SCIENTIFIC AMERICAN

A WEEKLY JOURNAL OF PRACTICAL INFORMATION, ART, SCIENCE, MECHANICS, CHEMISTRY, AND MANUFACTURES.

Vol. XL.—No. 13. [NEW SERIES.] NEW YORK, MARCH 29, 1879. [$3.20 per Annum. [POSTAGE PREPAID.]

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 mov ing 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 he cut-off will have been moved the amount necessary o 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.

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 in

Fig. 4.

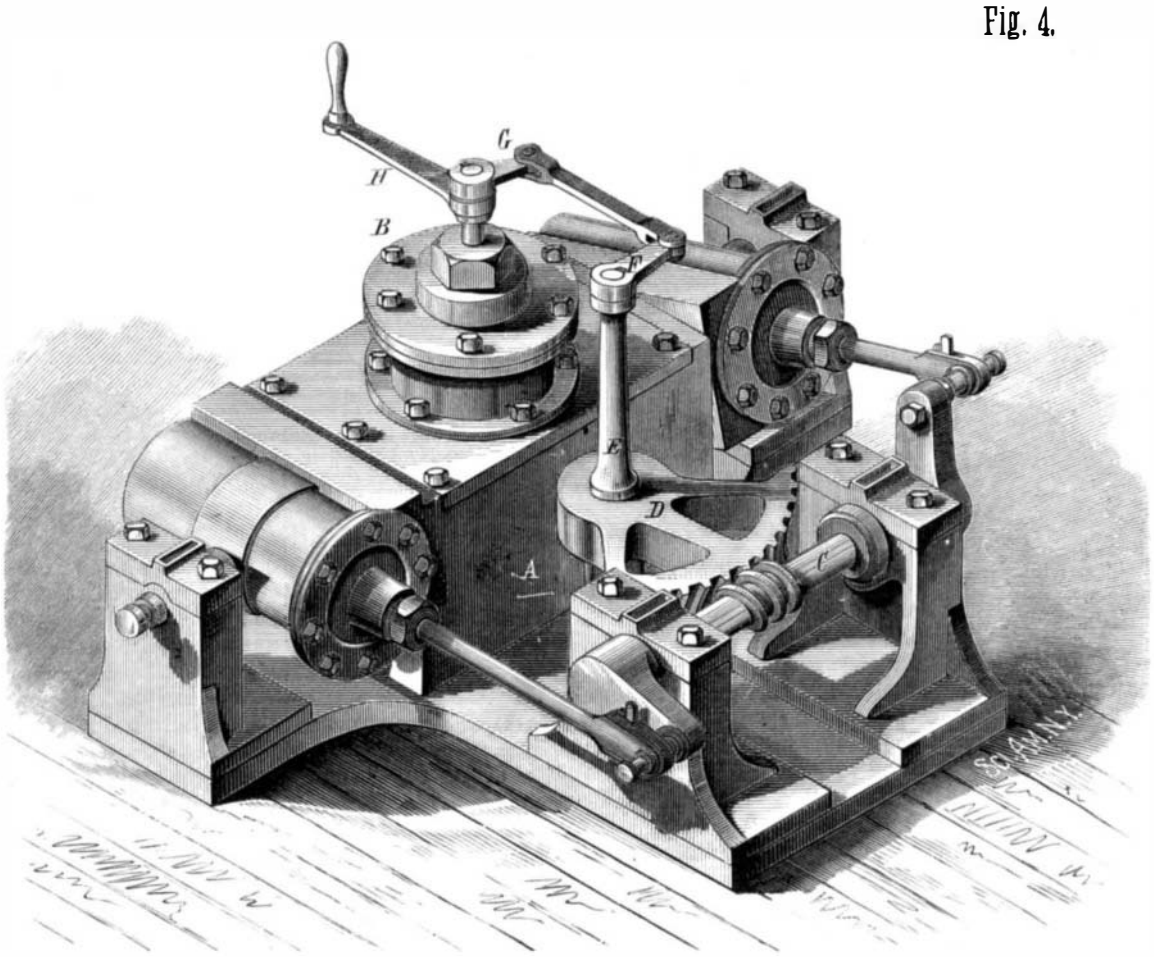

Fig. 2

Fig. 1

WADSWORTH'S NEW STEAM TILLER FOR VESSELS.

creased 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.

Scientific American.

ESTABLISHED 1845.

MUNN & CO., Editors and Proprietors.

PUBLISHED WEEKLY AT
NO. 37 PARK ROW, NEW YORK.

O. D. MUNN. A. E. BEACH.

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VOL. XL., No. 13. [NEW SERIES.] *Thirty-fourth Year.*

NEW YORK, SATURDAY, MARCH 29, 1879.

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THE SCIENTIFIC AMERICAN SUPPLEMENT
No. 169,
For the Week ending March 29, 1879.

Price 10 cents. For sale by all newsdealers.

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