

IMPROVED RIBBED BALE TIE.

We illustrate herewith a new and very simple tie for cotton and hay bales, etc., which is quickly adjustable, and is claimed to allow of no expansion of the bale after it is secured. This is an important consideration, as the bales always expand several inches in thickness after leaving the press, and, through their bulk, cost more for freight and storage than would be the case did the bands hold them in the shape given by the pressing. In Fig. 1 the tie is shown applied, and in Fig. 2 it is represented on a large scale. The novel feature consists in making slightly raised ribs on the band, at something less than an inch apart. The buckle is a mere frame with a cross-bar, A. The band is applied ribs inward, and the end is inserted through the buckle, as shown in Fig. 2, and under the part to which the buckle is attached. The crossbar, A, and front part of the buckle are suitably beveled to enable the end to be easily inserted and fastened without bending the band. The ribs, being formed along the entire length of the band, enable it to be adjusted to any size of bale. The employment of the device in no way damages it, so that it may be repeatedly used.

This bale tie is in use by many of the largest cotton-packing firms in the South, among whom are Hadden & Avery, Memphis, Tenn., Dunn, Ogletree & Co., Atlanta, Ga., and Woodruff & North, Selma, Ala.

Patented July 11 and 25, 1876. For further particulars address the manufacturers, Messrs. P. Hayden & Son, Columbus, Ohio.

Ozone Produced by Waves and Fountains.

The mechanical action of pure air over vegetation is productive of ozone, but still more manifestly is this subtle quality produced by the dashing of waves and spray against the air. These lashings of air and sea mixed are, electrically speaking, in the nature of one substance rubbing on another. They evoke ozone, which, being inhaled in breathing, gives a stimulus to the constitution. Hence the benefit to health from a sea voyage, or a residence at a pleasant seaside resort. Mr. Binney stated, at a recent meeting of the Manchester (England) Literary and Philosophical Society, that the atmosphere of towns may be sensibly ozonized, and of course improved in quality, by the action of public fountains. He says: "A water fountain may be regarded as a hydro-electric machine, the friction of the water issuing through the jets developing electric action, materially assisted by the conversion of the spray into aqueous vapor. I would suggest that this fact should be prominently brought before municipal bodies, to induce them to erect fountains in all available places in large cities, as sanitary agents. They might prove highly beneficial in crowded localities."

THE CAMACHO ELECTRO-MAGNETIC ENGINE.

The following description, with the diagrams annexed, from the *English Mechanic*, will enable the reader to obtain a tolerably correct idea of the new electro-magnetic engine patented by M. José S. Camacho, of Paris, and which has attracted considerable attention from students of electricity and motive power. The invention consists mainly in the employment of an improved armature and the arrangement of the commutator, by means of which the speed and power of the engine can be varied; but M. Camacho claims the use of tubular magnets for the purpose, as well as his improved armatures and commutators.

The new engine may be constructed according to two modifications, the electro-magnets being stationary, and the armatures movable, or *vice versa*. In both cases the principle of the apparatus remains the same, the details only of the engine being varied. The armatures are formed of metallic plates insulated magnetically from one another, in order to cause the engine to generate a greater amount of force. The magnetic inertia of a temporary magnet is so much greater in proportion as the volume or mass is increased; consequently a comparatively long time is required for it to attain its maximum of magnetization if the mass is considerable. Moreover, in the case in question, and when the armature is placed in proximity to the magnet, it has a tendency to become magnetized throughout its whole extent. It should further be observed that the nearest part of the magnet (which is alone effective) cannot attain its maximum amount of magnetization except at the same time as the whole of the armature—that is to say, when the latter has arrived opposite the magnet. Now it is precisely at this instant that, in rotatory electro-magnetic engines, the passage of the current, which produces the attraction, would cease; whence it results that the armature has finished its course or travel without attaining its maximum of magnetization; and consequently a great diminution of the force, which would otherwise be produced by the en-

gine, ensues. In order to remedy these defects, the armatures of M. Camacho's electro-magnets are composed of a suitable number of metallic plates or blades, arranged normally at the acting surface of the electro-magnets, and magnetically insulated from one another by the interposition of any suitable substance which forms a bad conductor—such, for example, as paper, resin, and the like, and even certain metals which form bad conductors of magnetism. "In this manner the magnetization is produced successively in each of the plates of which the armature is composed, which, in

electro-magnetic engine, in which the electro-magnets are fixed or stationary, and the armatures are movable; Fig. 2 is an elevation of one of the electro-magnets, and Fig. 3 a horizontal section of one limb of a magnet, a longitudinal section being shown in Fig. 1; Figs. 4 and 5 show the improved commutator.

The electro-magnets, A (shown detached in Fig. 2) are four in number, and fixed at equal distances apart from one another between two disks, B, serving as a frame and support to the whole of the apparatus. (One disk only is shown in the figure.) The movable part of the engine is composed of a shaft or axis, C, upon which are fastened recessed or hollow disks, D, to which the armatures, E, are attached. These armatures in the present example are three in number, and they are formed, as before mentioned, of a series of plates or blades of metal insulated electrically from one another and arranged in parallel or radiating positions, as shown in the engraving. The shaft, C, also carries the commutator (F, Figs. 4 and 5), in contact with which roll four rollers, each of which is in communication with one of the electro-magnets, A. The current enters the apparatus by a binding screw attached to the frame or disk, B, passes thence into the shaft, C, and into the commutator, F, whence it reaches the rollers, which direct it successively to each of the electro-magnets, A, by the intervention of binding screws insulated from the frame, and fixed on a disk of wood or other insulating material. The current issuing from the electro-magnets passes to binding screws attached to a metallic ring, which unites them all, and which is insulated from the frame by a disk of wood or other suitable material; the current then passes off by a binding screw to return to the battery. The positions of the binding screws on the metallic ring are shown in dotted lines.

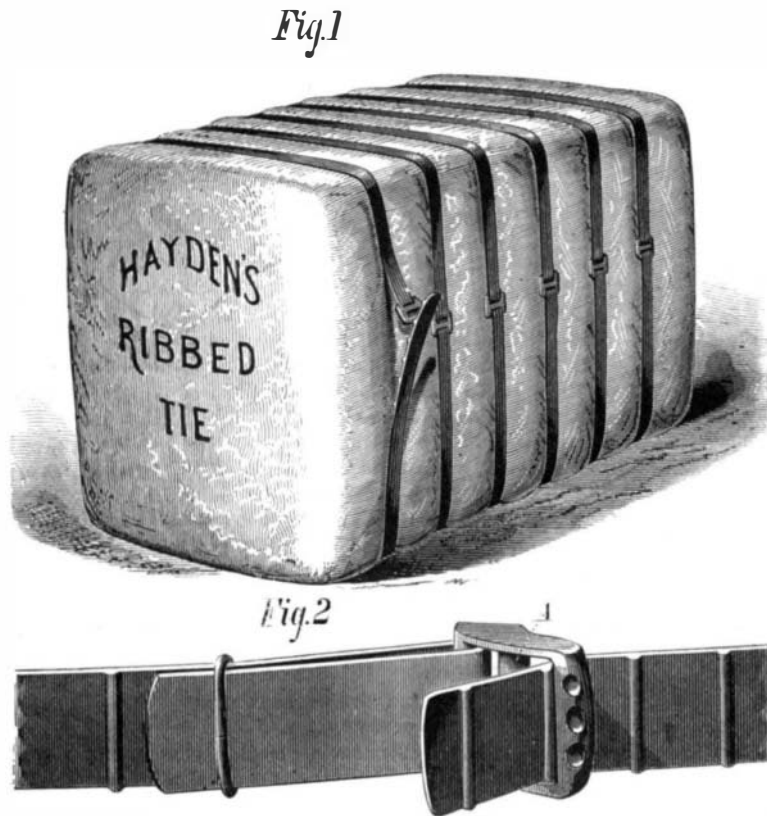
An ordinary commutator may be used, but M. Camacho prefers the improved commutator, F, shown separately in Figs. 4 and 5, which is provided with triangular contact makers, admitting of the duration of the passage of the current being varied or regulated in each electro magnet, according to the position given to these contact makers relatively to the friction rollers before spoken of. The adjustment is effected by causing the commutator to slide along parallel with itself upon the shaft, C, and when in the required position is held by the set screw. The blades of the armature, which are magnetically insulated from one another, as shown in Fig. 1, may be made of a triangular or trapezoidal form in section; but as previously stated, for the sake of greater simplicity the armatures may consist of any suitable number of metal blades with parallel faces arranged in juxtaposition, but magnetically insulated from one another by any suitable means. The electro-magnets employed in the engine are by preference constructed of tubes of a cylindrical, rectangular, square, or other convenient section, an example of which is shown in Fig. 3; but ordinary electro magnets with solid cores may be employed, arranged in any required number round the apparatus.

The engine may be constructed of any dimensions. Bars or bolts are shown at T, Fig. 1, for the purpose of securing it either to a fixed framework or to the object itself, to which it is to impart motion. It is applicable, says the inventor, to industrial purposes generally, such as driving sewing machines, working musical instruments, machine tools, and the like. It may also be employed, by constructing it of suitable dimensions, for the hauling of vehicles upon rails or upon the ground, as well as propelling vessels, or for imparting motion to other apparatus.

Coast Lights Injured by Birds.

It is a curious fact that, during the months of April and October, keepers of lighthouses along the coast are obliged to exercise the greatest vigilance in order to prevent injury to their lights through the breaking of the lantern glasses by birds flying against them at night. Ducks often dash against the panes with such force as to shatter heavy plate glass, and even wire netting, now used, is sometimes found an inadequate protection. The keeper of the new light near St. Augustine, Fla., states that almost every morning during last month he picked up from twenty to fifty dead birds, which had committed involuntary suicide in the above manner. It is estimated that at each of the large lighthouses on the coast some 2,000 birds are thus yearly slaughtered, or in all about 100,000 annually. The circumstances also serve to indicate that the flight of the birds, which migrate during the months named, is accomplished in the night.

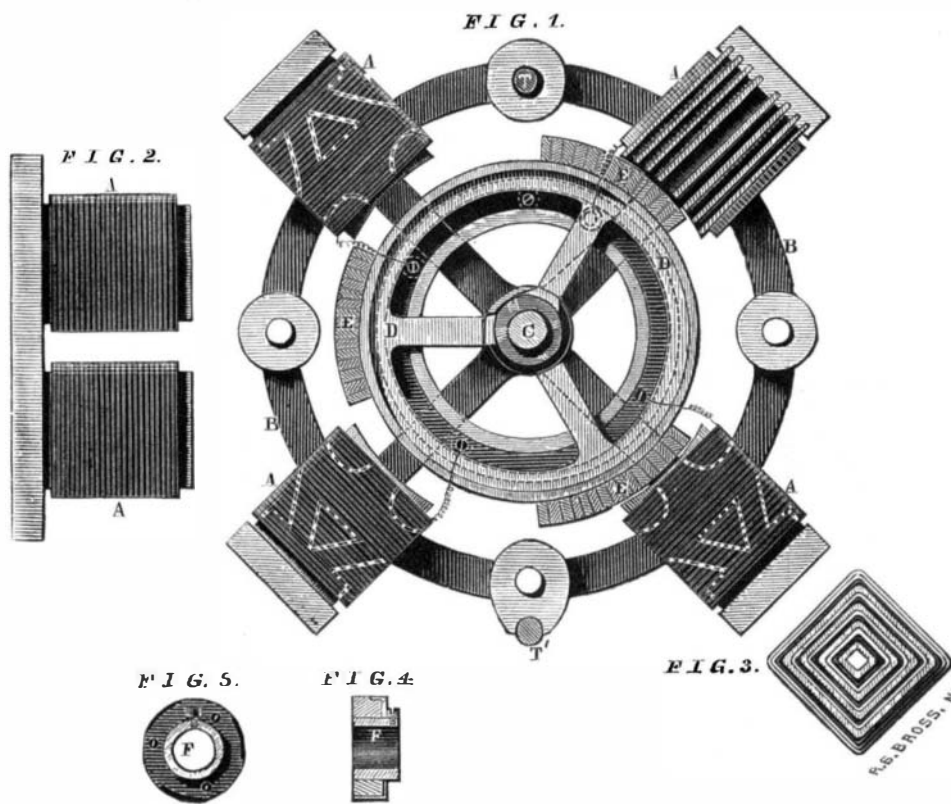
VARNISH FOR SILVERWARE.—Gum elemi, 30 parts; white amber, 45; charcoal, 30; spirits of turpentine, 375. It must be used in a heated state, the metal to which it is to be applied being also heated.



HAYDEN'S RIBBED BALE TIE.

consequence of their small volume, are thus brought to a condition of maximum magnetization as soon as they come within the range of magnetism of one of the electro-magnets of the engine, and the travel of the armature is completed in maximum magnetization, giving greater production of force with the same expenditure of electricity. As this effective force is the product of forces multiplied by velocities, it is also evident that an increase in the effective force is produced by reason of the greater rapidity of the magnetization and demagnetization of the armatures formed of insulated plates or blades."

In the new commutator the piece of metal or contact maker, serving as a conductor, instead of being made rectangular in shape, is constructed in the form of a trapezium



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or triangle, so that the rubber which acts against it continues in contact therewith, during only a fraction of a revolution, varying according to the position in which the contact maker is placed. It will thus be seen that it suffices to advance or draw back the commutator upon its axis of rotation, while the rubbing surfaces of the engine remain stationary in order to modify the passage of the currents in the electro-magnets, and consequently to regulate the speed and power of the engine.

In the diagrams, Fig. 1 is a transverse section of a rotary