VOTING BY MACHINERY.

M. Martin, a noted French electrical engineer, whose numerous labors with regard to the electric light have resulted in his almost total blindness, has recently invented a curious apparatus for voting by machinery, the details and engravings of which we extract from *La Nature*.

The invention is intended to be used in legislative and similar assemblies, and it is so arranged that, on the question being put, each member has only to press a black or a white button in a box before him, according as he wishes to vote "no" or "yes," when one circle on a large indicator board appears of the corresponding color. The indicator is represented in our large engraving above each circle, on which places are prepared to receive the names of the voters. In case the member does not wish to vote, he presses both of his buttons, and the fact is noted by his circle appearing half black and half white

The interior mechanism of the indicator board is represented in Fig. 2. The electro-magnets above the circles operate so as to throw down the white screens, while similar magnets below the circle raise the black screens. Another ingenious feature is that the machine may be caused to instantly record the number of votes cast on each side. For this purpose two wheels are provided, each numbered on its sides with figures, up to the total of members of the assembly. Each wheel turns before a window in the indicator, which is just large enough to show the necessary figure. A lever moved by a weight describes a semicircle when the presiding officer touches a button placed before him, the effect of the last operation being to break a current. The lever carries a copper contact which travels over a distributor, and establishes a current whenever it passes before a circuit corresponding to a vote given. This current is transmitted to an electro-magnet, on the right for the positive and on the left for a negative vote, and the effect of the

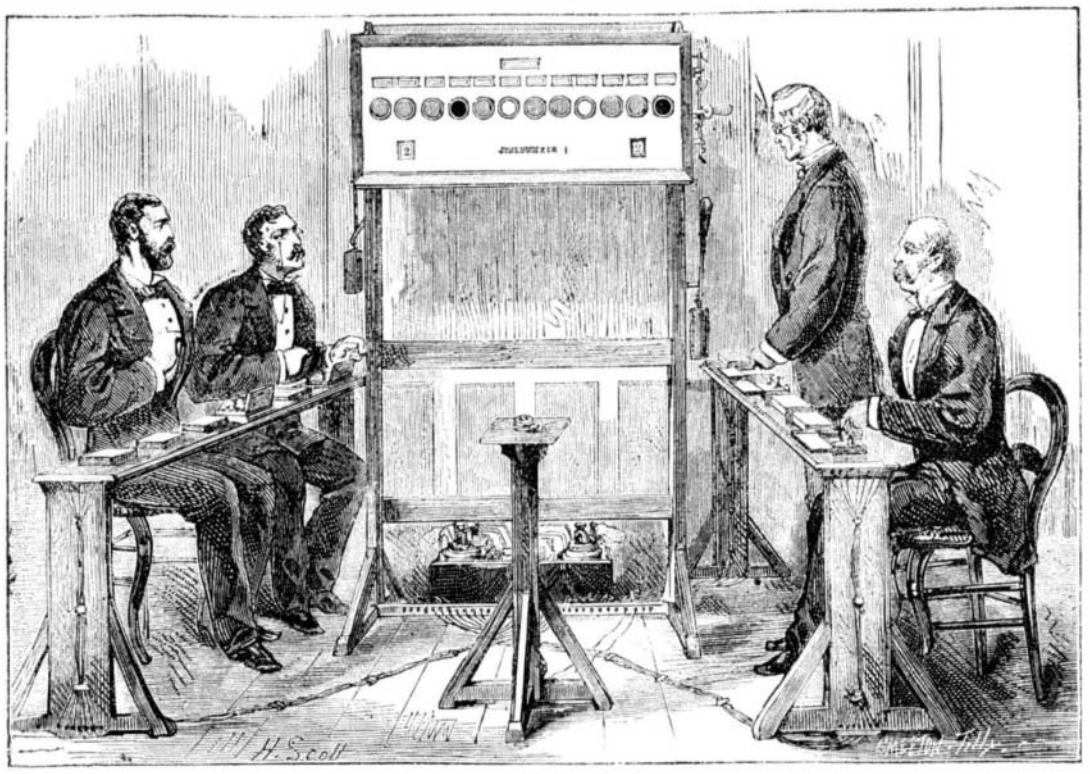
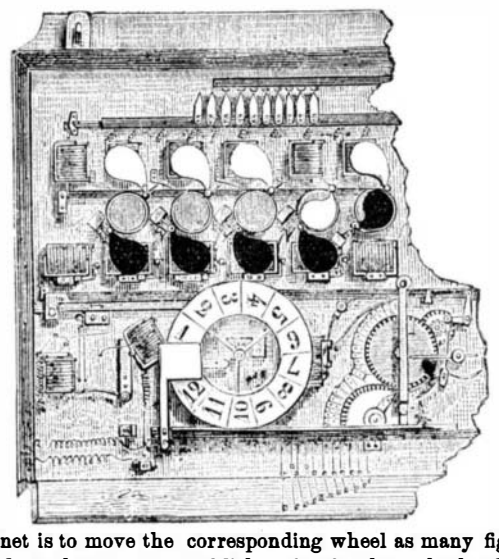


Fig. 1.-ELECTRIC APPARATUS FOR RECORDING VOTES.

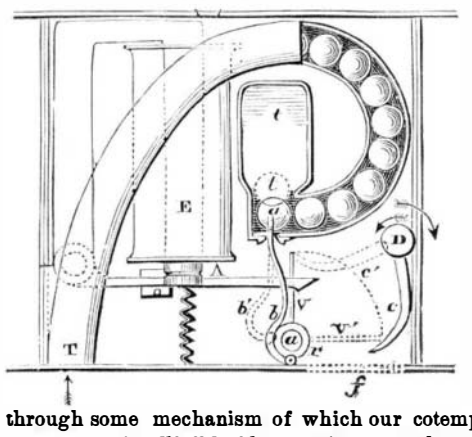
Fig. 2



magnet is to move the corresponding wheel as many figures ahead as the contact establishes circuits through the distributor. The result is shown at the windows marked 2 2 in the large illustration

There is also an arrangement whereby a record of the votes is made on paper. The electro magnets which move the screens at the same time cause points to project, and

Fig. 3.



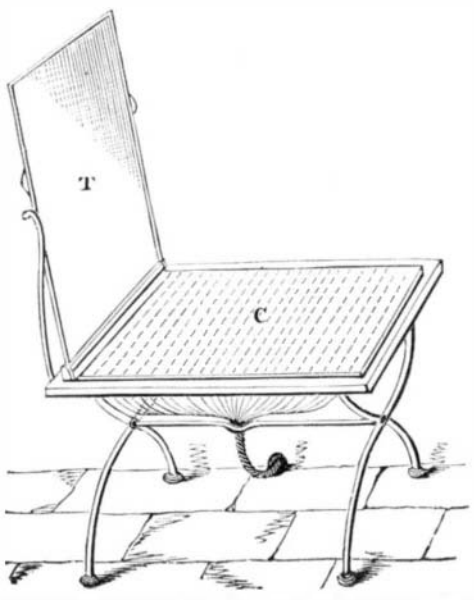
these, through some mechanism of which our cotemporary fails to convey an intelligible idea, mark upon a sheet of paper when the latter is pressed behind them. The sheet is previously prepared with the names of the voters at proper places, so that from the nature of the mark it is instantly seen how the individual voted.

By another system, invented by MM. Clérac and Guichepot, the whole assembly is enabled to see how the voting progresses, and each member can see, without leaving his seat, whether his vote has been received and registered. On each side of the tribune is placed a large slab, divided into as many compartments as there are members. One of these slabs is for the affirmative votes, and the other for the negative. On each member's desk are two knobs, one in electrical connection with the compartment on each slab which belongs to that member's seat.

Fig. 3 represents the interior of one of these divisions or compartments. It is composed (1) of an electro-magnet, E, whose armature, A, holds back a small shutter, V, of a gaudy color, and an arm, *b*, both fixed to and movable around the axis, *a*; (2) of an inclined tube, T, containing ivory balls, and whose lower end, *t*, pierced laterally, only allows one of these balls per vote to pass out; (3) of a cam, *c*, fitted into a shaft traversing all the compartments of the same vertical row; (4) a small window, *f*, looks toward the assembly.

When the member presses the knob—either "yea" or "nay"—before him at his desk, the electro-magnet attracts the armature, A, which releases the shutter, V, and which at once—by means of a spring, *r*—shuts down in front of the window, *f*, so as to become visible to the member voting. At the same time the arm, *b*, obeying the impulse of the spring, *r*, pushes out a ball from the tube, T, into a vertical receiver, *t*, whence it arrives into a receptacle for all the balls from its corresponding frame. These various duties are accomplished, comparatively speaking, simultaneously in the different parts of the two frames, so that the whole of the voting is declared to the assembly by the appearance of the closed shutters, at the same time that its total value is

Fig. 4

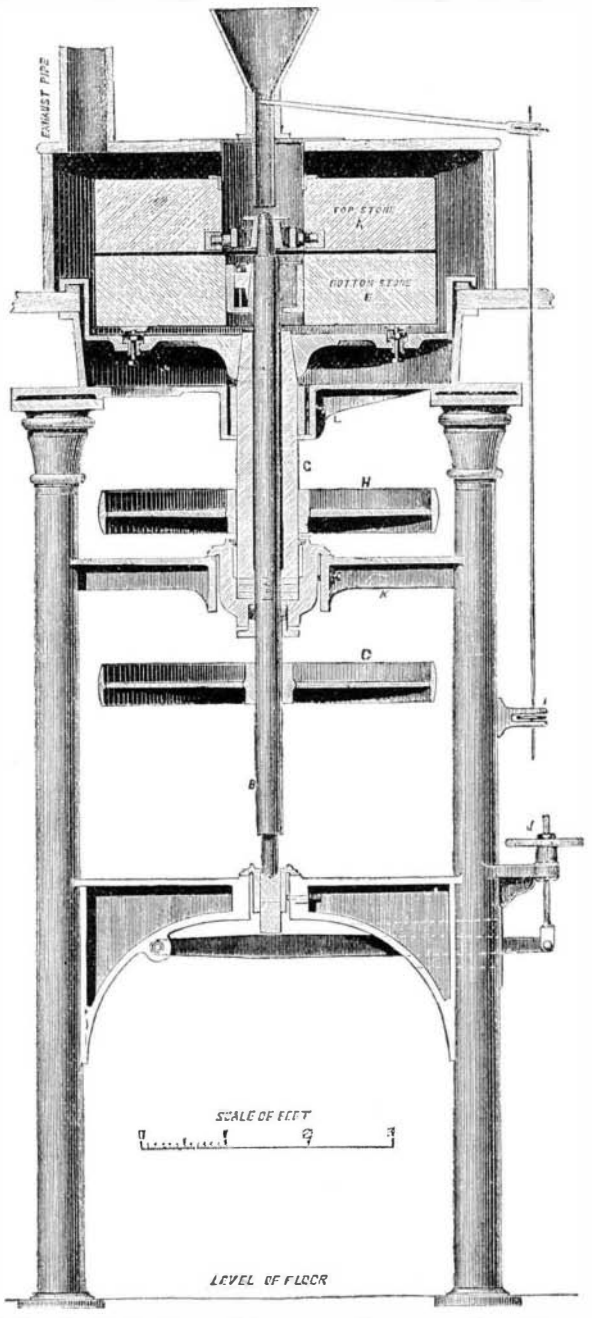


automatically declared by the final collecting tube graduated for the purpose. After the voting, the shutters and arms of all the compartments are restored by a single movement to their original position, by means of the vertical shafts, D, and the cams, *c*. The machine is then ready for a fresh vote. There are twenty ivory balls in the tube, T, which suffices for a sitting, and they are all exactly the same in size, and each bears either the name of a member or a number. When the numbering of the votes is accomplished, it merely suffices, after each ballot, to take away these balls and make up from them the list of voters. But the inventors have even done away with the necessity for this labor. The same electric current which has thus far worked the machine prints the name of the member and indicates the nature of his vote. Upon a metallic board, T, Fig. 4—prior to the voting—is a sheet of paper, sensitized by a salt easily decomposed by electricity (such as ferrocyanide of potassium); then this board is lowered upon a plate of hard caoutchouc, into which are embedded metallic pieces, each bearing the name of a deputy engraved upon it. Just as on the two frames, each member has allotted to him in this plate two metal pieces, the one in iron and the other in copper, communicating respectively with his "for" and "against" voting knobs. At the same moment, therefore, that the electric current drops a ball in either frame, it decomposes the salt on the prepared paper, and prints the member's name in red or blue, according as he votes "yea" or "nay."

IMPROVED MILL.

We illustrate herewith a novel system of grinding wheat, which deserves a good deal of attention. Very little description is necessary. It will be seen that the bed stone, instead of being fixed as usual, is set in a kind of frame or saucer, supported on a tubular shaft, and that this bed stone revolves in one direction while the runner revolves in the opposite way. At the first glance it would appear that there is very little in this. The remarkable feature is that, from evidence placed before us, we are left no room to doubt that a single pair of stones thus fitted will grind as nearly as may be three times as much wheat in a given time as a pair of millstones worked in the ordinary way. The stones are driven by two belts, one open and the other crossed. The top stone, A, is carried by the spindle, B, and driven by the pulley, C, while the bottom stone, E, is driven by the pulley, H. The hand wheel, I, regulates the feed, while J is used for adjusting the stone or tempering the grist. K is the footstep for the hollow spindle, fitted with friction plates.

The stones are driven at about the usual velocity, say, 108 to 112 revolutions. Now, at first sight it would appear that precisely the same results would ensue if the top stone of an ordinary mill were driven at twice the usual velocity; but this conclusion would be erroneous. Any attempt to overdrive an ordinary mill makes



the flour too hot, and for this reason there is a certain normal velocity which cannot be exceeded. In the mill now under consideration, although the relative velocity of the two stone faces is just twice as great as the normal velocity, there is no overheating whatever. The mill runs quite cool, and as we have said, brings down about three times the ordinary quantity of flour. The result seems to be brought