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DRAFTSMAN.

No. 827,663.

PATENTED JULY 31, 1906.

J. W. PIERCE.

COMBINED CONTROLLER AND DIMMER SWITCH.

APPLICATION FILED DEC. 5, 1904.

3 SHEETS—SHEET 1.

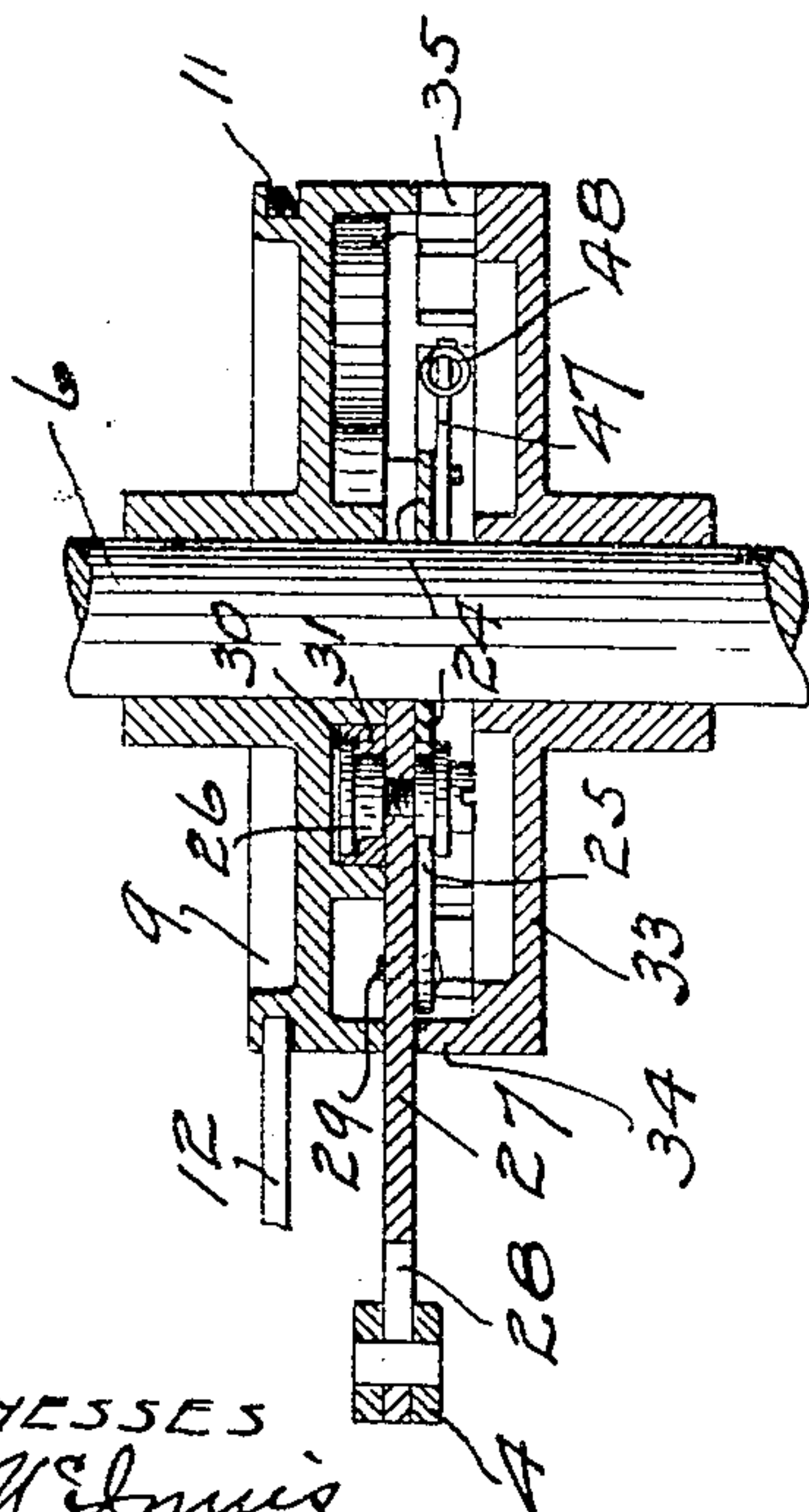
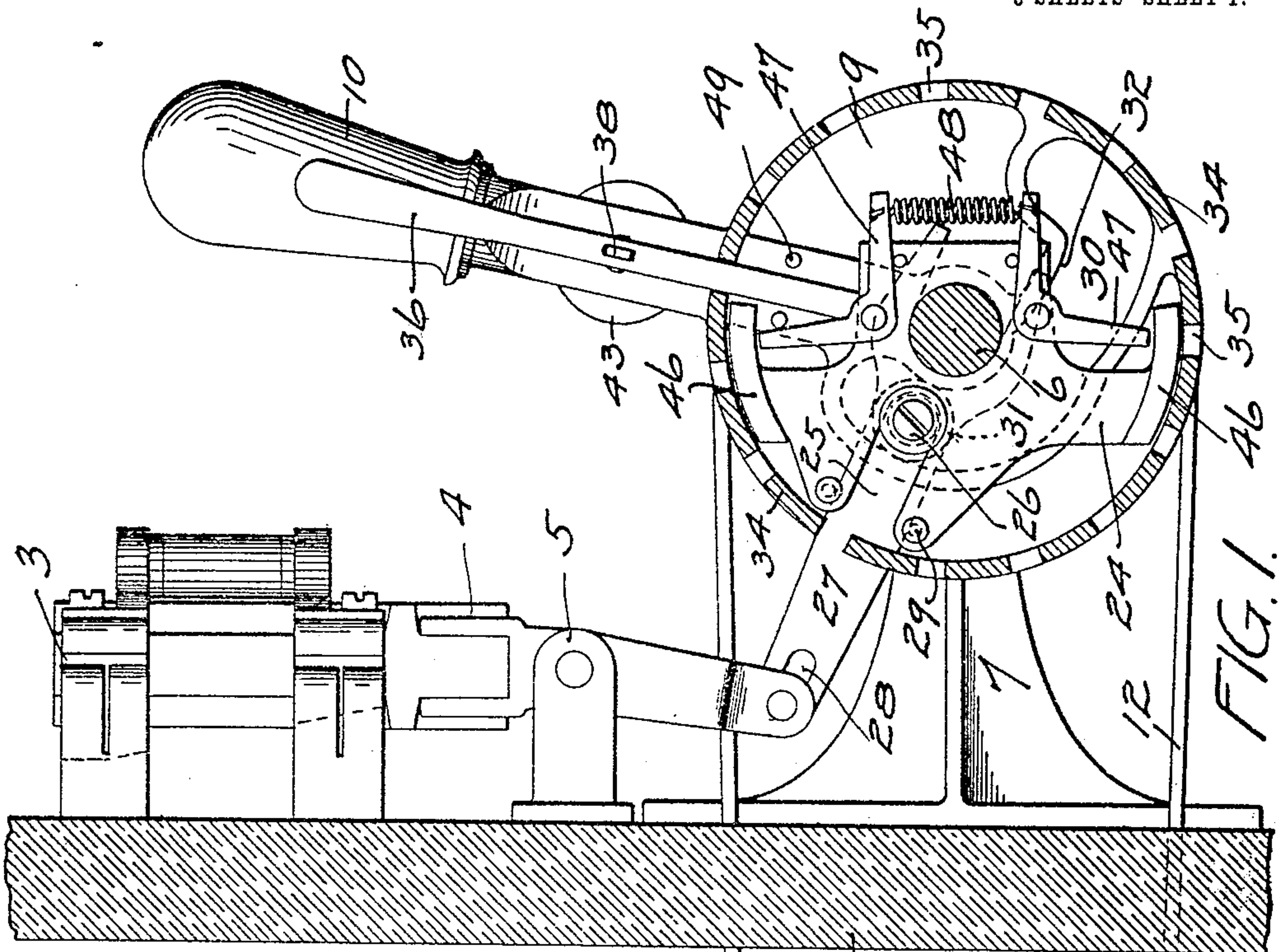
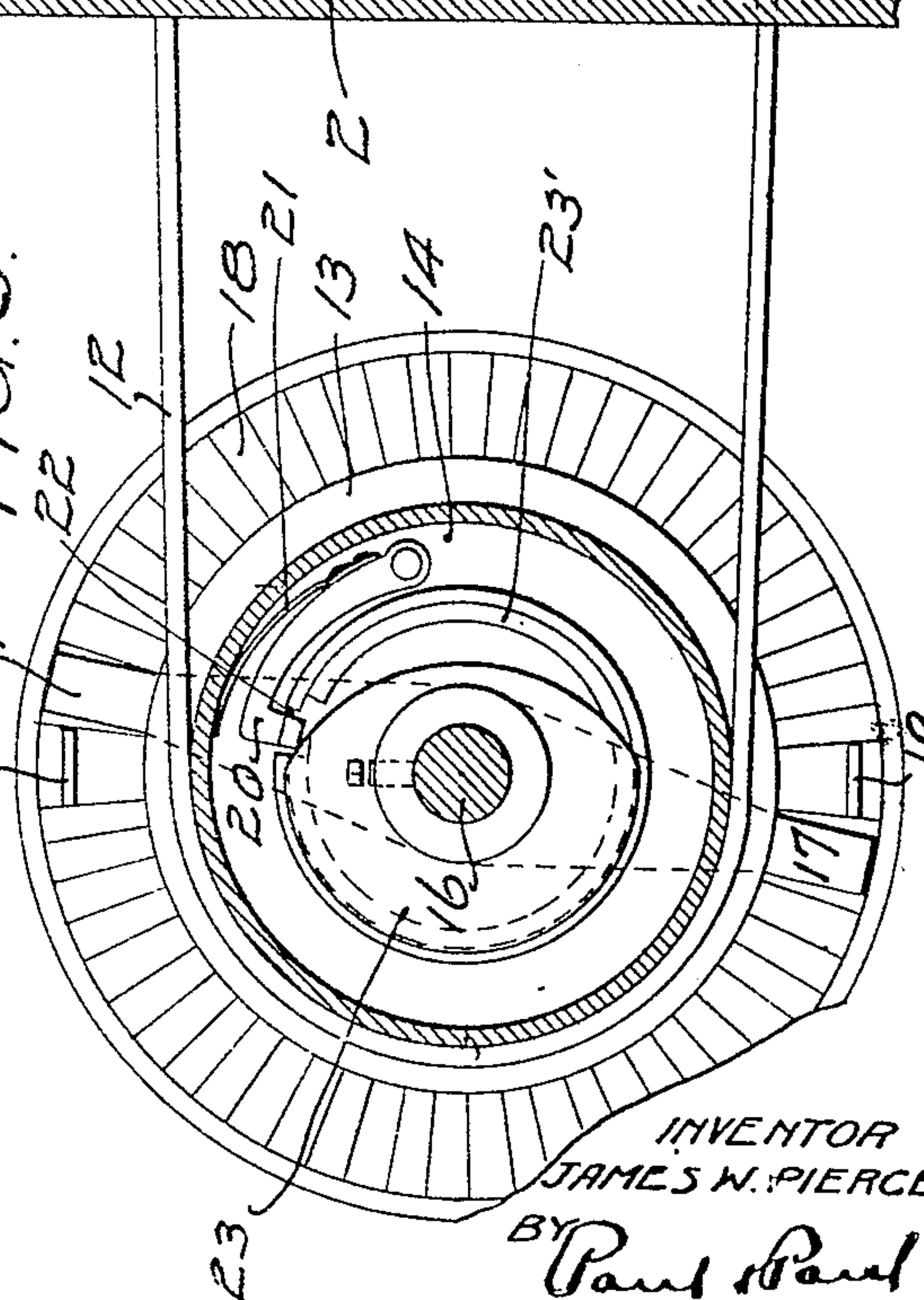


FIG. 5.



WITNESSES
M. M. Ellis
O. H. H. H. H.

INVENTOR
JAMES W. PIERCE
BY
Paul Paul
HIS ATTORNEYS

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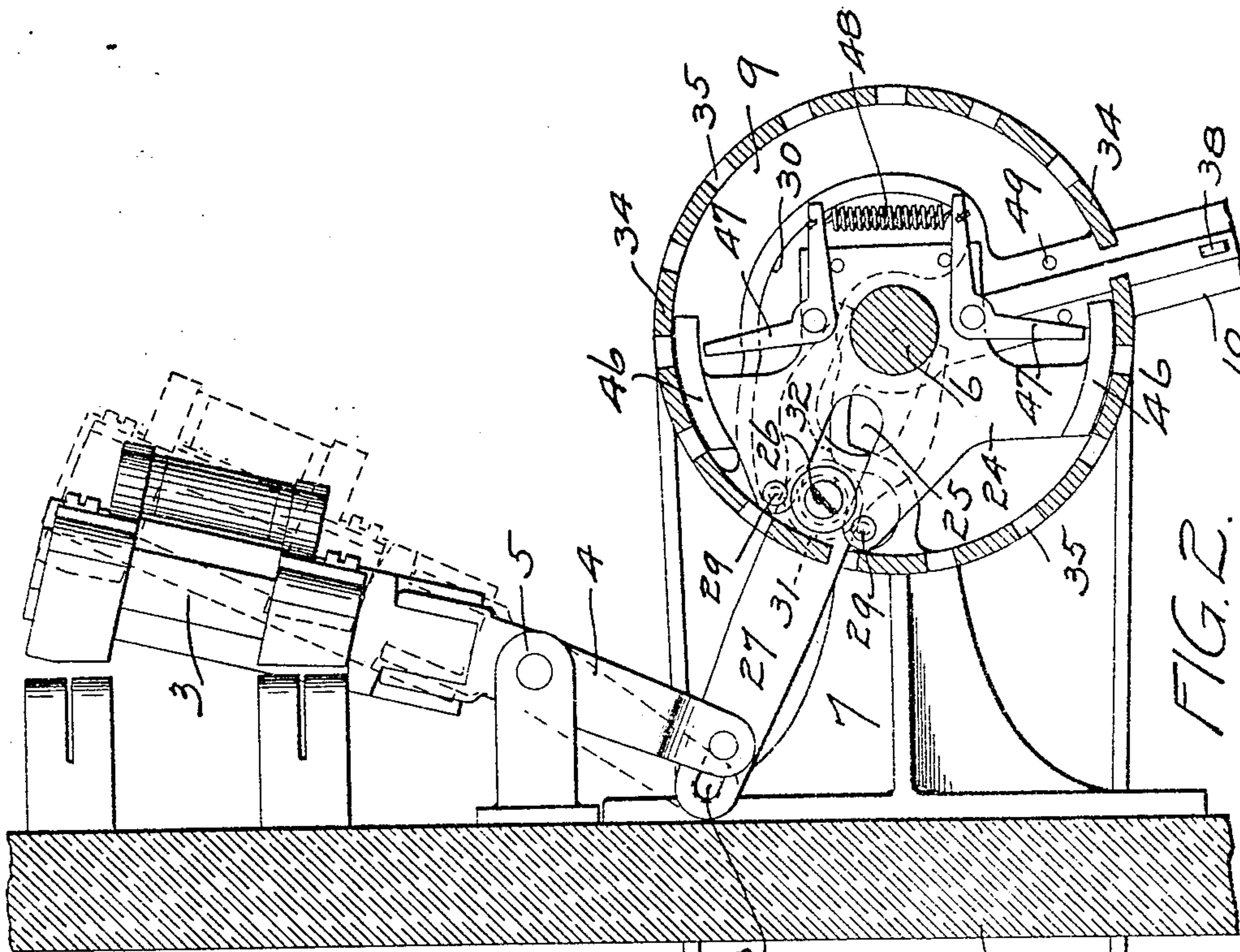


FIG. 2.

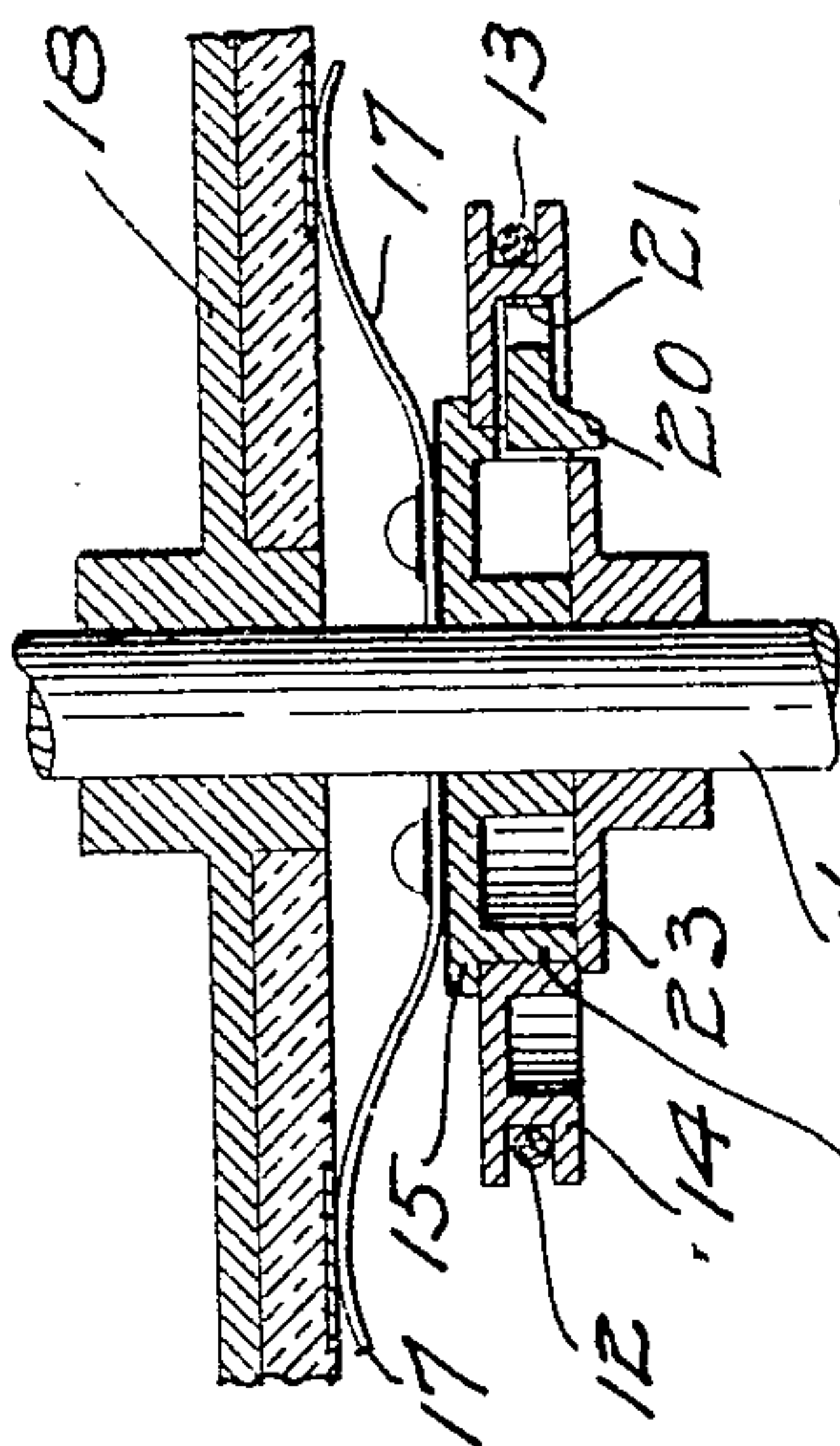
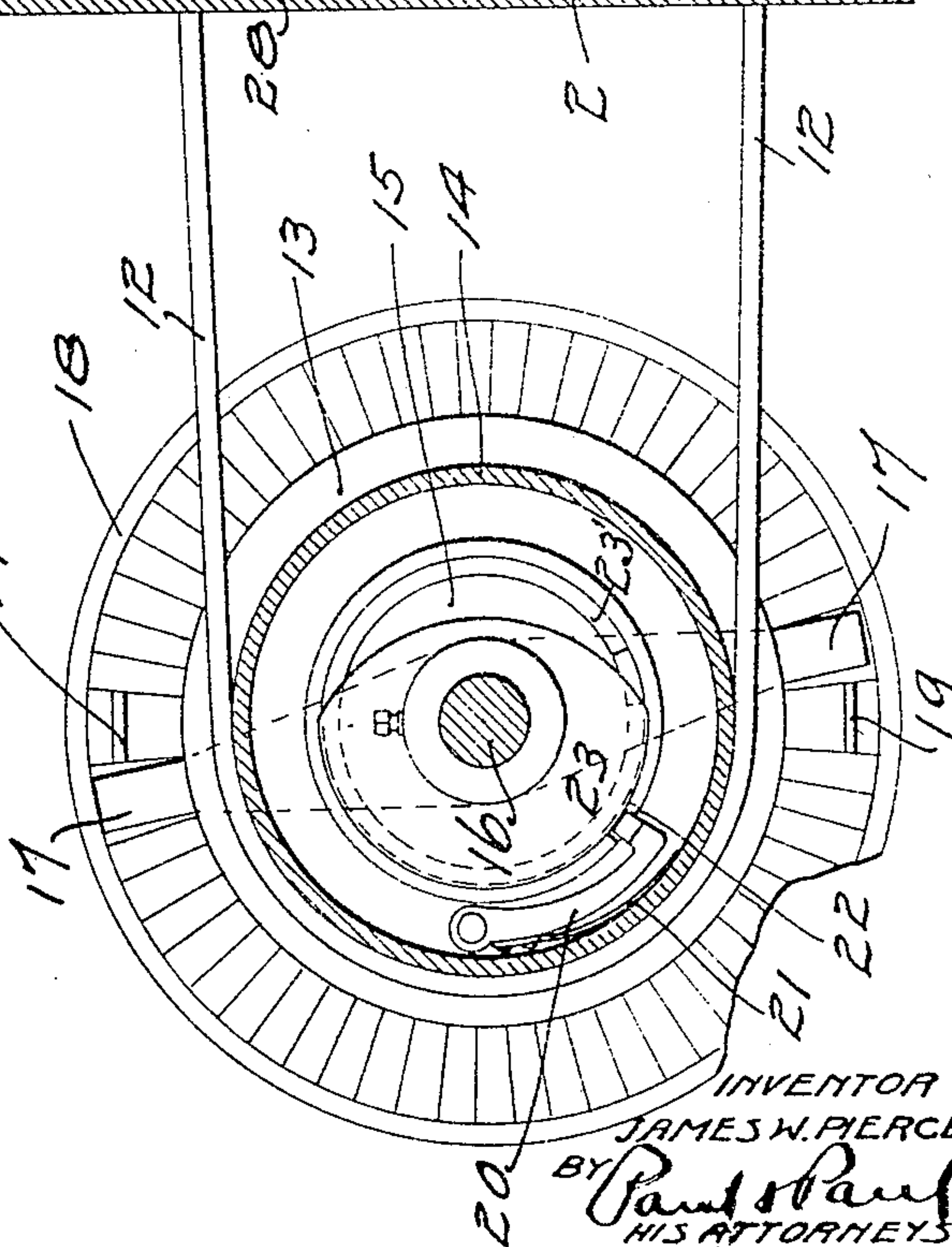


FIG. 6.



WITNESSES
M. M. Davis
C. Thammann

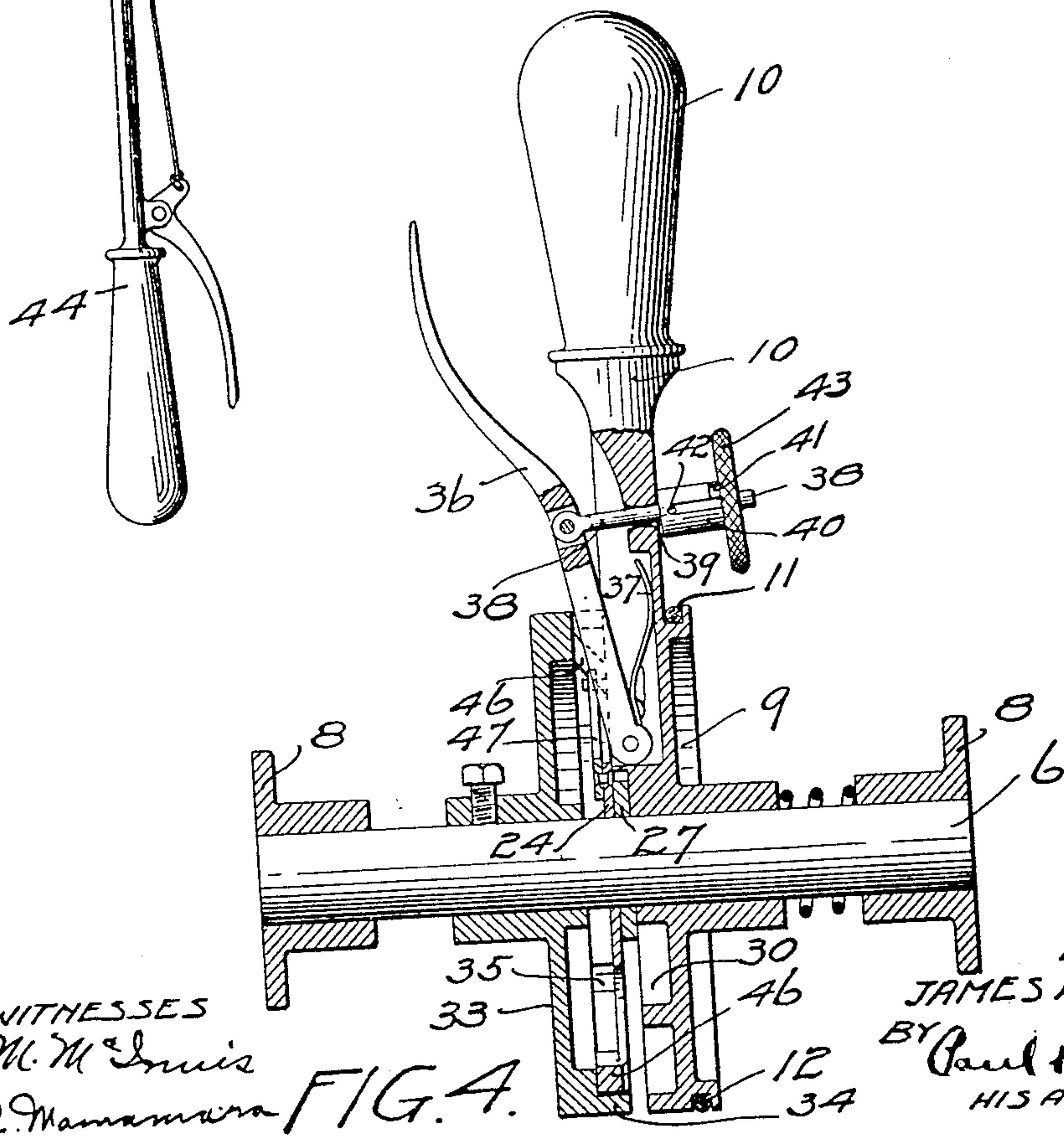
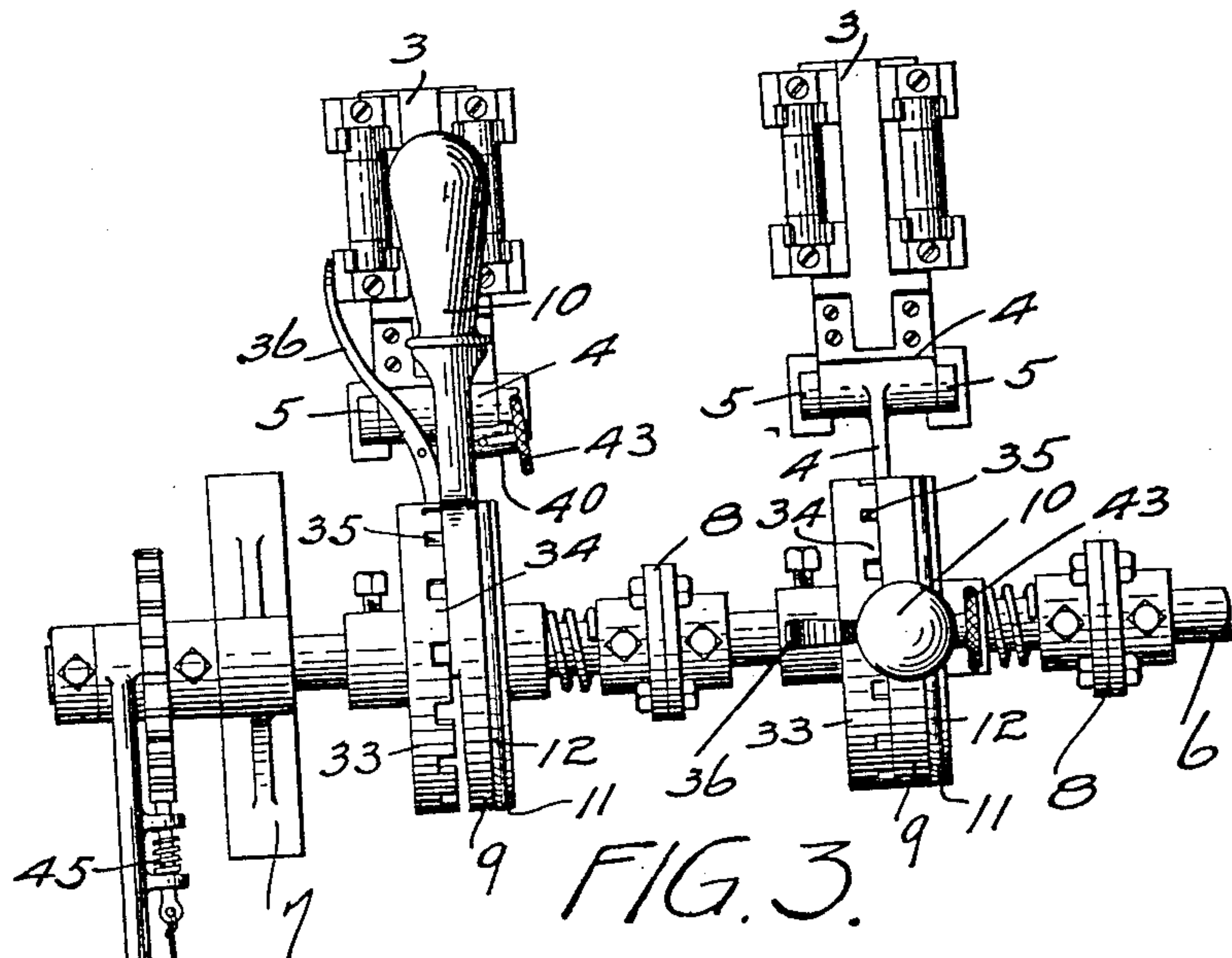
INVENTOR
 JAMES W. PIERCE
 BY *Paul & Paul*
 HIS ATTORNEYS

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APPLICATION FILED DEC. 6, 1904.

3 SHEETS—SHEET 3.



WITNESSES
M. M. Davis
C. M. Mammara

FIG. 4.

INVENTOR
JAMES W. PIERCE
BY Paul & Paul
HIS ATTORNEYS

UNITED STATES PATENT OFFICE.

JAMES W. PIERCE, OF MINNEAPOLIS, MINNESOTA.

COMBINED CONTROLLER AND DIMMER-SWITCH.

No. 827,663.

Specification of Letters Patent.

Patented July 31, 1906.

Application filed December 5, 1904. Serial No. 235,608.

To all whom it may concern:

Be it known that I, JAMES W. PIERCE, of Minneapolis, Hennepin county, Minnesota, have invented certain new and useful Improvements in a Combined Controller and Dimmer-Switch, of which the following is a specification.

My invention relates to switches designed particularly for use in producing the various light effects, in color or otherwise, desired in a theater, especially on the stage. The devices in general use for this purpose are for the most part crude and cumbersome, the switches, either rotary or knife type, being merely mounted in one place on a marble board without regard to position and with the dimmers grouped at the top or bottom in another place, making it necessary for the operator to familiarize himself with a great many parts, which he may be called on at any moment to locate, the attraction occupying the stage being obliged to suffer annoyance and inconvenience arising from errors or delays, whether great or small, in the manipulation of the lights.

The object, therefore, of my invention is to simplify and improve the ordinary switchboard as much as possible by reducing the number of parts employed and arranging the switches and dimmers in groups, so that their location can be easily determined and memorized.

The invention consists generally in providing a single operating-lever, by means of which both the switches and the dimmers are controlled.

Further, the invention consists in providing an interlocking switch and dimmer mechanisms and a master-lever for operating said switches or all the dimmers independently or all the dimmers and switches simultaneously.

Further, the invention consists in various constructions and combinations, all as hereinafter described, and particularly described in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a vertical section of a portion of a switchboard, illustrating the circuit-switch in full lines, the dimmer-switch in section, and the mechanism for operating the circuit and dimmer-sections also in section. Fig. 2 is a similar view showing the circuit-switch in its open position. Fig. 3 is a front elevation of the board, showing the circuit-switches and operating

mechanism thereon. Fig. 4 is a detail sectional view of the switch-operating mechanism. Fig. 5 is a sectional view showing the mechanism for operating the circuit-switch. Fig. 6 is a sectional view of the dimmer-switch.

In the drawings, 2 represents a switchboard of the ordinary type having mounted on the front thereof a series of circuit-switches 3, connected in the usual manner with the lights in various parts of the theater, and also with the dimmer-switches and rheostats that are cut into each circuit at the back of the board, the wiring for the different circuits being omitted in this case for the sake of clearness of illustration. These circuit-switches are of the ordinary knife type and have levers 4 pivoted upon standards 5 on the front of the switchboard. The oscillation of these levers toward and from the board operates the switches and closes or opens the circuits in the well-known way.

Below the circuit-switches, of which there may be any number on the board, according to the number of circuits desired, is a rock-shaft 6, supported in bearings on brackets 7, that are secured to the front of the board. This shaft is preferably made in sections connected at the ends by couplings 8.

Below each circuit-switch is an operating mechanism therefor combined with mechanism for controlling the dimmer, and as these mechanisms in each circuit are identical it will be sufficient to describe one in detail, it being understood that I may use any number of them, according to the number of circuit-switches on the board.

9 is a disk having its hub loosely mounted on the shaft 6 and provided with a handle 10, by means of which the disk is oscillated back and forth in the manipulation of the switches and dimmers. An annular groove 11 is provided in the periphery of this disk to receive a cable or belt 12, preferably of wire, that extends through the switchboard and fits within a similar groove 13 in the periphery of a ring 14, that is loosely mounted on a hub 15, which is free to turn on a shaft 16 and is provided with contact-springs 17, that travel over the surface of the rheostat 18, secured on said shaft, and having stops 19, that determine the travel of the springs in each direction thereover. A pawl 20 is pivoted on the ring 14 and normally pressed by a spring 21 through a notch 22 upon the edge of a cam 23, that is secured on

the shaft 16. This cam is adapted to press the dog 20 outwardly and hold it in such position during a portion of its movement and allow it to swing in and engage a flange 23' on the hub 15 during the rest of its movement, whereby the said hub will be revolved and the contact-springs moved over the face of the rheostat. This construction allows me to operate the contact-springs and increase or decrease the resistance in the circuit, and consequently the intensity of the light during a portion of the stroke of the handle 10, while during the remaining portion of such stroke the contact-springs will remain stationary and the resistance in the circuit unchanged.

In Fig. 1 the handle 10 is shown in its raised position and the pawl is on the point of engaging the flange of the contact-spring hub to operate the same and increase the resistance in the circuit to dim the lights. This operation of the contact-springs or dimmer-switch will take place during the initial movement of the handle 10 and terminate about the time it reaches a horizontal position, at which time the contact-springs will reach the limit of the rheostat and the cam 23 will have disengaged the dog from the hub, allowing the ring 14 to revolve without affecting the dimmer.

From the point where the dimmer passes out of operation to the end of its stroke the lever 10 controls the circuit-switch, and I will now proceed to describe the mechanism through which this control is effected.

A plate 24 is loosely mounted on the shaft 6 and has a slot 25 in one side to receive a stud 26, carried by a bar 27, that has a forked inner end to straddle the shaft 6 and a slot 28 in its opposite end, wherein the lower end of the blade 4 is pivoted. Pins 29 upon each side of the slot 25 act as stops for plate 24. A cam-track 30 is provided on the side of the disk 9 and receives an antifriction-roller 31, carried by the inner end of the stud 26. This cam-track is so arranged that during the initial movement of the handle 10 from its position shown in Fig. 1 no effect will be produced on the circuit-switch or the bar 27. When, however, the handle reaches a predetermined point in its stroke, the roller will engage the shoulder 32, which will move the bar 27 endwise until the blade-pivot reaches the end of the slot 28, and when the antifriction-roller passes over the shoulder 32 the bar 27 will be moved sufficiently to oscillate the blade 4 and open the switch and circuit. Upon the return movement of the handle the switch and circuit will be closed, and as the handle approaches the last quarter of its stroke the dimmer-switch will again be thrown into operation in the manner previously described.

It is frequently desirable to operate all the dimmers or all the circuit-switches independently of each other or all the circuit-switches and the dimmers simultaneously. I there-

fore provide a disk 33, secured on the shaft 6 and having a peripheral flange 34, provided with a series of notches 35. A lever 36 is pivoted on the handle 10 and is normally pressed toward said flange and notches by a spring 37. A rod 38 is mounted on said lever and projects through a hole 39 in the handle 10 and is slidable in a sleeve 40, that has a notch 41 to receive a pin 42 on said rod and lock said lever out of contact with the flange 34. For convenience in operating, a milled edge 43 is provided on the sleeve 40. When this locking device is in the position shown in Fig. 4, the lever 36 will bear upon the flange 34 with a yielding pressure and slip into the first notch it comes to when the handle 10 is moved in either direction. When the lever 36 enters one of the notches 35, the disks 9 and 33 will be locked together, and movement of the handle 10 will rock the shaft 6, as well as operate the switches with which the handle is connected. Upon one end of the shaft 6 a master-lever 44 is provided having a locking device 45, by means of which the lever can be temporarily locked on the shaft in any desired position. By means of this master-lever the shaft and all the switches can be operated, assuming that the levers 36 are in engagement with the notches in the flanges 34. If the handles 10 are all in the position shown in Fig. 1, movement of the master-lever will operate all of the dimmers to lessen the intensity of the lights in the circuits without affecting the circuit-switches, and by the same operation, by the simple adjustment of the levers 36, the operator can actuate any number less than all the dimmers and any combination of them that may be desired to produce the proper lighting effect. This is all done, as heretofore explained, by the initial movement of the handles 10. Their continued movement will finally operate the circuit-switches and open the circuits.

It is frequently desirable in the manipulation of the switch to provide means for automatically tripping the levers 36 to disengage them from their notches and allow all the handles 10 to be set in the same relative position. With this end in view I provide projections 46 with inclined or cam faces on each side of the plate 24 in the path of the lever 36 when at the limit of its stroke in each direction. The engagement of one of the fingers with the lever will force it out of its notch in the flange 34. In this position engaging the fingers 46 the levers 36 will be inoperative, and I therefore provide bell-cranks 47, pivoted on the plate 24 and having their contiguous arms connected by the spring 48 and their opposite arms extending up to engage pins 49 on the handle 10, there being one on each side of the lever 36. The spring 48 has sufficient tension to move the handle 10 away from the fingers 46 until the lever 36 again snaps into

one of the notches 35. In this way the device is automatically set in an operative position after the automatic release of the lever 36 by the movement of the master-lever.

5 I claim as my invention—

1. The combination, with a dimmer and circuit-switch, of an operating-handle, means connecting said handle with said dimmer and with said switch, and means whereby the initial movement of said handle will actuate said dimmer without affecting said switch, and the final movement of said handle will operate said switch without affecting said dimmer, substantially as described.

15 2. The combination, with a dimmer, comprising a rheostat and contact-springs movable over the same, of a circuit-switch, an oscillating handle, means connecting said handle and contact-springs to operate said springs upon the initial movement of said handle, and means connecting said handle and switch to allow it to remain stationary during the operation of said springs and to operate it during the final movement of the handle, substantially as described.

25 3. The combination, with a switchboard, of a handle mounted thereon, a dimmer comprising a rheostat and contact-springs movable over the same, a loosely-mounted ring, a cable connecting said handle and ring, and means interposed between said ring and springs for locking them together during the first part of the movement of said handle and releasing them during the last part of its movement.

30 4. The combination, with a switchboard, of an oscillating handle mounted thereon, a rheostat and a shaft, a hub loosely mounted on said shaft and having contact-springs engaging said rheostat, a ring loosely mounted on said hub and having a dog adapted to enter notches in said hub, a cam secured on said shaft and arranged to engage said dog periodically, and operative connections provided between said ring and handle.

45 5. The combination, with a series of dimmers and switches, of a shaft, a series of handles mounted on said shaft and operatively connected with said dimmers and switches and arranged to operate the former during their initial movement and the latter during their final movement, means for temporarily locking said handles on said shaft, and a master-lever for operating all of the handles simultaneously.

55 6. The combination, with a series of dimmers and circuit-switches, of a shaft, a series of handles mounted on said shaft and operatively connected with said dimmers and switches and arranged to operate said dimmers during their initial movement and said switches during their final movement, means for temporarily locking said handles on said shaft, a master-lever mounted on said shaft, and means for tripping said locking mechanism

isms at the limit of the stroke of said handles in both directions.

7. The combination, with a switchboard, of a shaft mounted thereon, a disk loosely mounted on said shaft and having a camway and provided with an operating-handle, a dimmer and a circuit-switch, means connecting said dimmer and said disk, and a lever mechanism connected with said switch and having an antifriction-roller to slide in said camway, substantially as described.

8. The combination, with a switchboard, of a shaft mounted thereon and provided with a master-lever, a series of disks having operating-handles loosely mounted on said shaft at intervals and provided with spring-pressed locking devices, a series of disks secured on said shaft near said handles and having notches to receive said locking devices, a series of dimmers and circuit-switches, and means connecting said dimmers and said circuit-switches with said loosely-mounted disks, and causing the operation of said dimmers during the initial movement of said handles and the operation of said switches during the final movement of said handles substantially as described.

9. The combination, with a switchboard, of a shaft mounted thereon, a series of handles loosely mounted on said shaft, dimmers and circuit-switches operatively connected with said handles, a series of disks having peripheral notches secured on said shaft, locking-levers carried by said handles and adapted to enter said notches and lock said handles on said shaft, means provided at the limits of the stroke of said handles for engaging and tripping said locking-levers to release said handles, and means for disengaging said levers from said tripping means to automatically return said levers to their locked position.

10. The combination, with a dimmer and a circuit-switch, of an operating mechanism therefor, and means for causing the operation of said dimmer during the initial movement of said mechanism and the operation of said switch during the final movement of said mechanism.

11. The combination, with a series of dimmers and switches, of a shaft, a series of handles loosely mounted on said shaft and operatively connected with said dimmers and switches, and means whereby the initial movement of said handles will operate said dimmers and the final movement of said handles will operate said switches, substantially as described.

12. The combination, with a series of dimmers and switches, of a shaft, a series of handles loosely mounted on said shaft and operatively connected with said dimmers and switches, and means whereby the initial movement of said handles will operate said dimmers and the final movement of said handles will operate said switches, substantially as described.

dles will operate said switches, and means for temporarily locking said handles on said shaft, substantially as described.

13. The combination, with a series of dimmers and circuit-switches, of a shaft, a series of handles loosely mounted on said shaft and operatively connected with said dimmers and switches and arranged to operate said dimmers during their initial movement and said switches during their final movement, means for temporarily locking said handles on said shaft, and means for tripping said locking mechanism at the limit of the stroke of said handles, substantially as described.

14. The combination, with a series of dimmers and switches, of a shaft, a series of handles loosely mounted on said shaft and operatively connected with said dimmers and switches, means for temporarily locking said handles on said shaft, and means for tripping said locking means at the limit of the stroke of said handles.

15. The combination, with a series of dimmers and switches, of a shaft, a series of handles loosely mounted on said shaft and operatively connected with said dimmers and switches, means for temporarily locking said handles on said shaft, means for tripping said locking means to release said handles, and means for disengaging said locking means from said tripping means to return said locking means to its locked position, substantially as described.

16. The combination, with a series of dimmers and circuit-switches, of a shaft, a series

of handles loosely mounted on said shaft and operatively connected with said dimmers and switches, means for temporarily locking said handles on said shaft, a master-lever for said shaft, means for tripping said locking means, and means for disengaging said locking means from said tripping means to allow the former to automatically return to its locked position.

17. The combination, with a series of dimmers and switches, of a shaft, a series of handles loosely mounted on said shaft and operatively connected with said dimmers and switches, means for temporarily locking said handles on said shaft, a master-lever, and means for tripping said locking means, substantially as described and for the purpose specified.

18. The combination, with a dimmer and circuit-switch, of a shaft, a handle loosely mounted on said shaft and operatively connected with said dimmer and switch, mechanism for temporarily locking said handle on said shaft, means for tripping said locking mechanism, and means for disengaging said locking mechanism from said tripping means to allow said locking mechanism to return to its normal position, substantially as described.

In witness whereof I have hereunto set my hand this 29th day of November, 1904.

JAMES W. PIERCE.

Witnesses:

RICHARD PAUL,
C. MACNAMARA.