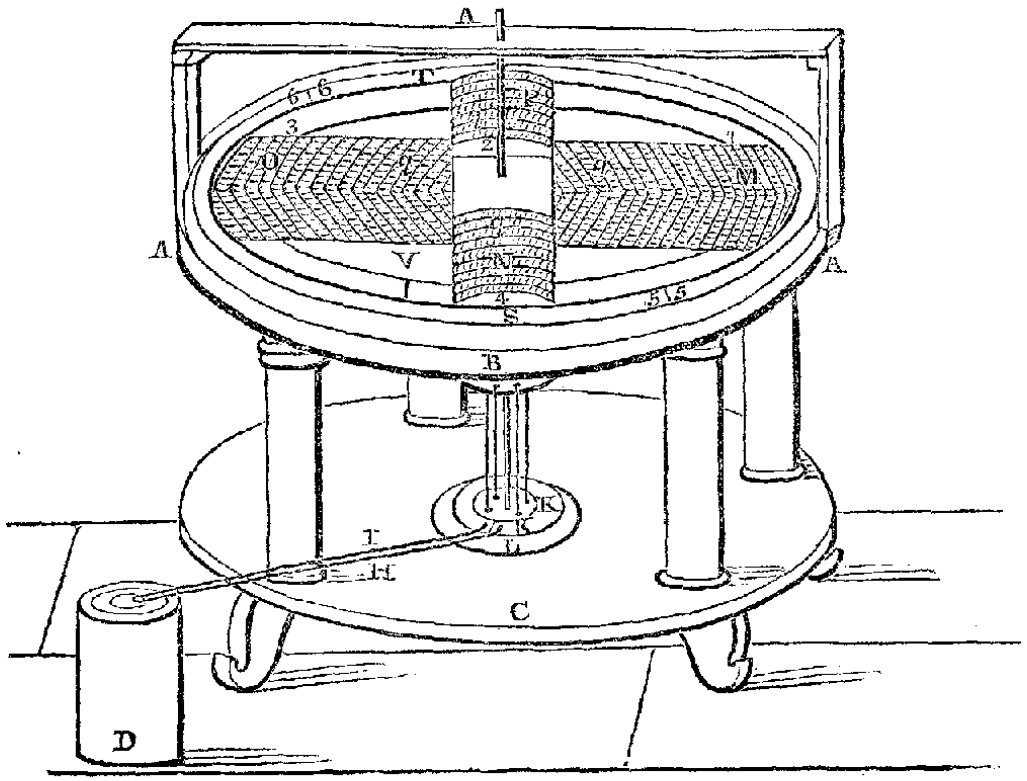
the appearance of varnish. Having thus decribed the nature of my invention, and the manner of carrying the same into effect, I would have it understood that I lay no claim to any of the materials *separately;* and it will be evident that the means of carrying the same into effect may be varied to suit the particular object to which the invention may be applied: but I would have it understood that what I claim is the impregnating timber, or wood of various descriptions, with the metallic solution above described, whereby such timber or wood will be preserved. WEBSTER FLOCKTON.

Specification of a Patent for the application of Electro Magnetism to the propelling of Machinery; granted to Thomas Davenport, of Brandon, Rutland County, Vermont, February 1837.

Be it known, that I, Thomas Davenport, of the Town of Brandon, in the County of Rutland, and State of Vermont, have made a discovery, being an application of magnetism, and electro-magnetism, for propelling machinery, which is described as follows, reference being had to the annexed drawings of the same, making part of this specification.



The machine for applying the power of magnetism, and electro-magnetism, is described as follows: The frame A may be made of a circular, or any other figure, divided into two, or more platforms, B and C; upon which the apparatus rests, and of a size and strength adapted for the purpose intended. The galvanic battery, D, is constructed by placing plates of copper and zinc, alternately, of any figure, in a vessel of diluted acid: there are two conductors, H and I, one from the copper and one from the zinc, in the vessel D, leading to, and in contact with copper plates, K and L, placed upon the lower platform. These plates, or conductors, are made in the form of a segment of a circle, corresponding in number with the

artificial magnets hereinafter described; they are placed around the shaft, detached from one another and from the shaft, having a conductor, leading from the copper plate of the battery, to one of said plates on the lower platform, and another conductor leading from the zinc plate of the battery, to the next plate on said lower platform, and so on alternately (if there be more than two plates on said lower platform) around the circle.

The galvanic magnets, M, N, O, P, are constructed of arms, or pieces, of soft iron in the shape of a straight bar, horse shoe, or any other figure, wound with copper wire *q*, first insulated with silk between the coils: these arms project on lines from the centre of a vertical shaft R, turning on a pivot, or point, in the lower platform; said copper wires, *q*, *q*, extending from the arms parallel, or nearly so, with the shaft down to the copper plates, K and L, and in contact with them.

The galvanic magnets, are fixed on a horizontal wheel of wood V, attached to the shaft.

The artificial Magnets S, T, are made of steel, and in the usual manner. They may be of any number, and degree of strength, and fixed on the upper platform, being segments of nearly the same circle as this platform; or if galvanic magnets are used, (which may be done,) they may be made in the form of a crescent, or horse-shoe, with their poles pointing to the shaft.

Having arranged these artificial magnets, on the top of the upper circular platform, there will be a corresponding number of magnetic poles—the north marked 5, and the South pole 6. Now we will suppose the machine to be in a quiescent state; the galvanic magnet, No. 1, being opposite the south pole of the artificial magnets, the galvanic magnet, No. 3, will, of course, be opposite the south pole, No. 6, and the galvanic magnets, No. 2 and 4, will be opposite each other, between the poles just mentioned.

There being a corresponding number of copper plates, or conductors, placed below the artificial magnets around the shaft, but detached from it, as well as from each other, with wires leading from the galvanic magnets to these plates, and in contact with them, as before described, these wires will stand in the same position, in relation to the copper plates, that the galvanic magnets stand to the artificial magnets, but in contact with the plates.

Now in order to put the machine in motion, the galvanic magnet, No. 2, being charged by the galvanic current passing from the copper plate of the battery, along the conductors and wires, becomes a north pole, whilst, at the same time, the magnet, No. 4, is charged by the galvanic current passing from the zinc plate of the battery, and becomes a south pole; of course the south pole of the artificial magnet, No. 6, will attract the north pole of the galvanic magnet, No. 2, and will move it a quarter of a circle; the south pole of the galvanic magnet, No. 4 being at the same time attracted by the north pole, No. 5, causes the said magnet, No. 4, also, to perform a quarter of a circle: the momentum of the galvanic arms will carry them past the centres of the poles, No. 5 and 6, at which time the several wires from the galvanic magnets, will have changed their positions in relation to the copper plates, or conductors:—For instance, the north pole, No. 2, having now become a south pole, by reason of its wires being brought in contact with the conductors of the zinc plate, and No. 4 having, in like manner, become a north pole, its wire having changed its position from the zinc plate to the copper plate, the poles of the galvanic magnets are, of

course, now repelled by the poles that before attracted them; and in this manner the operation is continued, producing a rotary motion in the shaft, which motion is conveyed to machinery, for the purpose of propelling the same.

The discovery here claimed, and desired to be secured by Letters Patent, consists in applying magnetic and electro-magnetic power, as a moving principle for machinery, in the manner above described, or in any other substantially the same in principle.

THOMAS DAVENPORT.

Remarks by the Editor.—The subject of the forgoing specification is one of great interest, and it has arrested a corresponding portion of public attention; we are likely soon, therefore, to have the question solved, whether this new power can be advantageously applied to the propelling of machinery as a substitute for the steam engine. Most of our readers, it is presumed, have seen Professor Silliman's notice of Mr. Davenport's machine, published in the Journal of Science, in April last, which contains much information respecting the attempts which had been made for the producing of motion by electro-magnetic apparatus. Since that period, advice has been received from Europe, showing that experiments upon this subject are in progress under the direction of some of the most distinguished Philosophers in various portions of that quarter of the globe.

We do not know by whom, or at what date, the first successful experiment of producing a direct rotary motion, by the electro-magnetic apparatus, upon a principle analogous to that upon which Mr. Davenport has proceeded, was performed. As early, however, as June, 1833, an article appeared in the London Mechanics' Magazine, proposing such an apparatus, and giving a figure of one which it was supposed, would answer the purpose; a supposition which was, undoubtedly, well founded. Not long after this, Mr. Saxton, we believe, produced a rotative machine by electro-magnetism, but we are not informed respecting its particular arrangements.

The history of the production of the machine patented by Mr. Davenport, is a history of the successful efforts of an individual, who to an indomitable perseverance, must have superadded, extraordinary natural abilities. His business is that of a blacksmith, and his advantages in point of education were not greater than usually falls to the lot of persons in country places, engaged in such pursuits. Accident brought to his notice, one of Professor Henry's electro-magnets, which he eagerly purchased, under a conviction that he could render it available as a motive power; this was in the year 1833, and in July 1834 he had so far succeeded as to produce a rotative machine, and this he effected in a country village, unaided by scientific knowledge, by books, or by the encouragement of men of superior attainments, or with kindred spirits. Whatever may be the final result of his labours, his merits are of a high order, and he has proved himself well worthy of the most splendid success. Should his machine finally accomplish that which he and many of his friends anticipate, its value will be incalculable, for although he may have been superceded in Europe, his claim as inventor will undoubtedly prove valid in his own country, and ambition need not carry him beyond it. We have twice seen his machine in operation, formerly in New York, and recently in Washington, where it was exhibited to the President, and the Heads of Departments. So far as the evidence of a model is to be taken, its performance is quite satisfactory; and Mr. Davenport is now occupied in constructing one which is intended to drive a Napier Press, re-

quiring a two-horse power. This, should it succeed, will be a fair test of its value, and we confess that, although our expectations do not generally partake of the sanguine in such matters, not only our hopes, but we may say our confidence, has increased as we have become acquainted with the progress of the experiments which are being carried on.

We are well aware, that should it be eventually proved, that an available power may be obtained, which may be substituted for that of steam, its adoption would depend entirely upon its economy, with respect to which we cannot have satifactory data until a machine of several horses power shall have been produced; the probability, however, is, that the cost of operating the electro-magnetic apparatus, will be much below that of the steam engine.

Progress of Practical and Theoretical Mechanics and Chemistry.

On the use of Steam in the Economising of Fuel. By ANDREW FYFE, M. D., &c. Edin.

Dr. Fyfe caused steam to pass through a porcelain tube, stuffed sometimes with charcoal, sometimes with coke heated to redness in a furnace, collected the resulting gas, generally over a water trough, but sometimes over mercury. His inference from a variety of experiments is, that the gas contains hydrogen, oxygen, and carbon, and that the two last are in the state of carbonic oxide. Hence the combustion of the gas gives rise to the formation of carbonic acid and water.

When air was freely admitted to the incandescent material, at the same time that steam was driven through it, Dr. F. found that the water of the steam was, in part at least, consumed, and that the heat was thereby augmented. This was proved by the greater quantity of water evaporated in a given time. On an average, for each ounce of steam thrown into the furnace, there were four ounces additional evaporated, over and above that evaporated without the transmission of steam, provided the steam was thrown in cautiously. This increase of temperature, by the use of steam as a fuel was not effected at the expense of a greater quantity of fuel, for there was rather less fuel consumed when steam was transmitted through it than when omitted, while at the same time the quantity of water evaporated was increased. To arrive at correct results, it is necessary to throw the steam in cautiously.

It is thus proved that water, while passing in the state of steam through fuel, not only acts as a sort of blast, but, at the same time, itself undergoes combustion, by the formation and consequent consumption of inflammable gaseous products; and the increase of heat, Dr. F. thinks, will more than compensate for any extra expenditure for converting the water into vapour.

The author states that the only instance which he had found on record in which steam was passed through fuel with any definite object in view, is mentioned by Mr. Mushet in the 6th volume of Tilloch's Magazine. Had he consulted the early volumes of Silliman's Journal, and also the 25th vol. of that work, he would have found a succession of papers by Samuel Morey, in some of which the use of water as a fuel is distinctly alluded to, and in the last paper its application is proposed by that indefatigable experimenter to one or two practical purposes.

The foregoing account of Dr. Fyfe's experiments is abstracted from his papers in Jameson's (Edinburgh) Journal, No. 45. G.