

No. 776,567.

PATENTED DEC. 6, 1904.

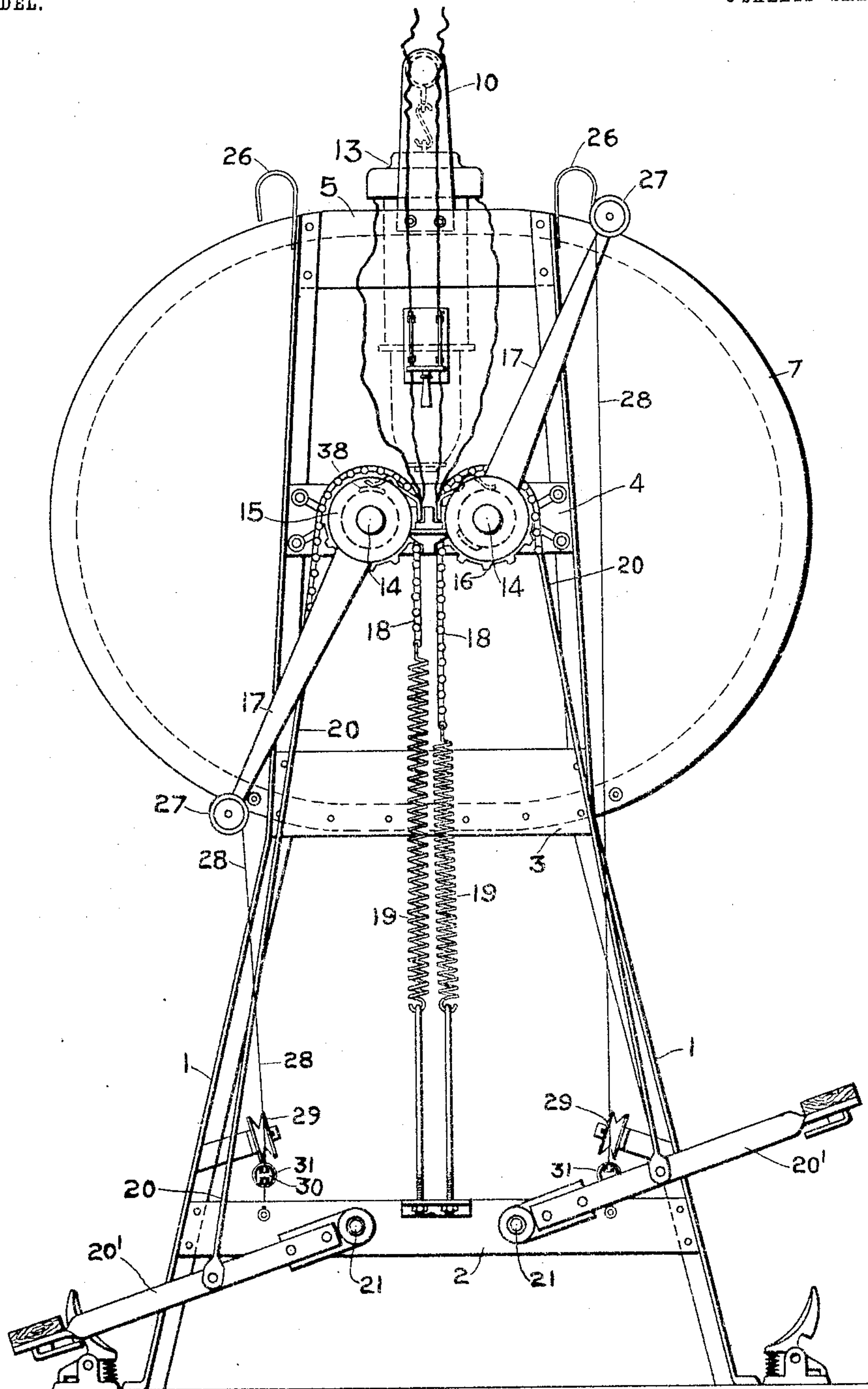
J. W. UPP & W. O. WAKEFIELD.

BLUE PRINTING FRAME.

APPLICATION FILED MAY 10, 1904.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses:

*Irving E. Steers.*  
*Allen C. Ford*

Fig. 1.

Inventors  
John W. Upp,  
William O. Wakefield,  
by *Albert H. Davis*  
Att'y.

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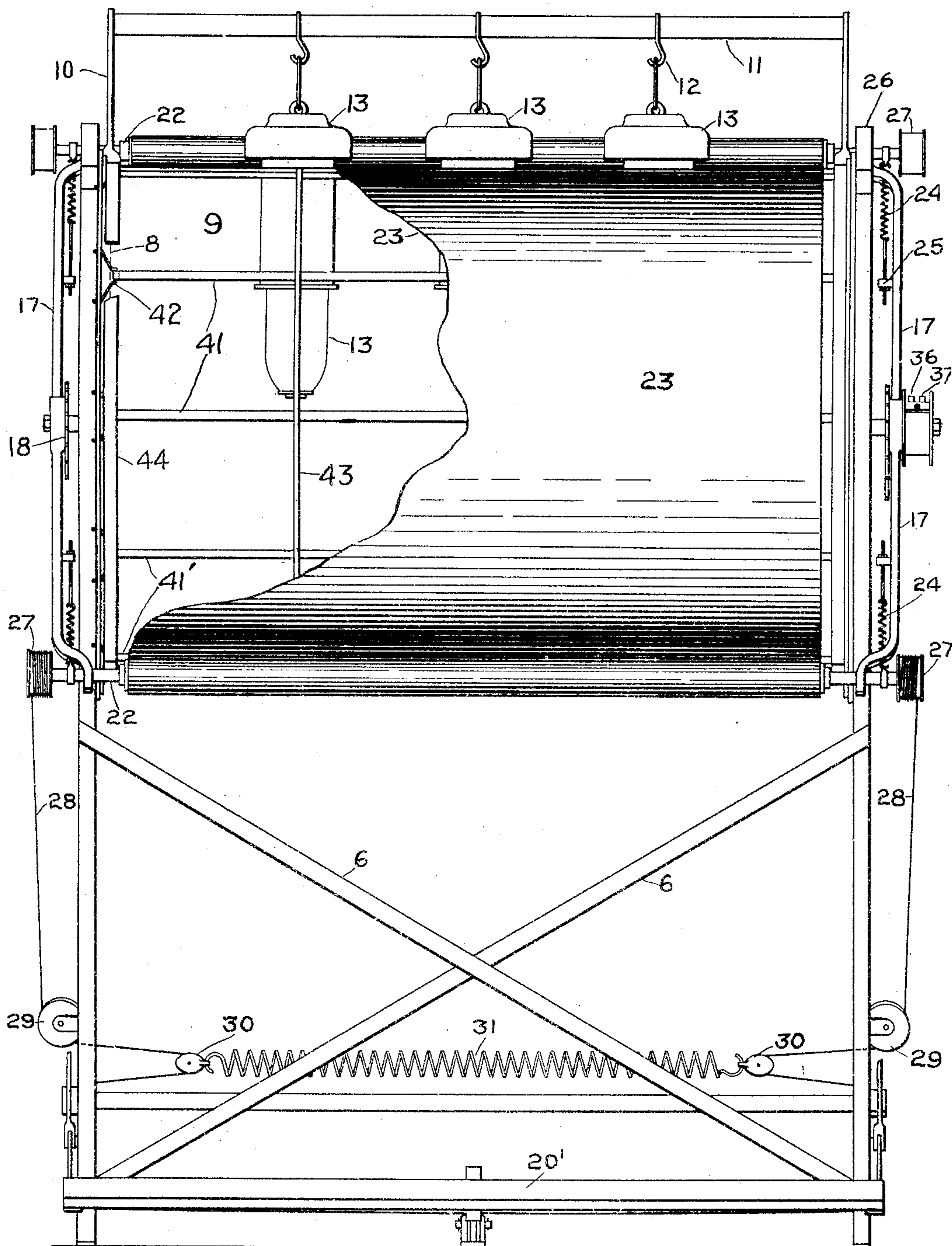
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BLUE PRINTING FRAME.

APPLICATION FILED MAY 10, 1904.

NO MODEL.

3 SHEETS—SHEET 2.



Witnesses:

*Irving E. Steers.*  
*Henry A. Ford*

FIG. 2.

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by *Albert H. Davis*  
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3 SHEETS—SHEET 3.

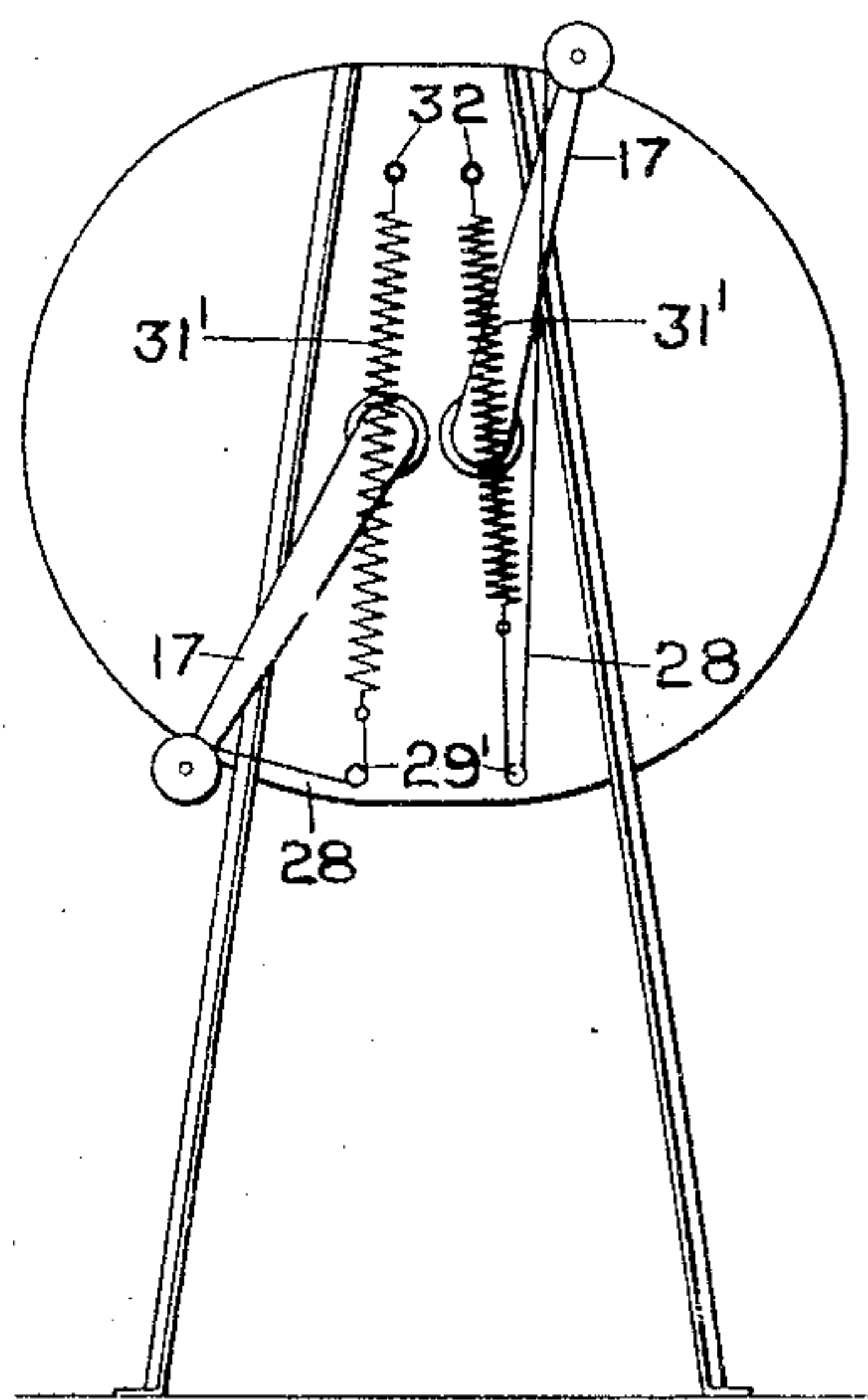


Fig. 3.

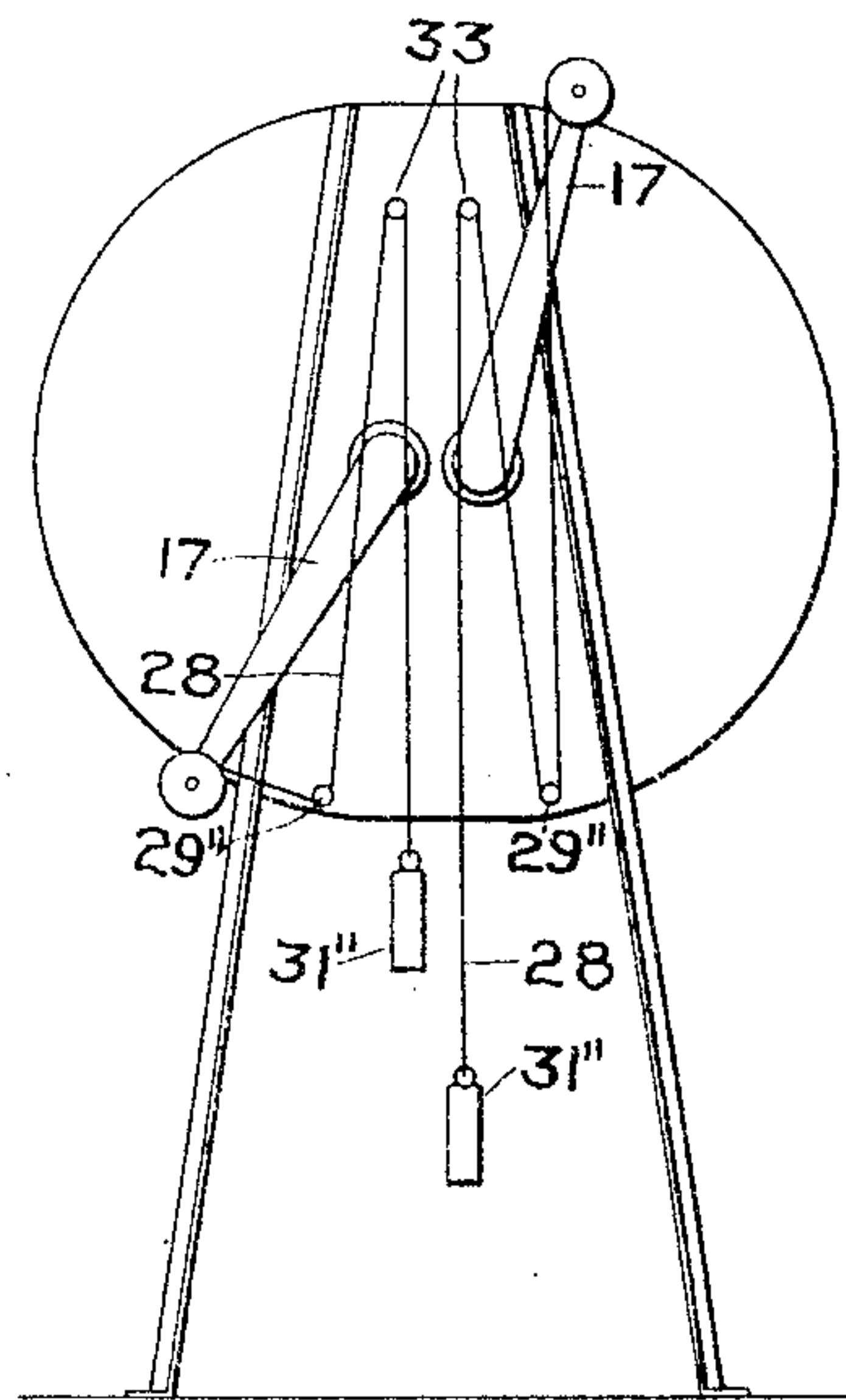


Fig. 4.

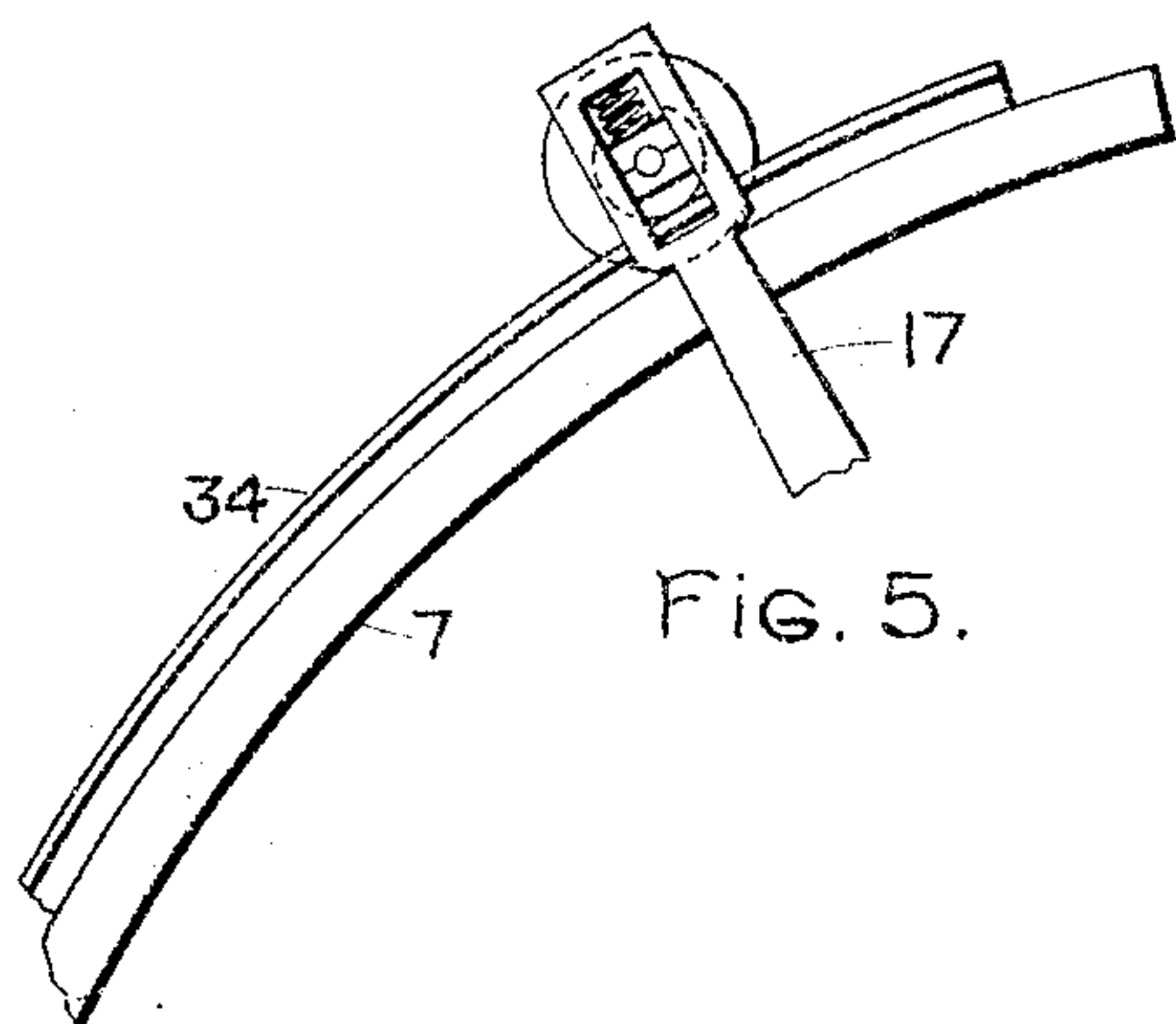


Fig. 5.

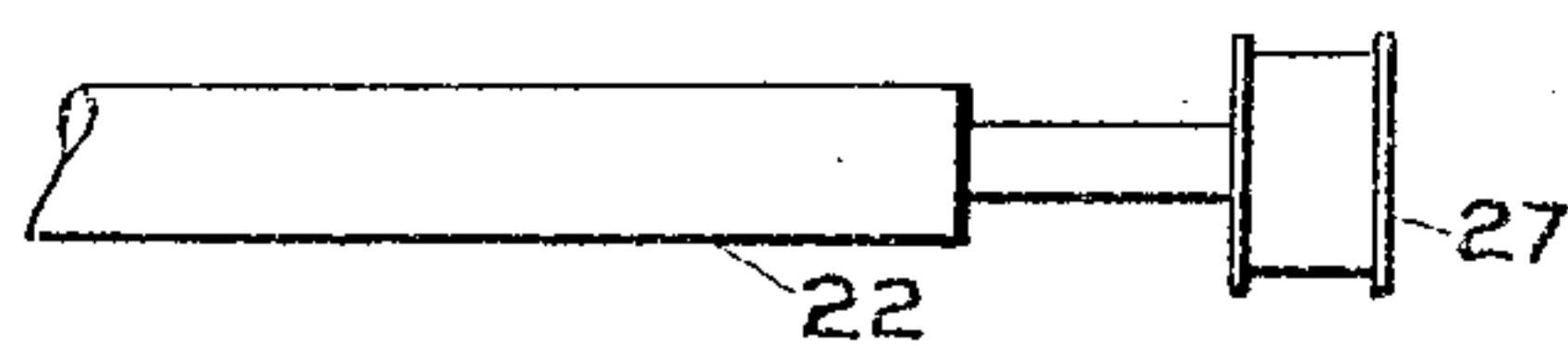


Fig. 6.

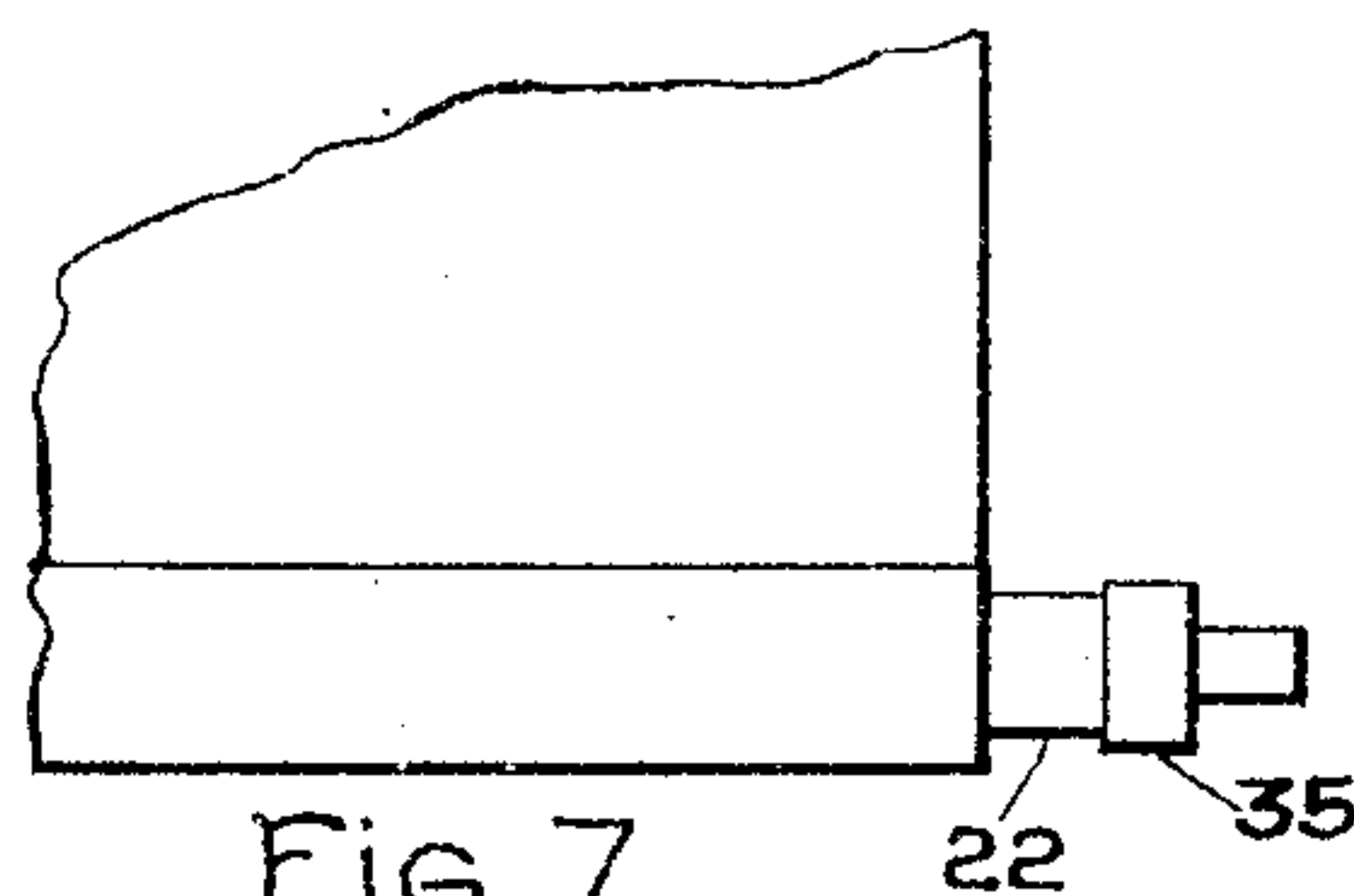


Fig. 7.

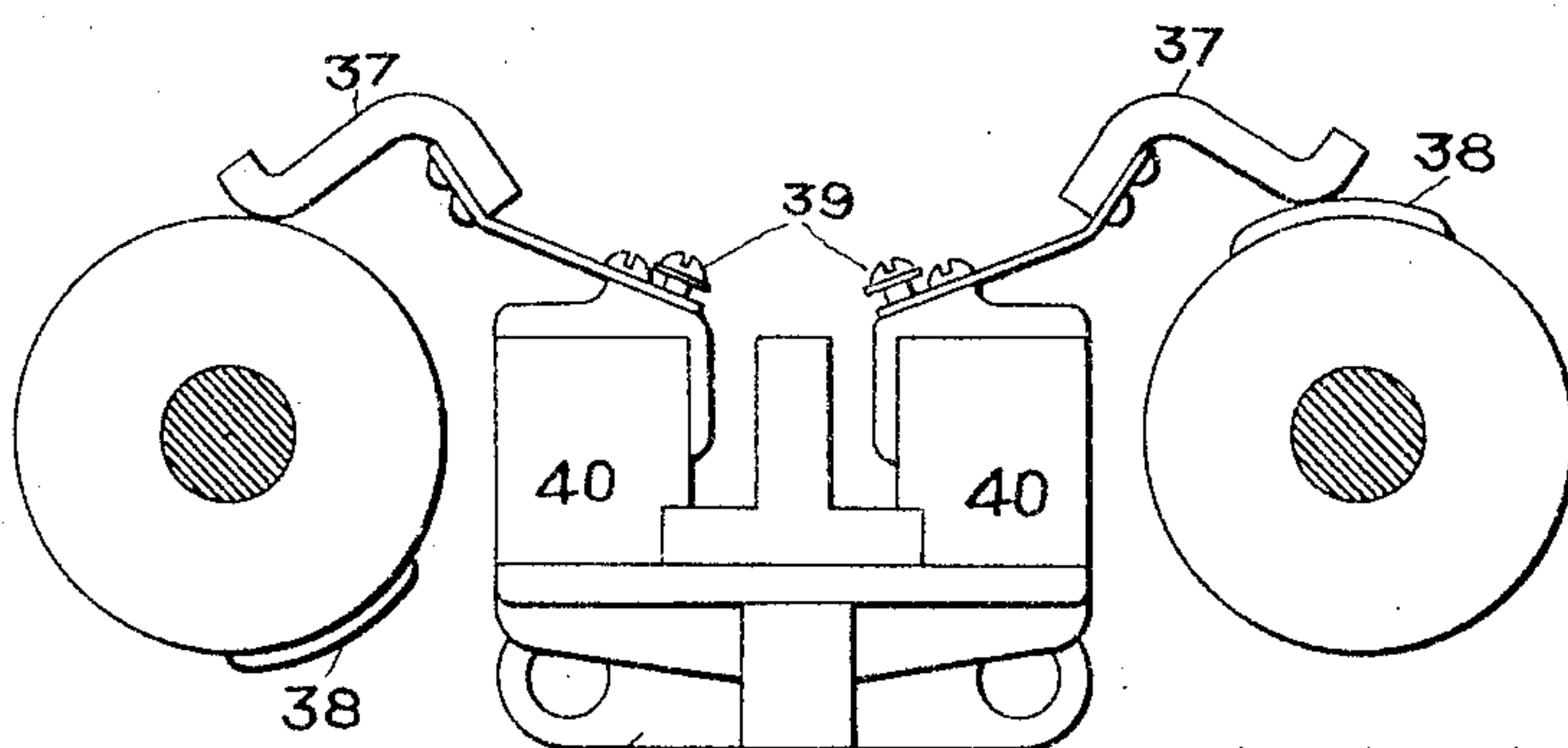


Fig. 8.

Witnesses:

*Lowell E. Steers.*  
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Inventors,  
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# UNITED STATES PATENT OFFICE.

JOHN W. UPP AND WILLIAM O. WAKEFIELD, OF SCHENECTADY, NEW YORK, ASSIGNORS TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

## BLUE-PRINTING FRAME.

SPECIFICATION forming part of Letters Patent No. 776,567, dated December 6, 1904.

Application filed May 10, 1904. Serial No. 207,243. (No model.)

*To all whom it may concern:*

Be it known that we, JOHN W. UPP and WILLIAM O. WAKEFIELD, citizens of the United States, residing at Schenectady, county of Schenectady, State of New York, have invented certain new and useful Improvements in Blue-Printing Frames, of which the following is a specification.

The present invention relates to blue-printing frames, and especially to that class in which the actinic rays of light are produced by artificial means.

The object of our invention is to provide a blue-printing frame which shall be simpler, more efficient, and more easily operated than those heretofore in use. To this end we provide a suitable supporting-frame upon which are mounted cylindrical plates of glass and suspend lamps with their centers of illumination in the vicinity of the axes of the cylindrical plates. The flexible sheets or aprons, which serve to press the printing materials into intimate contact with each other and against the outer surface of the glass plates, are each secured at one edge to a fixed part of the frame and wound upon a distributing-roller journaled in the free ends of a pair of arms pivoted coaxially with cylindrical plates, and these rollers are effectively biased, so that when the arms are released by the operating-levers the flexible sheets or aprons automatically coil up thereon, and when the actuating-levers are depressed the biasing means produce sufficient stress upon the sheets or aprons to cause them to bind smoothly and snugly upon the surface of the glass plates. The feed-circuits of the lamps are pivoted with cut-out devices controlled by the operation of the flexible sheets or aprons, so that they are lighted only when the entire machine is in condition to print.

A still further improvement consists in providing a detachable device for temporarily holding sheets of printing materials, whereby the full efficiency of a machine designed for making larger-sized prints may be developed when operating upon sheets of small size.

For a more complete understanding of our invention reference may be had to the following detailed specification and the accompanying drawings, forming a part thereof, in which—

Figure 1 is an end elevation of a blue-printing frame embodying our invention. Fig. 2 is a side elevation of the same with a part of the flexible sheet or apron shown broken away to disclose the detachable holding device. Figs. 3, 4, 5, 6, and 7 indicate modified forms of the biasing means for the flexible sheet or apron, and Fig. 8 is a side elevation of the cut-out device.

The supporting-frame consists of four upright iron posts 1, connected across the ends by cross-bars 2, 3, 4, and 5, diagonally braced at the sides by bars 6. To the upper inner sides of both pairs of end posts 1 are secured oval frames 7, with semicircular ends and having inwardly-extending ledges 8, upon which rest the ends of the cylindrical glass plates 9, which extend over arcs of about one hundred and sixty degrees. This part of our device is the same as that shown in the patent to Knox and Wakefield, No. 712,076, dated October 28, 1902, and accordingly will not be described here in detail. To the inner sides of the topmost cross-bars 5 at their middle points we secure upright posts 10 and join their upper ends by a horizontal rod 11, adapted to receive and carry the supporting devices 12, upon which a series of ordinary arc-lamps 13 are hung with their luminous centers positioned in the vicinity of the axes of curvature of the glass plates 9.

To each of the intermediate cross-bars 4 are secured two stub-shafts 14, coaxial with the glass plates 9, and on each of these shafts 14 is mounted a hub 15, having a sprocket-wheel 16 and an arm 17 secured thereto.

Each of the wheels 16 meshes with a chain 18, connected at its inner end to a retractile spring 19, adjustably connected at one end to the lowermost cross-bar 2, the other end of the chain being connected to a rod 20, which is pivotally secured to a foot-lever 20', fulcrumed at 21 to the lower cross-bar 2, so that



when the lever is pressed down the hubs 15 and the parts secured thereto at opposite ends of the machine are caused to rotate forwardly, and when released the springs 19 operate to  
5 rotate them in the reverse direction.

The arms 17 extend outwardly to the peripheries of the oval frames 7 and have slotted bearings at the ends, in which are journaled rollers 22, upon which the flexible sheets or  
10 aprons 23 are coiled, and in order to permit slight radial movement of the rollers to compensate for their increasing diameter as the aprons are coiled thereon springs 24 are provided, which engage the shafts of the rollers  
15 and parts 25, carried by the arms 17. The arms are arrested at the end of their upward travel under the recoil of springs 19 by spring-buffers 26, secured to the tops of the posts 1.

The means for biasing the respective rollers  
20 22, as shown in Figs. 1, 2, and 6, consist of pulleys 27, secured to their projecting ends, and bands 28, secured thereto at one end, passed about suitable guide-rolls 29, take-up rolls 30, and secured to the lower cross-bars 2. The  
25 take-up device consists of a helical spring 31, engaging at its respective ends with the take-up rolls. According to this arrangement the length of bands 28 paid out by the pulleys 27 exceeds only in slight degree the increase in  
30 distance between the guide-rolls 29 and the rollers 22 as the latter move upwardly, so that the total extension and construction of springs 31 is very inconsiderable.

In the modified arrangement shown in Fig.  
35 3 separate take-up springs 31' are provided for the respective bands 28, and instead of being arranged horizontally beneath the glass plates they are arranged vertically at opposite ends of the machine with their upper ends  
40 secured to fixed projections 32 from the upper cross-bars 5 and their lower ends connected to the bands 28, which pass down beneath guide-rolls 29'.

In the arrangement shown in Fig. 4 take-up  
45 weights 31'' are provided, which are connected to the free ends of the bands 28 after being passed beneath guide-roll 29'' and over rolls 33.

In the arrangement shown in Figs. 5 and  
50 7 the oval frames 7 and the rollers 22 are provided with friction-surfaces 34 and 35, respectively, so that a certain amount of drag is produced upon the rollers as they are moved up and down over the glass plates.

The means for automatically controlling the  
55 electric circuit through the lamps consists of two pairs of contact-fingers 36 and 37, one pair for each side of the circuit, and bridging-contacts 38, carried by the hubs 15 of the arms 17 in such position that the circuit will be  
60 closed on either side only when the rollers 22 are in their lowermost positions. The contact-fingers 36 36 and 37 37 are each provided with a binding-screw 39 and are separately mounted upon blocks 40 of insulation carried on

brackets 41, secured to cross-bar 4 between 65 the axles 14 of the arms 17.

The means for holding small-sized sheets of printing material in place upon the cylindrical glass plates 9, so that the entire surface of the plates may be utilized, consists of a series of  
70 flat metallic strips 41', extending longitudinally of the frame and secured at their ends to spring-yokes 42, fastened to the oval frames 7, and extending transversely to strips 41 are peripheral strips 43, which serve to hold the  
75 former from springing away from the glass surface. Over the ends of the longitudinal strips and their spring-yokes 42 are placed transverse protecting-bands 44. The small-sized sheets of sensitized paper and tracings  
80 are inserted at their upper edges between the surface of the glass plate and the longitudinal strips 41 to the full capacity of one side of the machine. The treadle 20' is then  
85 forced down into its locked position, as indicated at the left-hand side of Fig. 1, drawing the flexible sheet or curtain down over the sheets of printing material and their retaining-strips and closing one side of the circuit between fingers 36 and 37. The other  
90 side of the machine is then located and the flexible sheet or apron brought down in the same manner, and as the arms 17 move into their lowermost positions the bridging-piece  
95 38 is brought into contact with the fingers 36 and 37 on that side of the machine, closing the other side of the electric circuit and energizing the lamps 13.

We do not desire to restrict ourselves to the particular form or construction of device  
100 herein described and shown, since it is apparent that they may be changed and modified without departing from our invention.

What we claim as new, and desire to secure by Letters Patent of the United States, is—  
105

1. The combination of a transparent printing-surface, a flexible sheet or apron, a roller for distributing said sheet or apron over said printing-surface, artificial sources of light arranged in proximity to said printing-surface,  
110 and devices for supporting said roller having provisions for regulating said sources of light.

2. The combination of a cylindrical transparent printing-surface, a flexible sheet or apron, a roller for distributing said sheet or  
115 apron upon said surface, artificial sources of light arranged in proximity to said printing-surface, arms pivoted coaxially with said cylindrical surface and supporting said roller, and means carried by said arms for regulating  
120 said sources of light.

3. The combination of two cylindrical transparent printing-surfaces, a flexible sheet or apron for each of said surfaces, rollers for distributing said sheets or aprons upon said  
125 surfaces, artificial sources of light suspended between said surfaces, arms pivoted coaxially with said cylindrical surfaces and supporting



said rollers, and means carried by said arms for controlling said sources of light.

4. The combination of two cylindrical transparent printing - surfaces horizontally arranged on opposite sides of a suitable support, electric lamps suspended from said support between said surfaces, flexible sheets or aprons and their distributing-rollers, arms pivoted to said support coaxially with said cylindrical surfaces and carrying said rollers in their free ends, pairs of contact-fingers arranged in the opposite sides of the circuit of said lamps, and bridging contacts carried by said arms for closing the circuit between said fingers.

5. The combination of a transparent printing-surface, a flexible sheet or apron and its distributing-roller, and means for biasing said roller consisting of a drum or pulley secured to said roller and a band connected to said drum or pulley, and means for producing tension on said band.

6. The combination of a cylindrical transparent surface, a flexible sheet or apron and its distributing-roller, and means for biasing said roller consisting of drums or pulleys secured to both ends of said roller, flexible bands connected to said drums or pulleys and adapted to be wound thereon, and a retractile spring connected to exert tension on both of said bands.

7. The combination of a cylindrical transparent surface, a flexible sheet or apron and its distributing-roller, arms pivoted coaxially with said cylindrical surface and carrying said

roller in their free ends, and means for biasing said roller consisting of drums or pulleys secured to the opposite ends thereof, flexible bands secured to said drums or pulleys and adapted to be wound thereon in the reverse direction to the apron or sheet, and a retractile spring connected to exert tension on said bands.

8. The combination of a transparent printing-surface, one or more strips arranged to yieldingly hold sheets of printing materials in engagement with said surface, and a flexible sheet or apron arranged to be drawn over said strips and surface to press the printing materials into intimate contact with each other and with the said surface.

9. The combination of a transparent printing-surface, one or more flat strips flexibly connected at its ends to said surface and adapted to hold sheets of printing materials in engagement with said surface, transverse bands for supporting said strips intermediate their ends, and a flexible sheet or apron arranged to be drawn over said strips, bands and surface to press the printing materials into intimate contact with each other and with said surface.

In witness whereof we have hereunto set our hands this 9th day of May, 1904.

JOHN W. UPP.

WILLIAM O. WAKEFIELD.

Witnesses:

BENJAMIN B. HULL,  
HELEN ORFORD.