SCIENTIFIC AMERICAN

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

Vol. XLI.—No. 15. [NEW SERIES.] NEW YORK, OCTOBER 11, 1879. [$3.20 per Annum. [POSTAGE PREPAID.]

THE HYDROMOTOR.

The vessel represented in our engraving is propelled by a new apparatus invented by Dr. Fleischer, and the patents are managed by Fleischer's Patent Hydromotor Company, of Kiel, Germany. The craft is propelled without engine, paddle wheels, or propeller, and it is steered without a rudder. The invention is based on the principle of hydraulic reaction, and it embodies several novel and valuable features, which, according to the reports that have reached us, have rendered the hydromotor a success.

The use of a reactive jet of water as a means of urging a vessel forward is not of itself new, but the means employed by the inventor of the hydromotor to draw the water in and eject it are quite novel.

In the engraving Fig. 1 is a side elevation of the vessel, having a portion of the side broken away to show the arrangement of the propelling apparatus; Fig. 2 is a plan view of the boiler and steam cylinders; and Fig. 3 is a transverse section of the vessel, showing a rear elevation of the propelling apparatus.

Two cylinders, B, are connected with the steam boiler by suitable pipes, and the steam supply is controlled by the valve, A. Each steam cylinder has two suction pipes, F, and two discharge nozzles, H, connected with the cylinders by pressure pipes, G. The suction pipe is provided with a valve, E, and the discharge pipe has a valve, D. Below the cylinders and between the discharge pipes there is a condenser, I, having connected with it the air and feed pump, K. The steam used in the cylinders passes through superheaters which surround the chimneys, and its admission to the cylinders, B, through the valves, A, is controlled by a float in each cylinder.

The discharge nozzles are swiveled so that they may turn in any direction, and thus control the course of the vessel by changing the direction of the propelling force.

The great difference between this apparatus and its predecessors is that the steam pressure acts directly upon the surface of the water without the intervention of pistons or intermediate machinery. Friction, complications, expense of repairs, liability to breakage, are in a great measure, if not entirely, avoided, and it is said that the method of applying the power has proved highly economical and satisfactory. The boilers of the Pellworm and their appurtenances are precisely like other boilers. The steam is admitted to the upper part of the cylinders through the valves, A, which are controlled by floats, as before observed. The steam forces the water out through the discharge nozzles with considerable velocity, and the reactive force carries the boat forward. The steam is cut off at the early part of the stroke, and the expansive force completes the work. It may be imagined that considerable loss of power might arise from condensation in the cylinders, but as the water is covered with a film of oil, and a certain amount of oil and hot water clings to the surface of the cylinders and covers the inflowing water, the loss

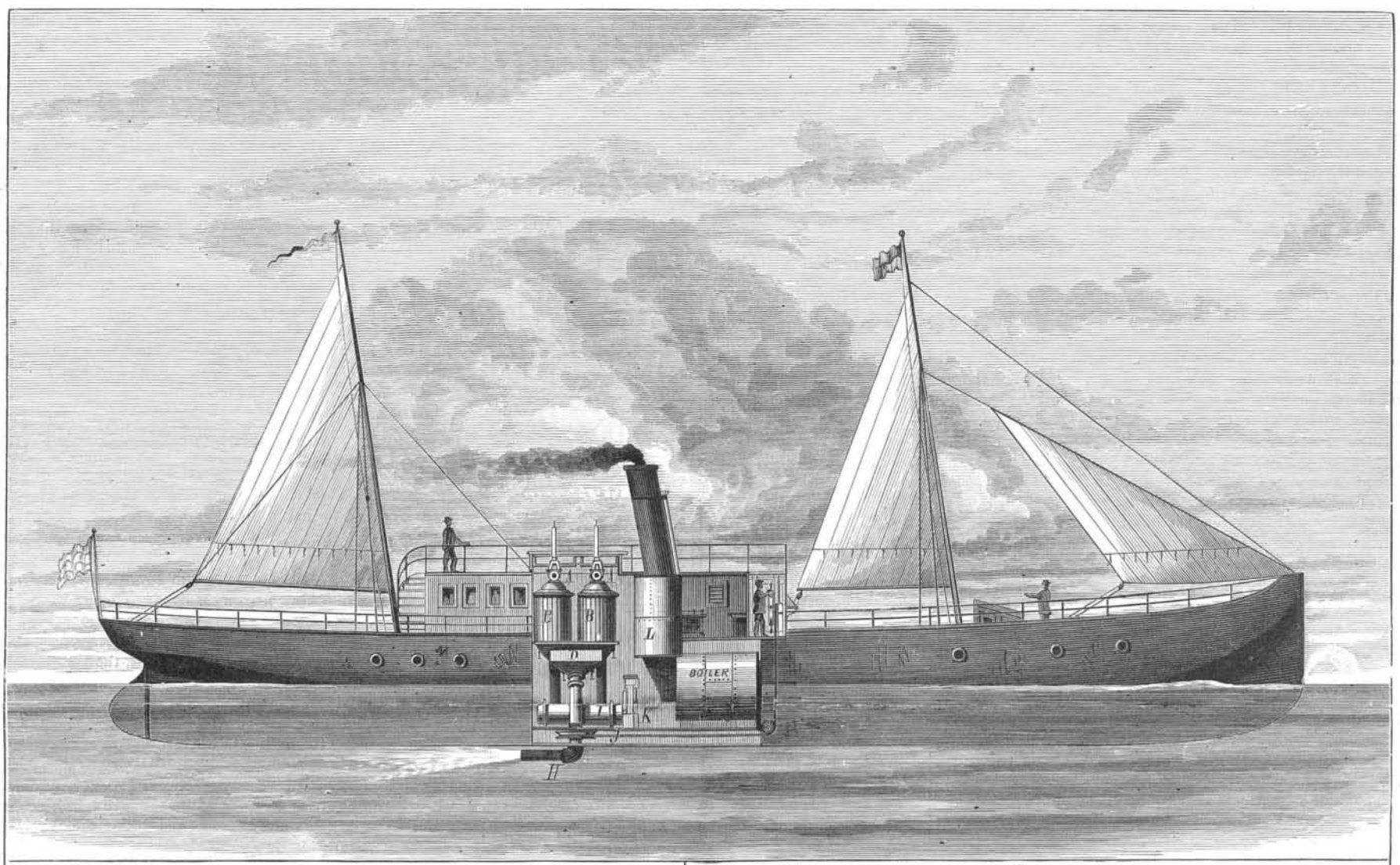


Fig. 2.

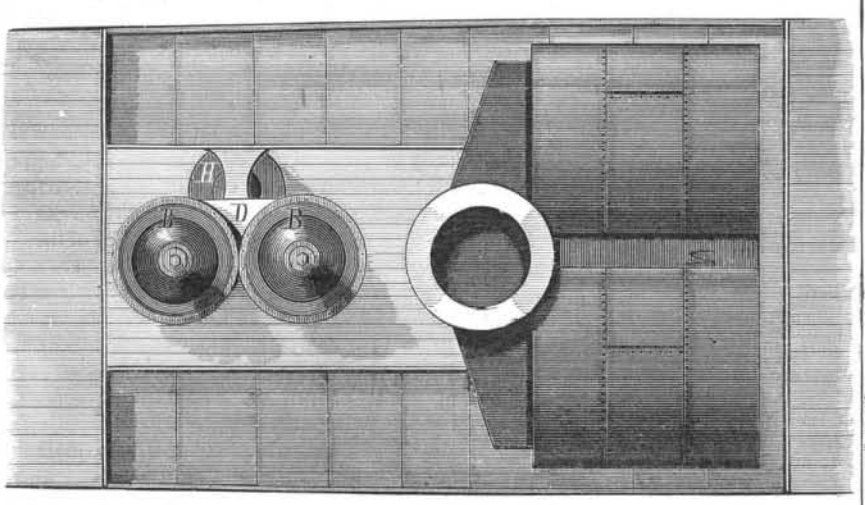
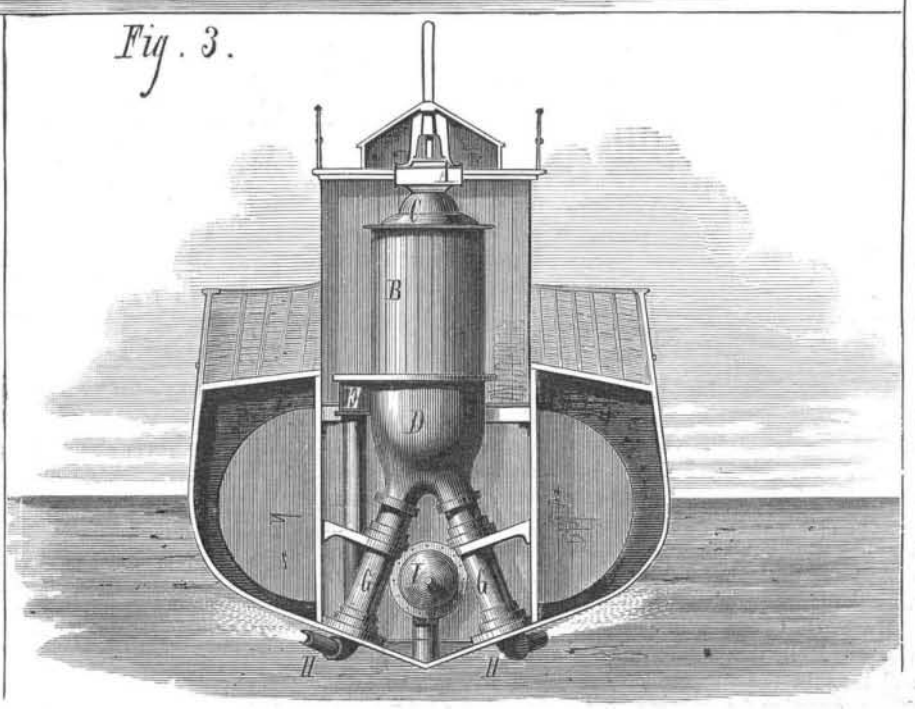


Fig. 3.



THE NEW HYDROMOTOR VESSEL PELLWORM.

is slight. When the water in the cylinders reaches the prescribed level the exhaust valve communicating with the condenser is opened, and as the vacuum is formed water enters the cylinders through the supply valves, and the operation is repeated.

We have been informed that Commander Grenfell, of the British Navy, a Russian engineer, and the technical director of the Flensburg Ship Yards, recently inspected the hydromotor as applied to the Pellworm, and were all highly pleased with its performances. It is said that the technical director wrote Mr. Howalt, the associate of Dr. Fleischer, that he had been converted from a decided opponent to a friend and champion of the invention, having figured over the formulas used in building the hydromotor and finding them both new and correct. Our informant also tells us that the Imperial German Navy has adopted the hydromotor after a personal inspection by the War Minister.

The Pellworm is 75 feet long, 12 feet beam, draws 3½ feet of water, is flat bottomed, and is capable of steaming 6 knots per hour The apparatus develops 25 horse power. It has been ascertained that 40 per cent of power of the steam is realized in the propulsion of the boat.

THE TEMPERATURE OF WATER SUPPLY.

At the recent meeting of the British Association for the Advancement of Science a paper was read by Mr. Baldwin Latham on the temperature of the water supply of towns. The author pointed out the fact that any increase in the temperature beyond 55° rendered the water unwholesome. The temperature of the water supply of a town, as furnished by public waterworks, was totally independent of the temperature of the water at its source of supply, and invariably the temperature of the water was the temperature of the ground at any season of the year at the depth at which the distributing mains are laid. The average temperatures throughout the year, whatever the source or mode of supply, varied very little, but there was great difference in the range of temperature; and while the temperature in the chalk wells at Croydon gave an average monthly range, based upon daily observations, of 0·64°, the same water, when supplied direct from the mains, gave an average monthly range of 21·14°, or when stored in a cistern, a range of 28·05°; while water supplied from the Thames in Westminster gave an average monthly range of 24·69°, but the average yearly difference of temperature between the chalk water supplied at Croydon and the Thames water supplied in Westminster was only 0·67°.

Mr Latham had taken a very large number of observations, and found that the temperature of water in wells varied very greatly. In some of the deepest wells the temperature was colder than in the shallow wells. The movement of the water through the strata of itself increased the temperature. Diarrhea was most largely produced when the water supply became heated beyond a certain degree. Until the water delivered to a town reached something over 60° of constant temperature, diarrhea did not break out in that town. During the present summer the temperature of the water had been five degrees less, and the result was that diarrhea had prevailed only in a very slight degree. The temperature of the water was, from a sanitary point of view, extremely important, and one which ought to be more fully investigated in regard to its influence upon certain classes of disease.

THE SYDNEY EXHIBITION.

The International Exhibition at Sydney, New South Wales, was opened September 17th, with promises of great success.

Great Britain has 800 industrial exhibits and 513 of fine arts. Germany has 691 entries, and Austria 170. France has 350 industrial exhibits and 168 of fine arts. Belgium has 236 industrial exhibits and 50 of paintings America has 150 industrial exhibits.

The State Department at Washington announces that thirty or more of our leading manufacturing firms are represented.

A Decayed American Industry.

Before the advent of cheap cotton the production and manufacture of flax were important industries in this country.

In 1810, when the population of the country was but little more than 7,000,000, there were produced in the United States over 21,000,000 yards of flaxen cloth made in families. At the present time, when the population of the country is believed to be 50,000,000, the total annual production of flax and linen fabrics is probably not over 5,000,000 yards, and not a yard of fine linen is made in the country.

Isthmus Ship Transit.

At a special meeting of the American Society of Civil Engineers, in this city, September 24, the ship railway, as proposed by Capt. Eads, was among the subjects discussed. Mr. F. M. Kelly, who, more than any other individual, has contributed to the exploration of the Isthmus of Panama, said that there would be no difficulty about building such a railway. It would be merely a matter of dollars and cents, but it might be difficult to select a route with the proper grades.

Mr. T. C. Clark, who presided at the meeting agreed with Mr. Kelly that a ship railway was perfectly feasible, and thought the suggestion of Admiral Ammen, that the whole question be referred to a convention of American engineers, was a good one.

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. XLI., No. 15. [NEW SERIES.] *Thirty-fifth Year.*

NEW YORK, SATURDAY, OCTOBER 11, 1879.

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(Illustrated articles are marked with an asterisk.)

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THE SCIENTIFIC AMERICAN SUPPLEMENT

No. 197,

For the Week ending October 11, 1879.

Price 10 cents. For sale by all newsdealers.

WATER FOR INDUSTRIAL USES IN NEW YORK.

A significant feature in connection with the water supply of this city is the increasing resort to artesian wells by large brewing establishments and other users of much water. Among the brewers who have made or intend to make themselves independent of the Croton water supply, are Elias & Betz, 54th st. and 1st ave., who have a well 425 feet deep; Clausen & Price, 59th st. and 11th ave., whose well is 625 feet deep; David Jones, 44th st. and 1st ave., well 662 feet deep; Geo. Ringler & Co., 92d st. near 3d ave., well 390 feet, and going deeper; and P. Doelger, 55th st. near 1st ave., whose well in process of construction is intended to be 600 feet deep.

As a rule these wells have a bore of 6½ inches, and cost from $6 to $10 a foot. Their great advantage lies in the cheapness of the water thus secured. The first well named is said to have paid for itself the first year. The Croton water tax paid by the larger breweries rises as high as $6,000 a year, and an equal outlay will usually sink an artesian well, securing a permanent supply independent of Croton water. The purity of the deep well water is also an advantage, and the same may be said of its average low temperature—about 52° Fah. The difference between that and Croton water at summer heat may make a saving of $20 a day in the ice bill of a large brewery. Artesian wells have also been sunk by manufacturers of mineral waters, that of John Matthews going down 300 feet. The deepest well, 1,001 feet, supplies the Higgins Carpet Factory with pure water for dyeing.

Only large establishments, however, such as require a large volume of water daily, can afford the first cost of artesian wells. The vast multitude of smaller manufacturing concerns, which need water chiefly or solely for steam power, are burdened by a Croton water tax which places them at a serious disadvantage in competition with shops elsewhere, which get their water free or at a reasonable cost.

Incredible as it may seem, the cost of water for running a steam engine in this city is at the present time about two-thirds the cost of fuel. For example, to run an economical one thousand horse power engine should cost for fuel, at present prices for coal, about $25 a day; the Croton water bill for the same is $5,062 a year, or nearly $17 a day. For smaller engines, each horse power up to and not exceeding ten, the charge for water is $10 a year; between ten and fifteen horse power, $7.50 each; for each horse power over fifteen, $5 a year. For all manufacturing purposes the charge for quantities of water less than 250 gallons a day is five cents a hundred gallons; for larger quantities the price diminishes to two cents a hundred gallons for quantities ranging between six and ten thousand gallons a day. For still larger quantities special rates are made, never less than one cent for one hundred gallons. Thus an establishment using one thousand gallons of water a day has to pay a water tax of $105 a year; for ten thousand gallons a day, the tax is $600.

The splendid water system of New York is capable of supplying upwards of a hundred million gallons of water a day. The actual consumption averages ninety gallons a day to each inhabitant, an amount fifty per cent. greater than that supplied to each inhabitant of Boston, Philadelphia, or any other of our great cities except Chicago, which furnishes eighty gallons a day to each inhabitant. On the introduction of waste water meters in Liverpool, where water did not begin to be so lavishly squandered as in New York, it was found that out of every hundred gallons supplied, seventy gallons were allowed to run to waste. It is, therefore, speaking within bounds to say that, the year together, an average of fifty million gallons of water are daily wasted in our city; yet the moment a man wishes to use any small portion of such water productively, the tax gatherer comes down on him with charges which, if not needless, are certainly unreasonably excessive. The practical tendency of this policy is to prevent the establishment here of new industries that have to compete with those planted in localities offering a cheaper water supply, and to drive away those that have made a beginning here. In this way New York strikes at the root of her own industrial prosperity. By laying excessive burdens on her manufacturers, she lessens the variety and volume of the employment possible to her working citizens; and by making production relatively more costly here than elsewhere, she indirectly cuts down the wages of her workmen. It is a bad policy; it does not pay, and cannot be made to pay.

CONSPIRACIES TO NULLIFY THE PATENT LAWS.

It is perfectly proper, and possibly a good policy, for parties having much to do with patented inventions to club together to secure the practical and legal testing of the merits of new inventions in their special field, and the validity of the claims on which patents on them rest. All inventions are not new and useful improvements, nor are all patents based upon claims which can be sustained in the courts. And there can be no just ground for complaint when the members, say of the Western Railway Association, the American Millers' Association, or the Car Builders' Association, resolve to act together in determining the advisability of adopting or refusing to adopt inventions which come within their special departments.. It is quite another thing, however, when the members of such associations agree to sustain each other in the infringement of the rights of patentees, in lobbying bills for the invasion or destruction of the inventors' constitutional privileges, or in thwarting the purpose of the patent law by refusing to consider or adopt improvements which are patented, simply because they are patented.