

No. 793,701.

PATENTED JULY 4, 1905.

E. O. WILCOX.  
MULTIPLE CHANGEABLE SIGN.

APPLICATION FILED APR. 14, 1904.

4 SHEETS—SHEET 1.

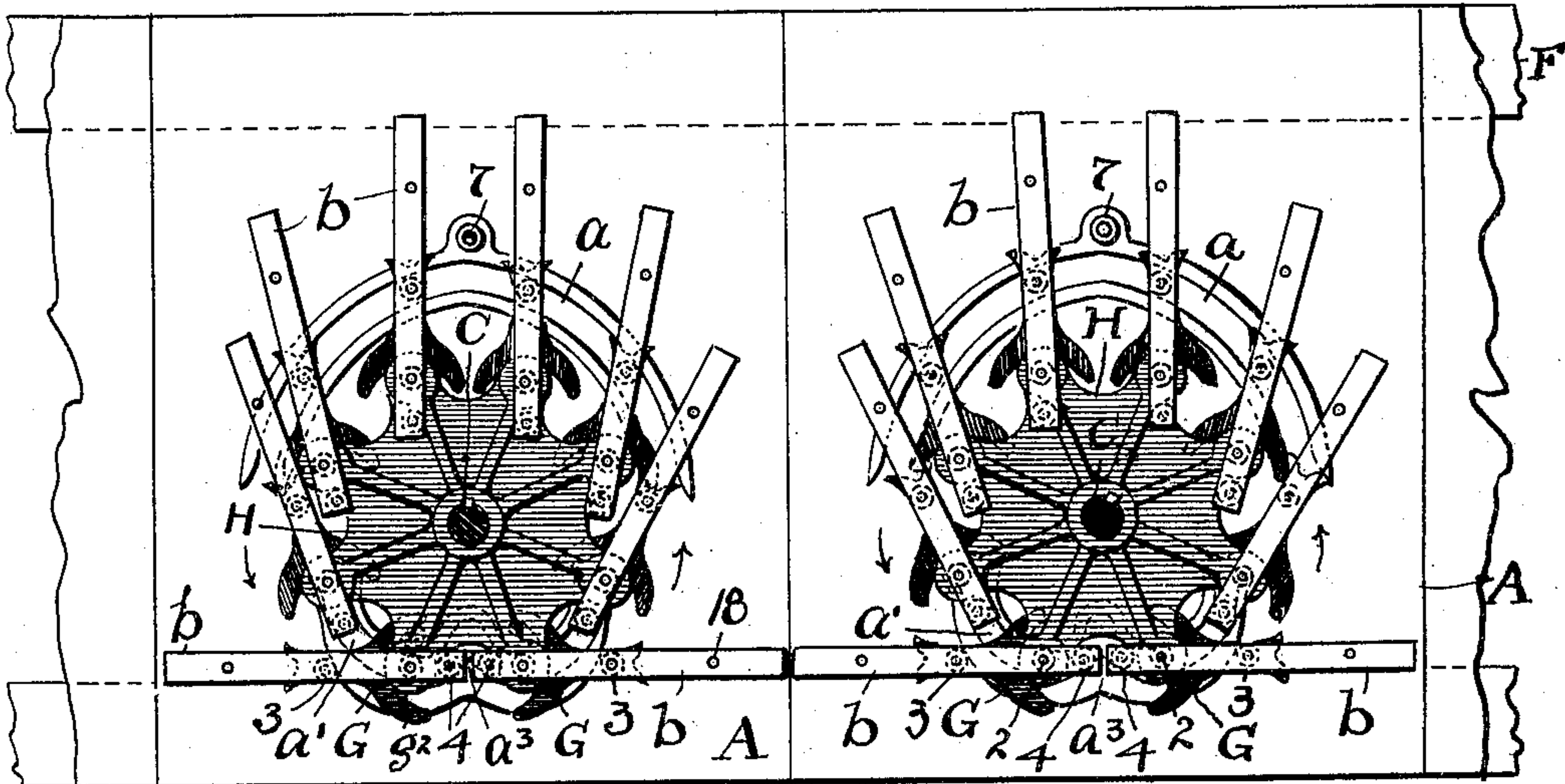
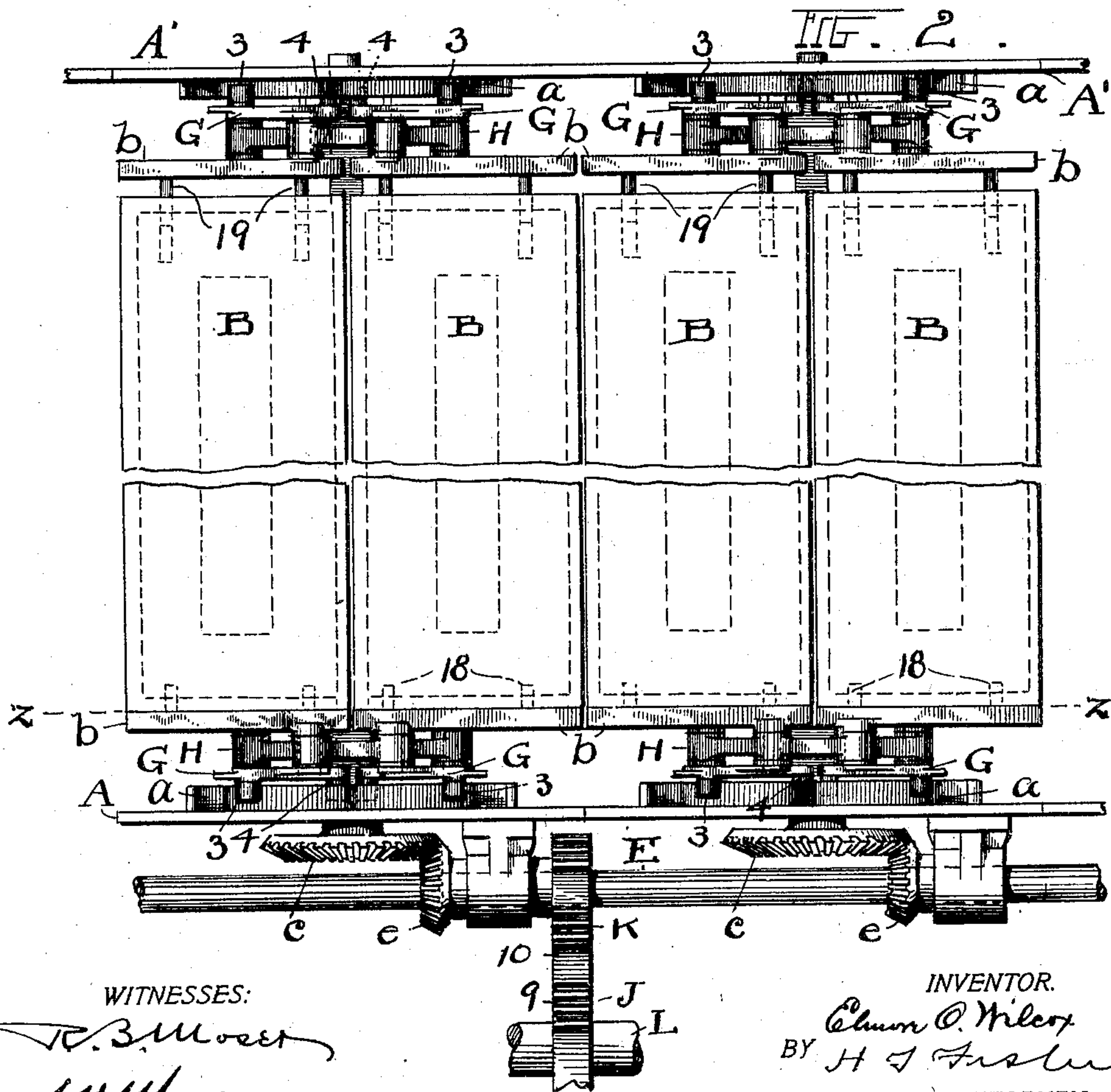


FIG. 1



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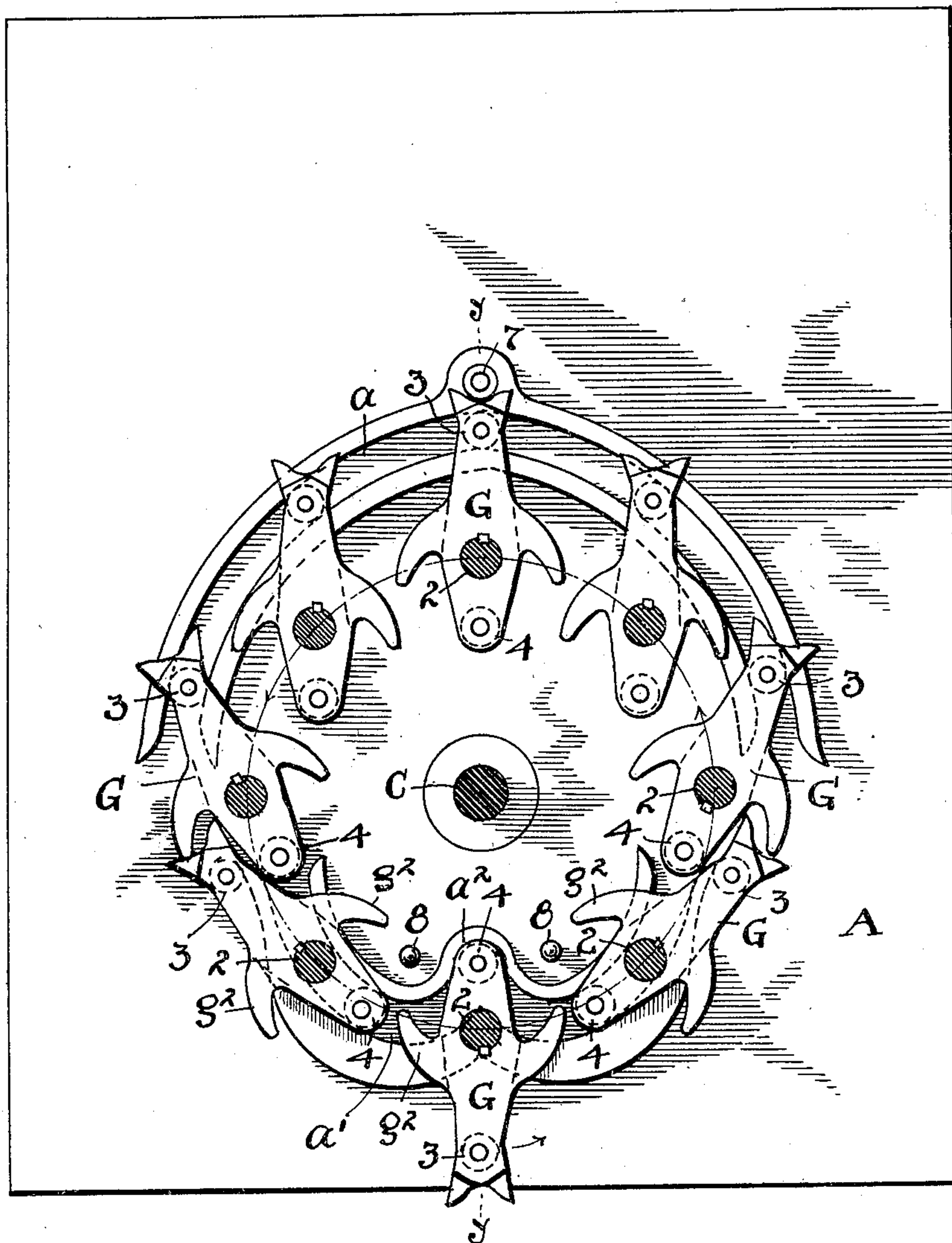
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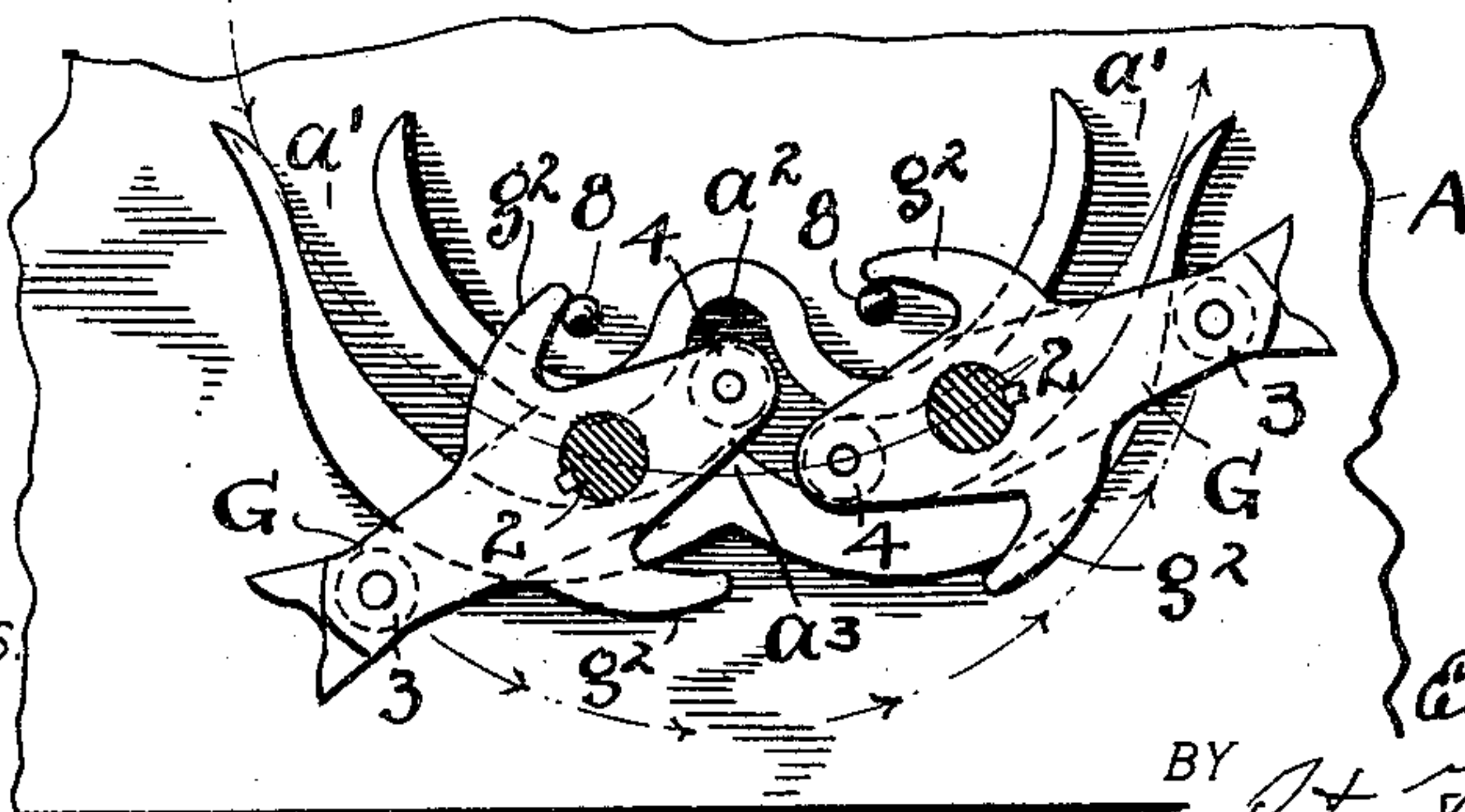
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4 SHEETS—SHEET 2.

II. 3.



4.



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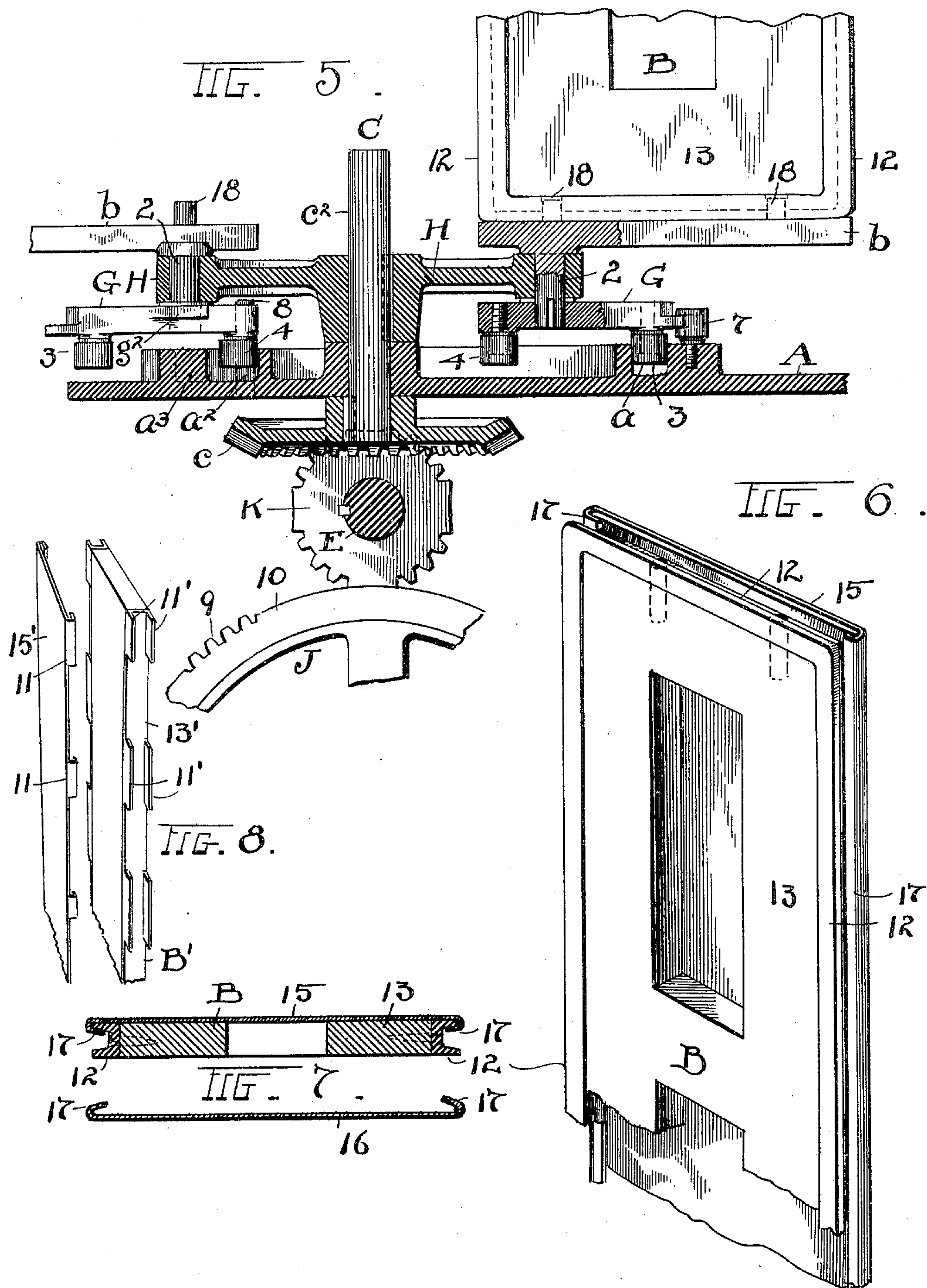
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4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.

FIG. 9.

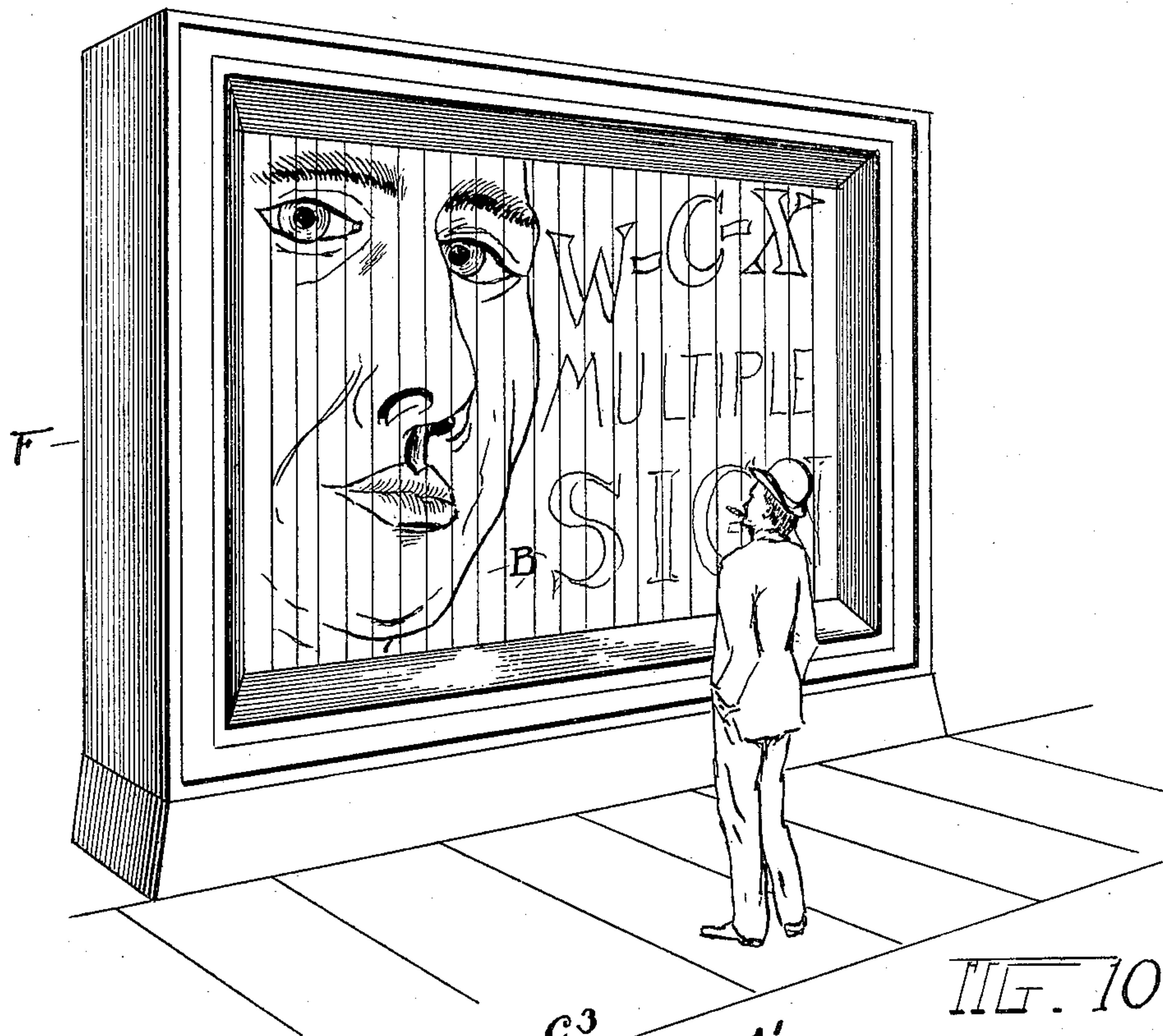
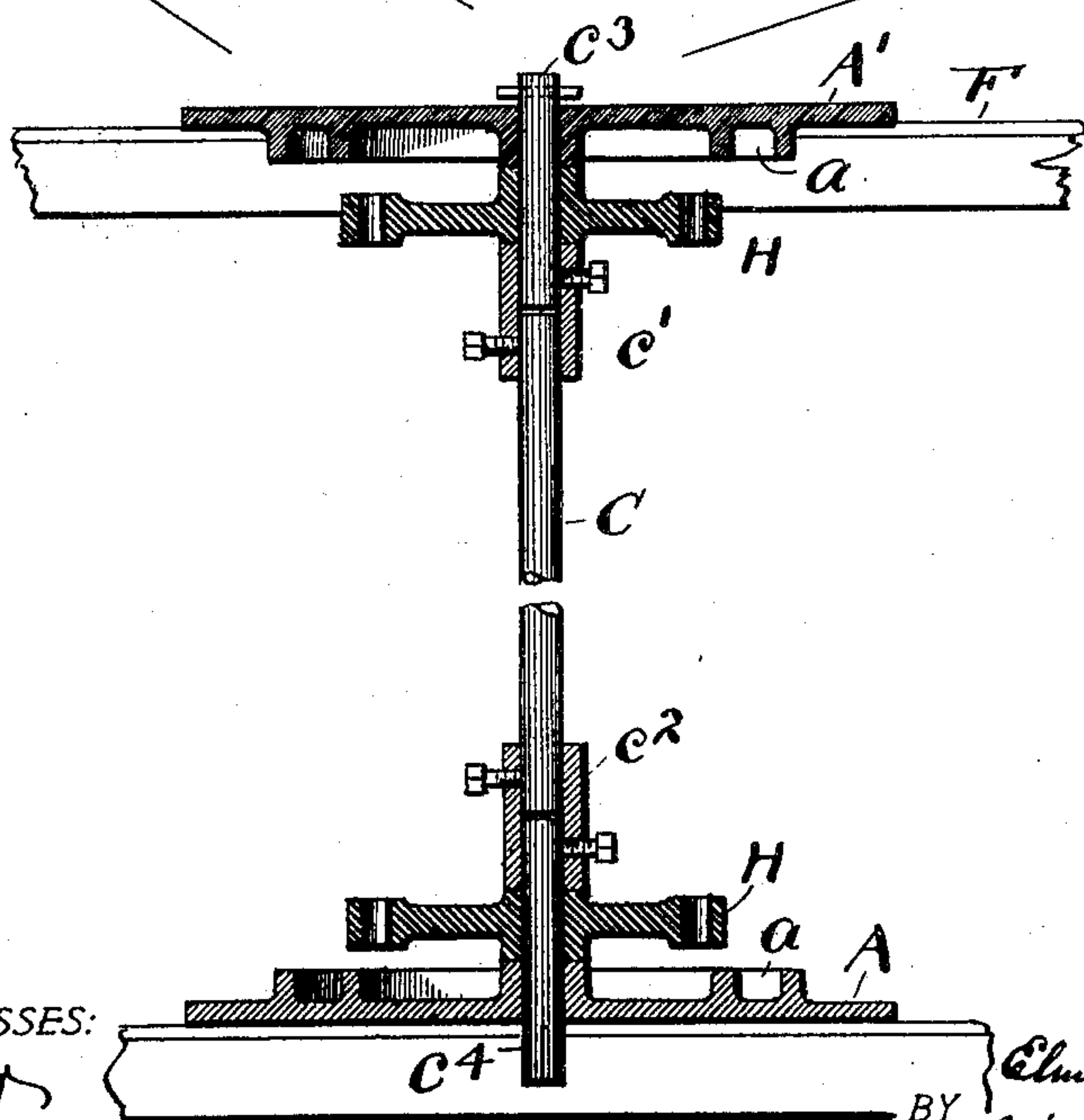


FIG. 10.



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# UNITED STATES PATENT OFFICE.

ELMORE O. WILCOX, OF CLEVELAND, OHIO.

## MULTIPLE CHANGEABLE SIGN.

SPECIFICATION forming part of Letters Patent No. 793,701, dated July 4, 1905.

Application filed April 14, 1904. Serial No. 203,069.

*To all whom it may concern:*

Be it known that I, ELMORE O. WILCOX, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Multiple Changeable Signs; and I do declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to multiple changeable signs adapted to be used by day or by night, with or without artificial illumination, and of a size suitable for outdoor display, as is now common with bill-boards, and which may entirely take the place of bill-boards in cities and wherever the unsightliness or size of such boards is found objectionable. The advantage of my machine over such boards lies in this, that while it does not exceed, say, ten feet in length by nine feet in height its multiple character affords about eighty square feet of advertising-surface, and this is obtained with the advantage of a shifting display which arrests the attention of persons passing by, and thus greatly enhances the value of the advertisement.

In the accompanying drawings, Figure 1 is a plan view of the lower operating mechanism for the sign-blades on line *z z*, Fig. 2; and Fig. 2 is a front elevation of the mechanism shown in Fig. 1. Fig. 3 is an enlarged plan view of the immediate actuating mechanism for each of the several groups of blades corresponding to one of the groups seen in Fig. 1 and showing the action in the reversal of a blade. Fig. 4 shows the front section of the parts seen in Fig. 3, illustrating the action which takes place in the individual reversal of the blades at the front of the machine. Fig. 5 is a vertical cross-sectional view centrally through Fig. 3 from top to bottom. Fig. 6 is a perspective view of a section of one of the several blades or plates, and Fig. 7 is a cross-section of a blade with one of its side plates removed. Fig. 8 is a perspective view of a modified form of blade and a plate therefor, and Fig. 9 is a perspective view of the machine, disclosing its true proportions as in ex-

hibition. Fig. 10 is a sectional view of the knockdown-shaft construction.

In the drawings, A represents a base-plate, and A' a corresponding top plate, for each group of blades and which enter into and constitute parts of the rigid framework of the machine, and B represents the exhibiting blades or panels. These are arranged in groups, with, say, eight in a group, and the panels of each group have a common center around which they are caused to travel in regular order and adapted to be brought into exhibitory position and retire in like manner and successively, and there may be as many of these groups as desired and according to the length of the sign, the plan contemplating the exhibition of two panels in each group at a time. The sign may also be extended or enlarged in length by placing one machine beside another and operating all in unison, so as to get the effect of a single machine having the large frontage of two or more. The blades of each group and all the mechanisms associated therewith, top and bottom, are the same in all particulars, so that a description of one group and even of one blade and its operation will suffice for all. In this connection it is to be understood that one of the important objects of the invention is to get the corresponding blades in a series of groups, two or more, into exhibitory position and alinement at the front of the machine certainly and promptly with each successive change of sign, thus producing a variable effect which is both attractive and entertaining, because the transition is simultaneous and practically instantaneous from one sign to another and usually is made often enough to make it an inducement to wait and see the next change—say four changes to a minute; but the pause or rest of a sign may be varied from a few moments to any length of time, and the change from one position to another is made with positive mechanism which holds the blade in mechanical control and is equal to all outdoor conditions, as will hereinafter be fully described. It is my plan, further, to have each advertisement occupy the entire front of the sign at a time, and while the



character of the display is generally that of an advertisement and made for profit it need not necessarily be limited thereto, but instead there may be printed matter substituted for the signs and with characters large enough to be read by an audience in large auditoriums and the device adapted to display songs, texts, pictures, and the like. In such cases the readings may extend from top to bottom in one or more columns and in as many or as few groups of blades as a given need may require. This arrangement is especially advantageous in Sunday-school work, where the changes can be made both attractive and instructive to children. Now having the blades of each group disposed about the axis or shaft C, through which all in a given group are operated, I provide for two distinct operations for each and all blades, comprising, first, the reversal of the blades collectively in their travel about shaft C from the front back to the front and, secondly, individual reversal of the blades at the front of the sign, so that first one side and then the other of each blade successively will be exposed before it leaves exhibiting position. The upper and lower plates A and A' are each provided with channels to guide and confine the blade-controlling mechanism, and said channels are of special and peculiar construction, according to the work to be done. Thus the inner and larger and more or less eccentric walled channel or way  $a$  extends about half-way around shaft C at its rear, and the outer guide channel or way  $a'$  is on a smaller arc and provided with a middle recess or retreat  $a^2$  at its middle and a substantially  $\Lambda$ -shaped deflecting projection  $a^3$  opposite thereto and through which a reversal of the blades is successively effected one at a time, also as will hereinafter more fully appear. Power is provided for each and all the groups alike from shaft E, Fig. 2, and bevel-pinions  $e$  thereon meshing with bevel-gears  $c$  on vertical shafts C of the several groups. Rigid with each blade top and bottom is a controlling-arm G, and this arm is operated by wheel or spider H on shaft C, also top and bottom. The exact means of connection between these parts comprises a shank or wrist 2, rigid with the base-support  $b$  for blade B, Fig. 5, and also rigid with arm G toward the inner end thereof, and shank 2 is rotatably engaged in or through the end of arm of spider H and becomes the medium through which both travel and rotation of the blade are effected. Each actuating-arm G is provided with two rollers 3 and 4 on its under side on opposite sides of shank 2 and which travel in grooves  $a$  and  $a'$  in plates A and A', as seen in Figs. 3 and 4. Thus the outer rollers 3 are adapted to run in groove  $a$  and the inner rollers 4 in groove  $a'$ , and as each roller 3 leaves its groove  $a$  roller 4 enters its groove  $a'$ , so that each and every blade has a constant

but successive groove connection through said rollers and is positively controlled in every position it assumes in its entire circuit. Now having the spider H power-driven, as above described, and engaging all the shanks 2 for all the blades in that group, the said blades are carried around from right to left with a push movement upon the blades in the first part of their travel and a pull in the latter part, and the changing-point in this action is at the middle of channel  $a$ , where I place an emergency-roller 7 to tide the blades over the change from one action to the other. In this travel of the blades they must be kept out of conflict with each other in any event, even under high winds blowing against the front of the machine, and this is accomplished by the mechanism I employ and by which the blades are carried positively in their orbit and have no play or freedom but such as the mechanism provides for and takes care of in every turn and movement. Thus all the parts are held in right working relations to or with each other all the time, and in the travel of the blades in channel or way  $a$  they are in parallel lines practically all the time and cannot possibly conflict with each other. In this operation the inner rollers 4 are for the time idle, but are traveling toward entry into channel or way  $a'$ . Then as the rotation of the blades continues the front or inner roller 4 is intercepted by the points of channel  $a'$ , Fig. 3, and brought into control thereof, while roller 3 quits channel  $a$  and goes free outside of channel  $a'$ . Now there are two important positions or operations of blade B as it reaches the front of the machine, which are, first, its alinement for exhibiting purposes at the left of the reversing center  $a^2 a^3$  in channel  $a'$  and, secondly, its reversal and pause for exhibition on the other side of said center. These two positions are exemplified first at the left of Fig. 1 and secondly at the right by two different blades, and the approach to the first position is seen at the left in Fig. 3 and the half-way change to the second position at the bottom of said figure. This change brings the rollers 4 of the two blades at the front in like position upon opposite sides of the central deflecting projection  $a^3$  in channel or way  $a'$ , while the roller 3 of each blade bears against the outer wall of said way, Fig. 1. This serves to effectually hold the blades in perfect alinement in exhibiting position, so that they cannot be disturbed by winds or other untoward influences and thrown out of alinement, and the same construction serves to hold them in positive mechanical control for reversal and travel against wind or other influence. After having momentarily paused for exhibition the reversal of the blades in exhibiting position at the left is effected by causing its wheel 4 at its front to be deflected rearward into recess or retreat  $a^2$ , as is about



to occur at the left in Fig. 4 and has occurred at the bottom of Fig. 3. Meantime arm G and shank 2 continue to travel, and having wheel 4 pocketed, so that it cannot advance further, the said wheel becomes for the time the axis for the rotation and reversal of the blade, because the pressure on the blade continues through shank 2, and the effect of this is to completely reverse the blade and bring it with its opposite side to the front and ready to exhibit with its companions in other groups, as presumably has occurred in Fig. 1, and with its edges close against adjacent blades. The half-way point of this rotation is shown at the bottom in Fig. 3. In this reversal I preferably, but not necessarily, employ auxiliary means for effecting the rotation of the blades, consisting of fingers  $g^2$  on the sides of arms G and posts or pins 8 on plates A and A', respectively, in position to be engaged by said fingers as said arms approach to reversing position, as seen at the left in Fig. 4. These arms and pins serve mainly to guard against miscarriage in the reversal of the blades and especially when the machine is operating in the face of heavy winds, and also promote the easy entrance of inner rollers 4 into recesses  $a^2$  and the effectual rotation of the blades. A finger  $g^2$  is placed on each side of arm G, so that said arms can be caused to travel to right or left with equal facility, and it is immaterial which direction the machine is run.

Any suitable means may be employed to obtain an intermittent action of the machine; but in this instance I employ a mutilated gear-wheel J on a power-driven shaft L, which has constant and regular rotation at a predetermined speed and is provided with gear-teeth 9 in groups and blanks 10 between, and which engages and imparts rotation to a mutilated gear K on shaft E, and the period of exhibition depends on the length of these blanks and the speed of travel.

The so-called "blades" or exhibiting members B are of special construction, adapting them to be easily changed on both sides, and comprise a preferably metallic frame 12 of channel-iron and a preferably wooden body portion or filler 13 within said frame. The sides 15 and 16 are preferably of sheet metal of some suitable kind with inturned edges 17, adapted to engage in the channels of frame 12, and each side is independently removable and interchangeable. The entire blade rests removably on supporting-bar  $b$ , which has dowel-pins or lugs 18 engaging in holes in frame 12, and there is sufficient room above said frame beneath upper bar  $b$  to raise the blades off the lower pins and then detach them from the upper pins 19 and take the blade bodily away. This affords all needed facility for changing signs in the machine and on the blades, and the length of time that any sign

is kept on exhibition depends entirely on contract.

Electric or other power can be employed to run a machine, and in some instances hand-power will suffice, especially for the smaller and lighter indoor machines, which may be used only for short periods at a time and at irregular intervals.

Any sign that can be posted on a bill-board or painted on a bulletin can be placed on this machine, and the work is done on the face of the sign exactly as ordinarily on bill-boards. The supporting structure shown includes a twelve-inch handsome steel frame F, giving to the sign the appearance of an immense framed picture, and the whole rests upon a suitable base of more or less elevation, thus bringing the sign at a suitable distance above the ground or floor, and it is inclosed all around, protecting the operating parts from the elements. The entire structure is built, preferably, of iron or steel, which makes it fireproof and substantial, and the machine can be easily moved from one location to another if this is found desirable, as it is essentially a knockdown machine.

As many extra blades or blade-plates may be kept in stock for each machine as may be found desirable, and, if preferred, the said blades may be painted or posted in the shop and when dry be placed in the machine.

Both the construction and the operation of the machine will be easily understood from the foregoing description and with a group of blades as a unit. This can be further simplified by following a single blade in its travel or orbit. It will be noticed in this connection that there is first a collective reversal of the blades in each group as they travel from exhibiting position rearward and around path  $a$  with the same edges always to the front except during the time of reversal at the front. All the blades partake of this reversal alike in transit and each gets its own separate reversal at the front of the machine half-way from the rear point 7 and with its own front edge as its axis of rotation in this latter instance. It will not be overlooked that while the guideways  $a$  and  $a'$  together constitute the orbits for the blades the said ways are essentially two different parts separated at their open ends at both sides and only made continuous in operation by the overreaching or connecting arm G, which engages in one guideway as it leaves the other.

Inasmuch as this machine is a knockdown machine, the shafts C are constructed to have their body portions lifted out by disengaging them at their ends, where they are coupled with shafts  $c^3$  and  $c^4$ , respectively, and which permit the body of the shaft to be removed, as clearly shown. The parts of the shaft are connected by adjustable sleeves  $c'$  and  $c^2$ , overlapping the ends of the shaft-sections, and the



end sections  $c^3$  and  $c^4$  remain in position with the plates A and A' at each end and with the wheels and spiders H thereon and are removable with said plates.

5 For traveling purposes and indoor display on the stage or platform the machine is made light and easy to erect and take down and pack; but its operation is the same as in the heavier machines.

10 Whether channels, ribs, or grooves be used as guideways for the blades is immaterial, and these are regarded as equivalents of one another in this case.

The main object of this machine is the reversal of the blades in the line of exhibition and the bringing of the blades edge to edge with such reversal, so as to form a practically-unbroken display-field whereon the most delicate lines and shadings may run from one blade over upon another and keep up the continuity without apparent interruption. All this is accomplished with the most perfect mechanical precision, and each and every blade in the field matches with its neighbor edge-wise and in plane, and when the change comes the blade at the right of each group retires and the next one at the left takes its place quickly and noiselessly. The gap is at the same time filled by the next approaching blade in each group.

It needs to be observed that the arm G and support  $b$  for each blade are in exactly the same vertical plane and that the roller 4 has its axis in line with the inner edge of the blade, and as these parts are rigidly connected the axis of rotation at roller 4 becomes essentially the axis of rotation of the blade. Therefore in the description and claims the arm G is treated as belonging to the blade and just as if the blade rested directly thereon, as it does through the intervening shank 2.

An important and vital feature of my improvement is embodied in the positive controlling mechanism for each blade and where-  
45 by each blade in its rotary and reversible travel is positively held to its course and prevented from flapping, rubbing engagement with the other blades, or untimed movement. This is necessary in an outdoor sign, where  
50 the conditions of the weather are apt to affect the operation of the sign, especially under wind-pressure.

A modified form of blade and removable plates therefor is shown in Fig. 8, which provides for the removal of plates 15' from blades 13' without the removal of said blades from the machine. Thus each plate is provided with hooks or intumed edges 11 of varying lengths, which slip over and lock upon side  
60 or edge projections 11' on the blades and securely fasten each plate upon the face of the blade.

What I claim is—

1. In a multiple-display machine, a series

of reversible blades supported to travel, and means to aline pairs of said blades and to retire each blade successively, said means comprising positive actuating mechanism constructed to control and guide each blade along predetermined paths throughout its full travel and to reverse the same at different points in its travel.

2. In a display advertising and like machine, a group of blades having operating mechanism connected with their ends, said mechanism comprising horizontally-disposed wheels and supports for the blades engaged by said wheels and constructed to reverse the blades at two different points in their travel and to aline the blades edge to edge, substantially as described.

3. In a multiple-display machine, groups of blades arranged in orbits about common centers, power-wheels to carry said blades around and guideways for the blades having one part constructed to keep the blades face to face and apart in their travel and the other part constructed to reverse the blades in the line of display and means to aline the blades of said groups and bring the blades edge to edge, substantially as described.

4. In a changeable-display machine, groups of blades and means to rotate the same in unison, and separate guideways for each group formed each substantially on the arcs of circles of different radii, and means connected with the ends of said blades traveling along said guideways, substantially as described.

5. In a changeable-display machine, a group of blades, means to rotate said blades about a common center, and two separate guideways for the blades forming the line of their travel and of different radii and separated at their ends, substantially as described.

6. In a changeable-display machine, a group of display-blades and ways for guiding and reversing said blades, said ways approximately circular in form and of different radii, substantially as described.

7. In a changeable-display machine, a group of display-blades and two separate open-ended guideways at each end of said blades forming orbits of travel for the blades, and guide mechanism for the blades having arms and rollers on said arms adapted to travel along said guideways, substantially as described.

8. In a changeable-display machine, a group of display-blades and a set of open guideways at each end for said blades, said ways spaced apart and of different sizes, carrying mechanism for said blades provided with rollers engaging said ways and means to rotate the blades comprising wheels with which each blade has operating engagement, said wheels arranged between the blade and the said guideways, substantially as described.

9. In a changeable-display machine, a display-blade and means to carry the same in its



orbit, a circular channel formed in two separate portions constituting the orbit of said blade in its travel, a central vertical shaft and means thereon to actuate said blade, and an arm for operating the blade having rollers adapted to run in the two portions of said channels successively, substantially as described.

10. In a changeable-display machine, a series of groups of blades, means to rotate said blades in unison, means to aline blades of the several groups edge to edge in the display-field, means to reverse the blades in each set twice during a complete circuit of their travel, and means to positively guide said blades in fixed relationship during their entire travel.

11. In a changeable-display machine, a series of blades in a group and means to convey said blades in their orbit comprising guide-ways for the blades, an arm governed by said ways and a support for each blade rigid with said arm and in alinement therewith, a shank between said arm and said support and means to actuate said parts rotatably engaged with said shank, substantially as described.

12. In a changeable - display machine, a group of rotatable blades and guideways therefor defining their orbit, means to rotate and reverse the blades in their orbit comprising an arm for each blade working in said guideways, said arm having a lateral projection and a fixed stop engaged by said projection in the reversal of the blade, substantially as described.

13. In a changeable-display machine, a rotatable support and a series of blades rotatably mounted thereon, means to aline a pair of blades edge to edge on said support, and positive actuating and controlling mechanism for each blade to establish a fixed working relationship between all the blades throughout the orbit of their travel, substantially as described.

14. In a changeable-display machine, a rotary support and a series of independently-rotatable blades thereon, means to rotate said support, and independent actuating and controlling connections for each blade to fix its

rotary travel and to hold each blade in fixed relationship with adjoining blades and apart therefrom during their travel, substantially as described.

15. In a changeable-display machine, separate sets of traveling blades adapted to aline and form a continuous face, and positive actuating and controlling mechanism for each blade to establish a fixed working relationship between all the blades throughout the length of their travel.

16. In a changeable-display machine, separate sets of upright blades and a traveling support for each set of said blades, and positive actuating and controlling mechanism for each blade to establish a fixed working relationship between all the blades in their travel and to aline separate blades in each set successively and simultaneously.

17. In a multiple-display machine, a group of blades having operating mechanism connected therewith to reverse and aline the blades edge to edge, said mechanism comprising a rotatable support, arms for each blade, rollers on said arms and a cam-track for said rollers.

18. In a changeable - display machine, a group of rotatable blades and a rotatable support therefor, arms for said blades provided with a set of rollers and fingers on said arms, a cam-track for said rollers, and pins to engage said fingers.

19. In a changeable - display machine, a group of rotatable blades and a rotatable support therefor, an arm for each blade and a cam-track engaged by said arm to reverse said blades and aline adjacent blades edge to edge in a display-field, said blades being provided each with a base-support having engaging members for removably fastening said blades in place.

In testimony whereof I sign this specification in the presence of two witnesses.

ELMORE O. WILCOX.

Witnesses:

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C. A. SELL.