, and carried nearly a thousand people. Part of the time I ran two boats. Once I counted 52 people in one boat. I made the whole chain myself and planted the posts. As I could find no wheels to suit me I made the moulds and cast the wheels myself out of block tin and zinc. It was no small job, I can tell you."

This was unquestionably a grand invention. In itself it was a perfect success; but it was not used. Mr. Cooper tells why:

"It demonstrated completely that the elevated water power along the line of the canal and every lock in the canal could be made use of to drive the boats. Governor Clinton gave me $800 for the privilege of buying the right to the plan in case he should want to use it on the Erie Canal. In making the canal he had promised the people along the route that as soon as it was finished they could sell their horses to tow the boats, their grain and fodder to feed the horses, and their provisions for the passengers. On reflection he thought that if he took all that away from them he would have to run the gantlet again, and he could not afford to do that. There never was anything done with the plan until a few years ago, when Mr. Welch, president of the Camden and Amboy Railroad and Canal, invented exactly the same thing and put it in practice on his locks on the canal. He found it saved half the time and great expense. He went to Washington to take out a patent for it, and when he got there he found that I had patented the same thing fifty-three years before. My patent had run out, so he could use the plan on his canal. It has also been used on one lock on the Erie Canal. If they could have used that chain on the whole length of the Erie Canal it would have saved many millions of dollars."

This would not be a bad place, were there room for it, to speak of "undeveloped" and therefore worthless inventions; and the assumption that if an inventor does not make his invention immediately profitable it must be good for nothing, and should be dispatented. But the moral goes without telling.

Mr. Cooper's next attempt at invention was made about the same time, but in quite a different direction. It was during the struggle of the Greeks for independence, and wishing to do something for their assistance, Mr. Cooper undertook to make a torpedo boat for them. Mr. Cooper says:

"It was a small one that could be taken on board ship and used to destroy any vessel that came to destroy them. It was fixed with a rotary steam engine and a screw wheel to propel it. It was intended to be guided from the ship or the shore. There were two steel wires fixed to the tiller of the rudder, and the operator could pull on one side or the other and guide the vessel just as a horse is guided with reins. It was so arranged that at night it would carry a light with its dark side toward the object to be destroyed, and by simply keeping the light in range with the vessel it would be sure to hit it. The torpedo was carried on a little iron rod, projecting in front of the torpedo vessel a few inches under water. Contact would discharge the torpedo and bend this iron rod. This would reverse the action of the engine and cause the torpedo vessel to return right back from whence it came, ready to carry another torpedo."

Unfortunately the torpedo boat was not ready in time to go with the ship carrying the contributions for Greece. It was stored in Mr. Cooper's factory (he had then turned his attention to glue) and was destroyed by the burning of the factory. It seems to have been quite a promising affair for the time. Mr. Cooper says:

"I experimented with it at once to see how far it could be guided. I made a steel wire ten miles long and went down to the Narrows to test the matter. I had steel yards fastened to one end of the wire, and to the other end the torpedo vessel as attached. It got about six miles away when a vessel

coming into the harbor crossed the wire and broke it. Although the experiment was not complete it showed that for at least six miles I could guide the vessel as easily as I could guide a horse."

Mr. Cooper's work as the pioneer locomotive builder in this country; his later inventions and improvements in the manufacture of railway iron and wrought iron beams for fireproof buildings; his application of anthracite coal to iron puddling, and his other successes are almost as widely known as his philanthropic efforts for the education and advancement of the industrial classes of this city.

After all, we are not sure but the story of his long and varied and always honorable career, told by himself, would not be worth, to young people who have to make their way in life through many difficulties, more even than the advantages of the noble institution which bears his name.

Taste for Reading.—Sir John Herschel has declared that "if he were to pray for a taste which should stand under every variety of circumstance and be a source of happiness and cheerfulness to him through life, it would be a taste for reading." Give a man, he affirms, that taste, and the means of gratifying it, and you cannot fail of making him good and happy; for you bring him in contact with the best society in all ages, with the tenderest, the bravest, and the purest men who have adorned humanity, making him a denizen of all nations, a contemporary of all times, and giving him a practical proof that the world has been created for him, for his solace, and for his enjoyment.

Africa Crossed Again

Information has been received by way of Lisbon, March 12, that the Portuguese explorer, Pinto, has succeeded in traversing Africa from west to east, and has reached Transvaal. The latitude of his course across is not mentioned.

CURIOUS FACTS IN MAGNETISM

At the meeting of the New York Academy of Sciences February 17th, the article in the March number of *Harper's Magazine*, entitled "Gary's Magnetic Motor," was incidentally alluded to, and Prof. C. A. Seeley made the following remarks: The article claims that Mr. Gary has made a discovery of a neutral line or surface, at which the polarity of an induced magnet, while moving in the field of the inducing pole, is changed. The alleged discovery appears to be an exaggerated statement of some curious facts, which, although not new, are not commonly recognized. If a bar of iron be brought up, end on, near a magnetic pole, the bar becomes an induced magnet, but an induced magnet quite different from what our elementary treatises seem to predict. On the first scrutiny it is a magnet without a neutral point, and only one kind of magnetism—namely, that of the inducing pole. Moreover, the single pole is pretty evenly distributed over the whole surface, so that if iron filings be sprinkled on the bar they will be attracted at all points and completely cover it. Now, if while the bar is covered by filings it be moved away from the inducing pole, the filings will gradually and progressively fall, beginning at the end nearest the inducing pole and continuing to some point near the middle of the bar; the filings at the remote end will generally be held permanently. When the bar is carried beyond the field of the inducing pole it is simply a weak magnet of ordinary properties—*i. e.*, of two poles and a neutral point between them.

A plausible and simple explanation of this case is that the inducing pole holds or binds the induced magnetism of opposite name, so that it has no external influence; the two magnetisms are related to each other as are the positive and negative electricities of the Leyden jar. Let the inducing pole be N.; the S. of the bar will be attracted by it and bound, while the N. of the bar becomes abnormally free and active. On moving the bar from the pole the bound magnetism is released and a part becomes residual magnetism. Now when the residual balances the free magnetism which is of opposite name, we are on Gary's neutral line. In a restricted sense there is a change of polarity over the half of the bar contiguous to the inducing pole; on the other half there is no change of pole in any sense. Experiment with a shingle nail in the place of the filings, *à la* Gary, bring the nail to the induced bound pole, and it may be held, except at the neutral line. Now if one will read the magazine article with such ideas as these he will feel pretty sure that the writer of it has used words recklessly, that Gary has not made an original discovery, and that the "neutral" line, whatever it be, has only an imagined relation to the "principle" of the motor.

The Gary Motor as a perpetual motion scheme, of course, is not worthy of serious notice from a society devoted to science. It has no noteworthy novelty of construction or conception. Mr. Gary is afflicted with the very old delusion of the cut-off or shield of magnetism, which is to cost less than what comes from it. His cut-off is a sheet of iron, which we know acts simply as an armature.

A New Phenomenon in Statical Electricity

M. E. Duter, in a paper read before the French Academy in December, showed that when a Leyden jar is charged with either positive or negative electricity its internal volume increases, and that this effect is a new phenomenon, unexplainable by either a theory of an increase of temperature or of an electrical pressure. The experiment was performed by means of a flask-shaped Leyden jar with a long tube attached to its neck, and containing a liquid which served as the inner armature. The author's attention had been called to the fact that this phenomenon had been observed ten years ago by M. Gori.

His researches, just made public, leave no doubt of the accuracy of M. Duter's view, that the glass of the jar really expands. According to the theory of elasticity, the effect of an internal pressure in a hollow sphere is in the inverse ratio of its thickness. M. Duter, therefore, had three flasks made of the same volume, but of thicknesses of 4 mm., 0.8 mm., and 0.5 mm. respectively. They were filled with water and enveloped by tin foil. Each carried a capillary thermometer tube, in which the variations of the height of liquid served to measure the changes in volume due to electrification. He found that these changes were imperceptible in the thick glass, very marked in the flask of mean thickness, and rose to 30 mm. in the thinnest. The variations in volume were very nearly in inverse ratio of the square roots of the thicknesses.

A NEW ORE CRUSHER

The accompanying engravings represent an improved ore crusher, which is said to be very effective and economical in the use of power.

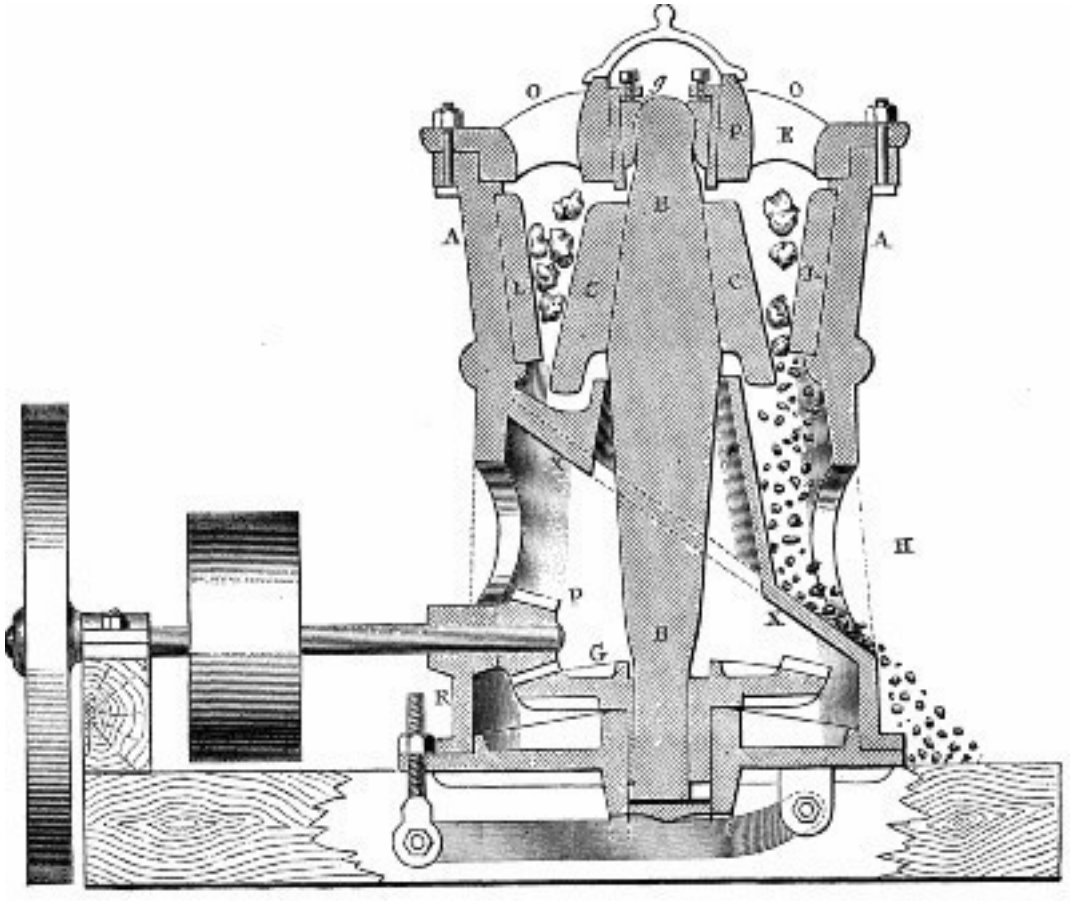


Fig. 1—BROWN'S ORE CRUSHER.

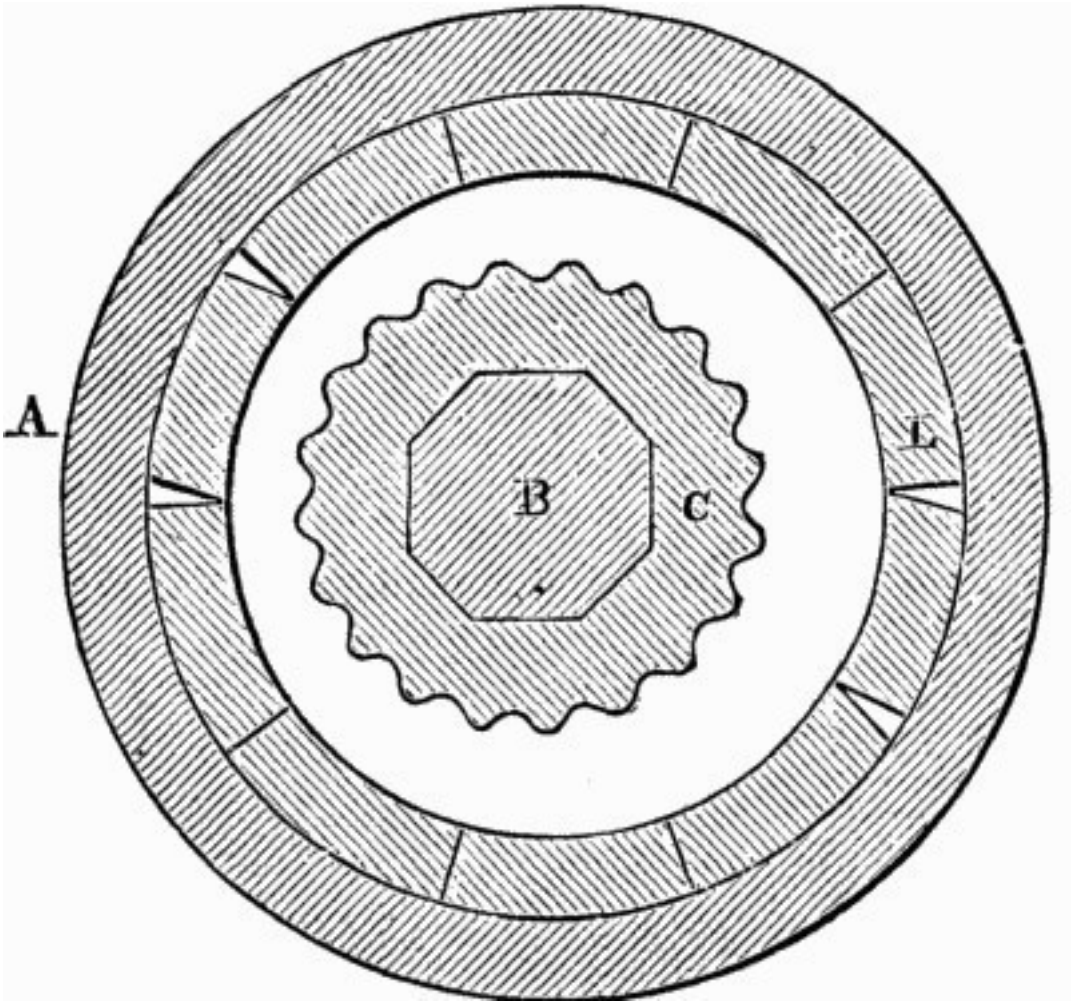


Fig. 2—HORIZONTAL SECTION.

A short vertical cast iron cylinder, A, having in one side a discharge opening, H, contains all of the movable parts.

The upper portion of the cylinder is lined with chilled iron plates, L, and an inclined chute, X, leads to the discharge opening, H.

A rigid shaft, B, carries the circular crusher, C, and moves in a ball and socket joint at the upper end, and extends eccentrically through the boss of a bevel wheel, G, at its lower end, and rests on a step supported by a lever that may be adjusted by the screw, R. The wheel, G, is driven by the pinion, P, on whose shaft there are a pulley and a fly-wheel.

The double gyratory motion of the crusher, C, causes it to approach all portions of the lining, L, crushing whatever lies between.

It is said that this machine is capable of crushing 10 tons of the hardest ore per hour. Its weight is 6,500 lbs.—*Musée de l'Industrie.*

RECENT AMERICAN PATENTS

Enos Richmond, of Troy, N. Y., has invented a steak tenderer, having a plunger studded with chisel-pointed rods, and arranged in a case in connection with an elevating spring. A blow upon the knob at the top of the plunger forces the chisel-pointed rods through holes in the casing into the meat, the casing resting on the surface of the steak.

Messrs. A. W. Southard and Volney R. Sears, of Falls City, Neb., have patented an improved invalid bedstead, which is provided with ingenious mechanism for placing the invalid in different positions.

An improved spring attachment for carriage tops, which is designed to prevent the rear bow from being bent by the weight of the top when turned back, has been patented by Mr. Robert E. McCormick, of Doylestown, O.

Mr. Espy Gallipher, of Schellsburg, Pa., has devised an axle journal having a groove lengthwise upon its upper side which extends back upon the surface of the axle and communicates with an oil cup. A sliding rod occupies a portion of the groove; when this rod is drawn out it permits the oil to fill the groove; when it is pushed into the groove in the axle, the oil is ejected and a further supply is cut off.

An improved pill machine, invented by Messrs. W. N. Fort and R. R. Moore, of Lewisville, Ark., is adapted to the manufacture of pills in large quantities. The machine has mechanism for grinding and mixing ingredients, a grooved wheel and trough for forming the pills, and a device for applying powder.

An improvement in millstone adjustments has been patented by Mr. Stephen P. Walling, of South Edmeston, N. Y. This invention consists in a screw applied to the end of the mill spindle on which the stone is rigidly held, so that the running stone may be forced by the screw away from the stationary stone and held against the action of a spring at the opposite end of the spindle, the object being to prevent the stones from becoming dulled by contact with each other.

An improved attachment for sewing machines for soaking or waxing the thread as it passes the needle, has been patented by Mr. Pedro F. Fernandez, of San Juan, Porto Rico. The invention consists in a frame secured to the arm of a sewing machine by a thumb-screw, and provided with a clamping device for holding wax or soap.

A novel combination of a toggle and springs and levers for operating a drag saw has been patented by Mr. Harvey Hughes, of Wheat Ridge, Ohio. The saw, while properly guided, is free to move up or down without affecting the leverage.

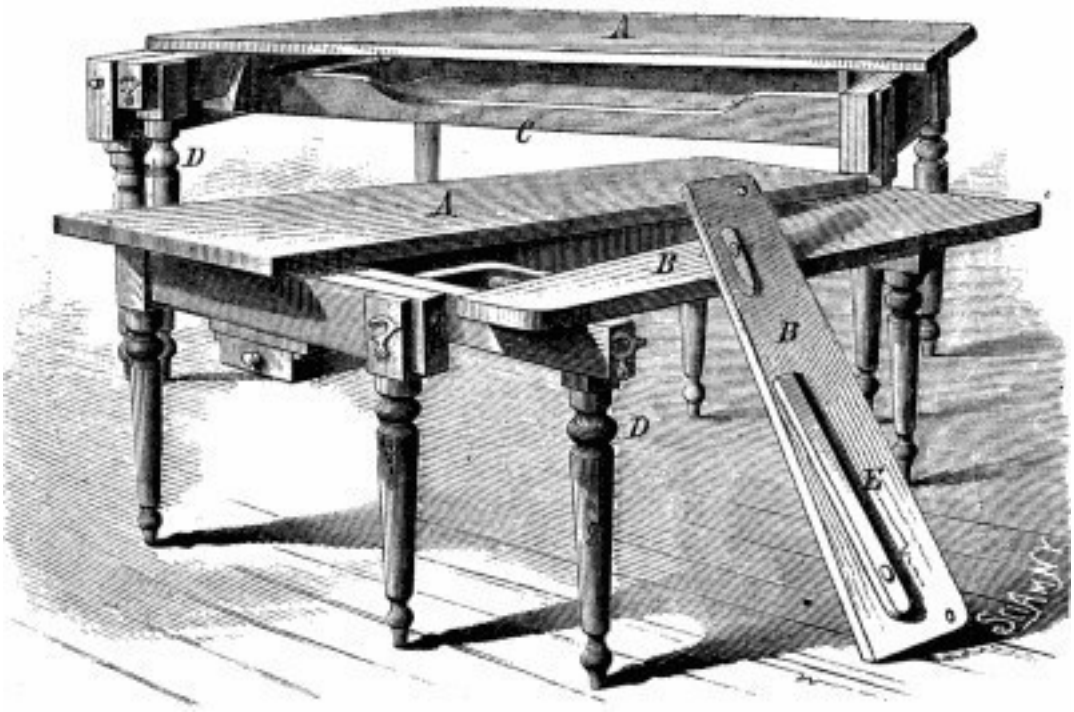
An improvement in filters, which consists in re-enforcing the felt disk with a backing of wire cloth to enable it to resist heavy water pressure, has been patented by Mr. B. P. Chatfield, of Aiken, S. C.

A basket having light sheet metal sides attached to a wooden bottom by crimping the edges over a rib on the periphery of the bottom, has been patented by Mr. Samuel Friend, of Decatur, Ill. The handle and lid may be easily removed to permit of packing and storage.

An improved cross bar for fastening doors, patented by Mr. Richard Condon, of La Salle, Ill., has a spring acted portion which engages a socket on the door casing, and is retained in that position by a spring catch.

A NEW IRONING TABLE

The accompanying engraving represents a convenient and inexpensive table recently patented by Mr. Albert H. Hogins, of Morrisania, N. Y. It is more especially designed for ironing, but it may be used for other purposes when closed up. The top is made in two tapering sections, A B. The section, B, is narrower than the other, and is pivoted at its wider end to a bar, E, which slides into a socket formed in the table. The table has five legs, one of which, D, is attached to a sliding rail that supports the narrower end of the movable part of the top. The table is provided with a drawer in one end and with a tray, C, for containing blankets, etc.



HOGINS' IMPROVED TABLE.

The convenience and practicability of this table for general laundry use, will be apparent without further explanation. The board, B, when drawn out will be used for ironing skirts, shirts, and other garments requiring a board of this character, and when the table is closed together and fastened by the hooks, it may be used in ironing larger articles. When closed it presents the appearance of an ordinary table and may be used as such.

Further information may be obtained by addressing the inventor as above.

A NOVEL ENGINE REGULATOR

The accompanying engraving represents two different styles of regulator, invented by Mr. Stenberg, in which the effect of centrifugal force is utilized. In a vessel, A, of parabolic shape is placed a disk, C, which floats on glycerine contained by the vessel, and is attached to the walls of the vessel by an annular membrane, so that it may rise and fall in a vertical direction as the glycerine is carried with more or less force toward the edge of the vessel by centrifugal action. The inner surface of the vessel, A, is provided with radial grooves, by which the rotary motion of the vessel is communicated to the glycerine. To the center of the disk, C, is attached a vertical rod, which extends downward through the hollow shaft and is connected with governor valve. An increase of speed throws the glycerine toward the periphery of the valve, and, raising the disk, C, closes the steam valve; a diminution of speed permits the glycerine to fall back, when the disk descends and the valve opens.

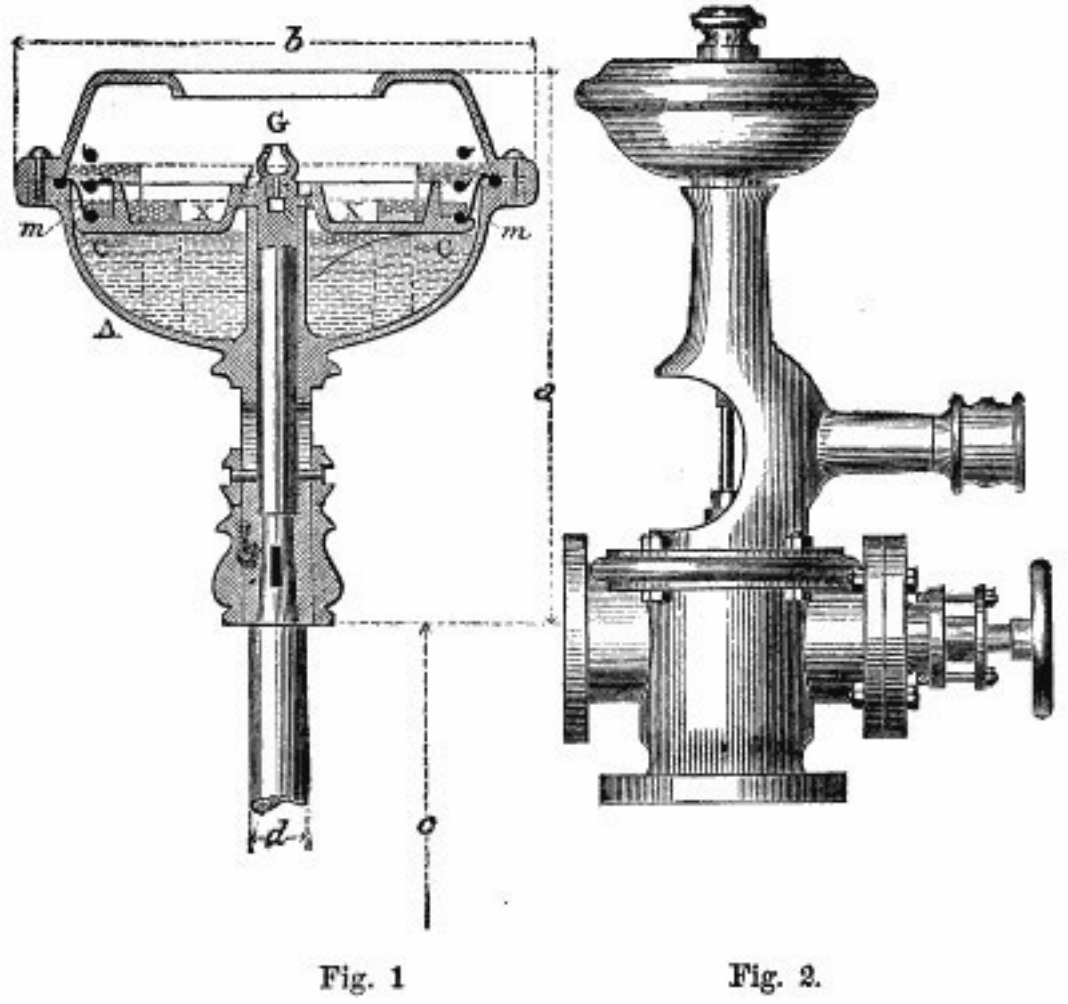


Fig. 1 Fig. 2.

STENBERG REGULATOR.

The disk, C, has a small aperture for the admission and escape of air, and the apparatus is adjusted by pouring lead into the groove in the disk.

The regulator shown in Fig. 2 operates upon the same principle, but it is adjusted by means of a spring.

This apparatus is manufactured by Blancke Bros., Magdeburg.—*Musée de l'Industrie.*

A Strange People

Botel Tobago is an island in the South Seas which has lately been visited by a party of United States naval officers. They were surveying a rock east of the South Cape of Formosa, and called at this island. They found a curious race of Malay stock. These aborigines did not know what money was good for. Nor had they ever used tobacco or rum. They gave the officers goats and pigs for tin pots and brass buttons, and hung around the vessel all day in their canoes waiting for a chance to dive for something which might be thrown overboard. They wore clouts only, ate taro and yams, and had axes, spears, and knives made of common iron. Their canoes were made without nails, and were ornamented with geometrical lines. They wore the beards of goats and small shells as ornaments.

Such is the account of these strange people given by Dr. Siegfried, in a letter read at the last meeting of the Philadelphia Academy of Natural Sciences.

REMEDY FOR THE NEW CARPET BEETLE

Noticing a statement made by Mr. J. A. Lintner, to the effect that the Persian insect powder would probably prove unavailing as a remedy against the ravages of the new carpet beetle (*Anthrenus*), W. L. Carpenter, of the U.S.A., was led to institute some experiments with this well known insecticide, the results of which he communicates to the current number of the *Naturalist*. A small quantity of the powder was introduced, on the point of a penknife, under a tumbler beneath which various insects were consecutively confined. The movements of the insects brought them in contact with the poison, which readily adhered to their body; in endeavoring to remove it from their appendages a few particles would be carried to the mouth and thence to the stomach, with fatal effect. The results were briefly thus: A honey bee became helpless in 15 minutes; a mad wasp in 8 minutes; a small ant in 5 minutes; a large butterfly resisted the effects for over an hour, and apparently recovered, but died the next day; a house-fly became helpless in 10 minutes; a mosquito in 15; and a flea in 3 minutes. In experimenting on beetles, an insect was secured as nearly the size of the carpet beetle as could be found. It was easily affected, and became helpless in 12 minutes.

In these, and experiments with various other insects, the scent from the powder did not produce any bad effect on those subjected to its odor where actual contact was not possible; but when carried to the mandibles the effect was to produce complete paralysis of the motor nerves. The experiments prove that all insects having open mouth parts are peculiarly susceptible to this popular insecticide. As a result, the writer does not hesitate to recommend the powder to housekeepers as an infallible agent in destroying the carpet beetle and preventing its ravages. The Persian insect powder liberally sprinkled upon the floor before putting down a carpet, and afterward freely placed around the edges, and never swept away, will suffice to preserve a large sized carpet. No ill effects from its use need be feared by the householder, since the drug is poisonous to no kinds of animals except insects.

Banana Flour

The banana has recently found a new use in Venezuela. It has the property of keeping the soil moist round it, in a country where sometimes no rain falls for months; so it has been employed to give freshness, as well as shade, to the coffee plant, whose cultivation has been greatly extended (Venezuela produced 38,000,000 kilogrammes of coffee in 1876). The Venezuelans can consume but little of the banana fruit thus furnished, so that attention is being given to increasing its value as an export. At the Paris Exhibition were samples of banana flour (got by drying and pulverizing the fruit before maturity) and brandy (from the ripe fruit) The flour has been analyzed by MM. Marcano and Muntz. It contains 66.1 per cent of starch, and only 2.9 of azotized matter.

NEW STENCIL PEN

The accompanying engraving shows new form of stencil pen invented by Mr. J. W. Brickenridge, of La Fayette, Ind. In Fig. 1 the entire apparatus is shown in perspective; Fig. 2 is a longitudinal section of the pen; and Fig. 3 is a vertical section of a portion of the driving apparatus. In this instrument compressed air is used as a motive force for driving the perforating needle. The inverted cup, shown in detail in Fig. 3, has its mouth closed with a flexible diaphragm, which is vibrated rapidly by a pitman having a convex end attached by its center to the middle of the diaphragm. The pitman is reciprocated by a simple treadle motion, which will be readily understood by reference to Fig. 1.

Конец ознакомительного фрагмента.