

No. 746,434.

PATENTED DEC. 8, 1903.

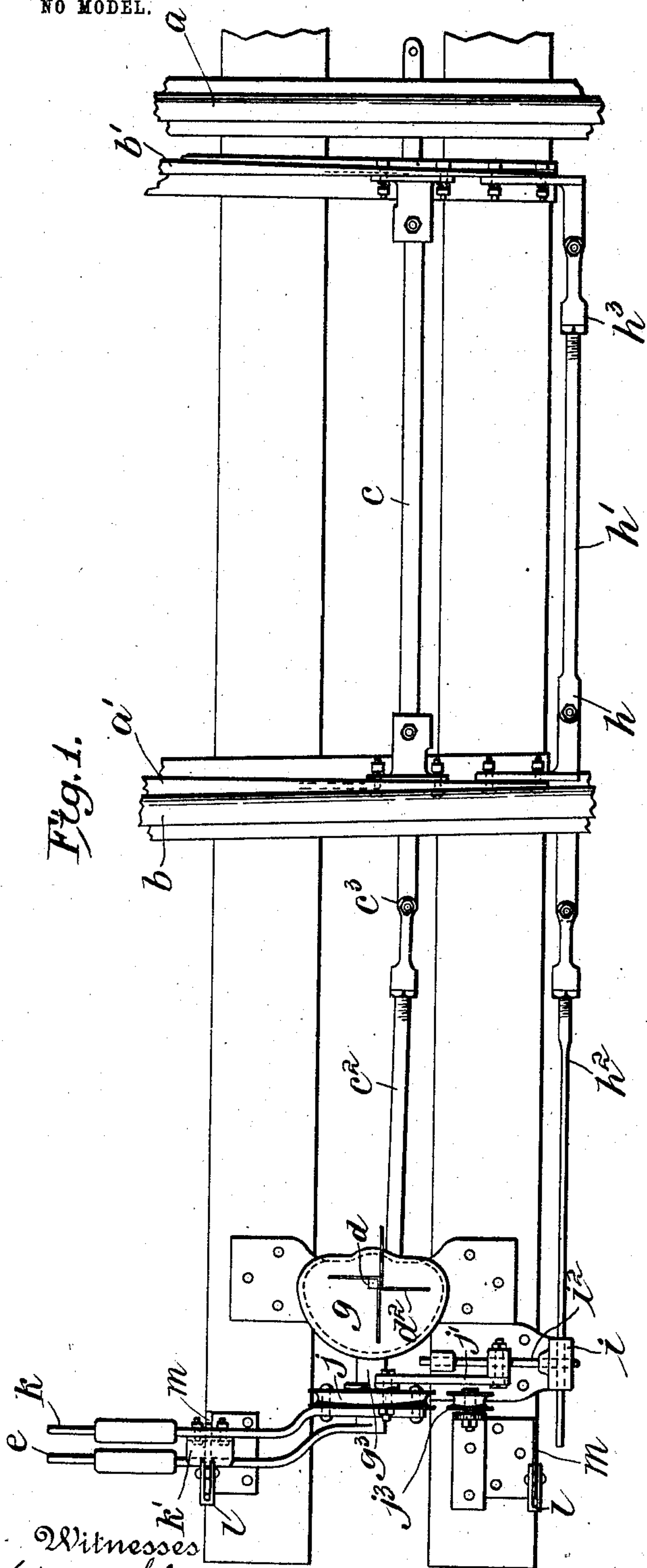
W. W. ALLEN.
SWITCH STAND.

APPLICATION FILED OCT. 31, 1902.

NO MODEL.

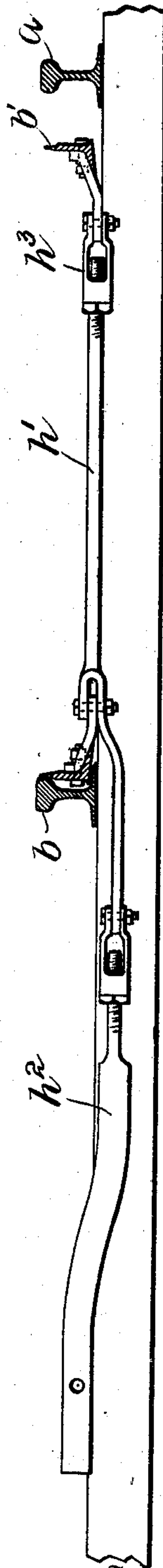
5 SHEETS—SHEET 1.

Fig. 1.



Witnesses
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Fig. 2.



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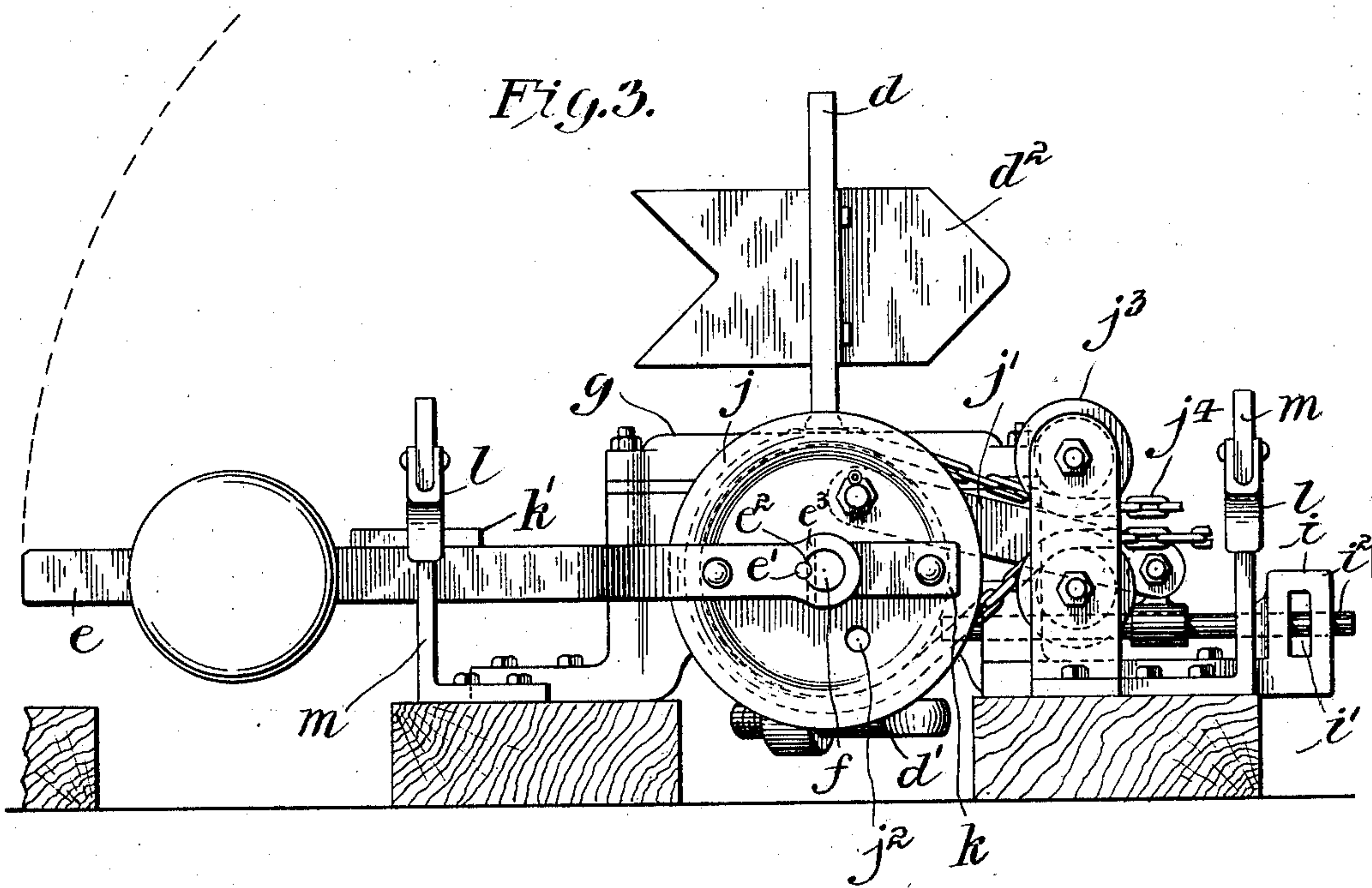
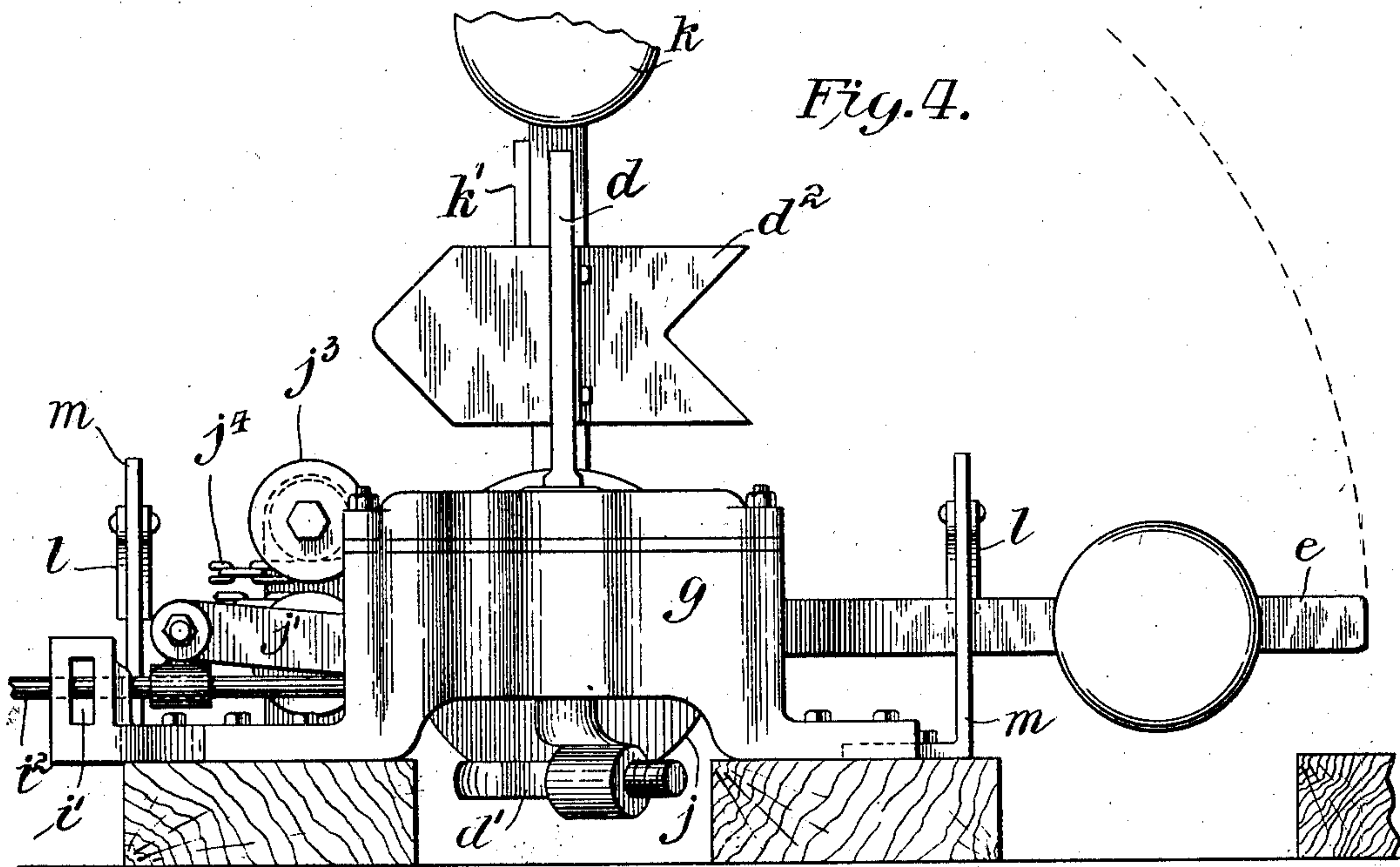
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5 SHEETS—SHEET 2.



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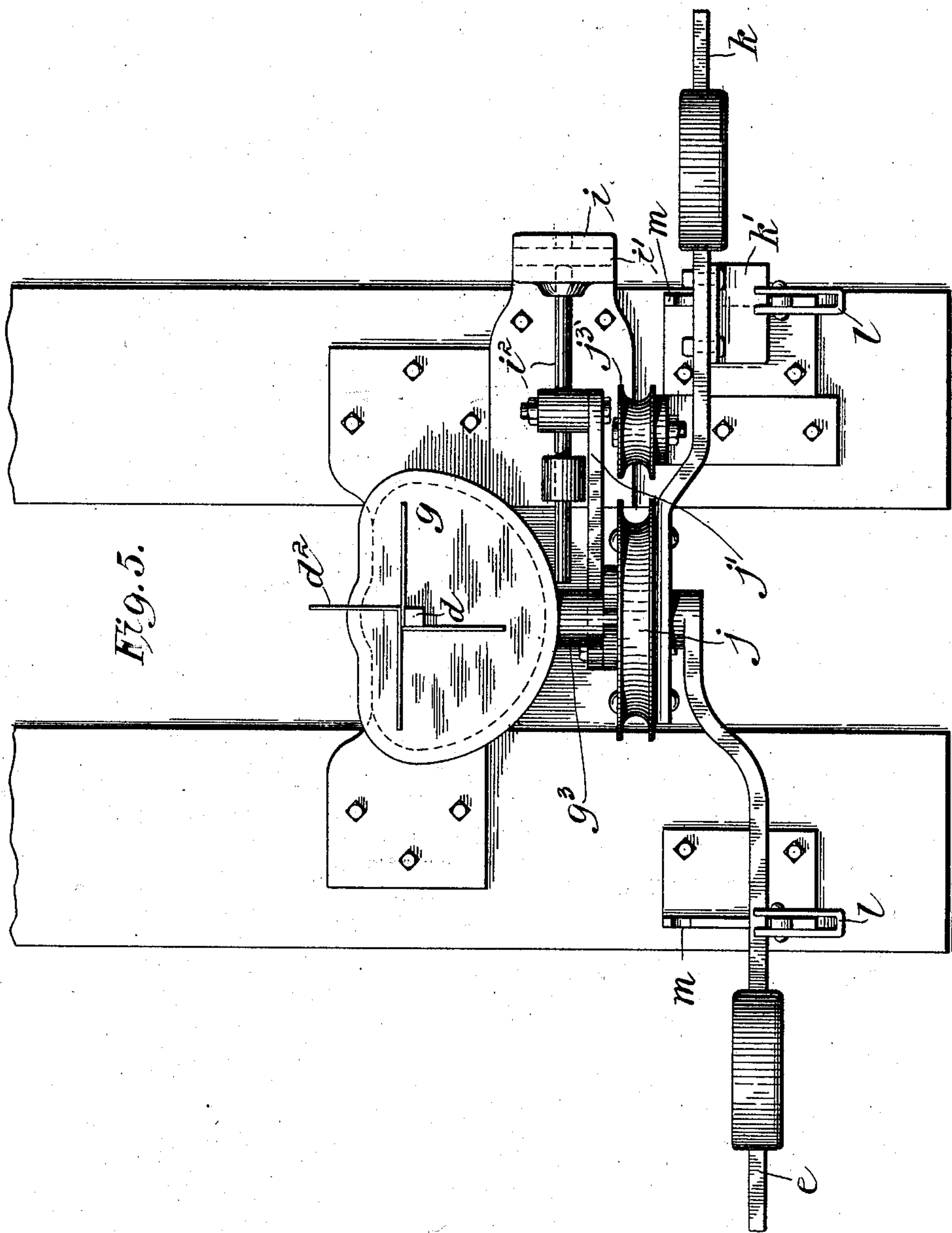
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5 SHEETS—SHEET 3.



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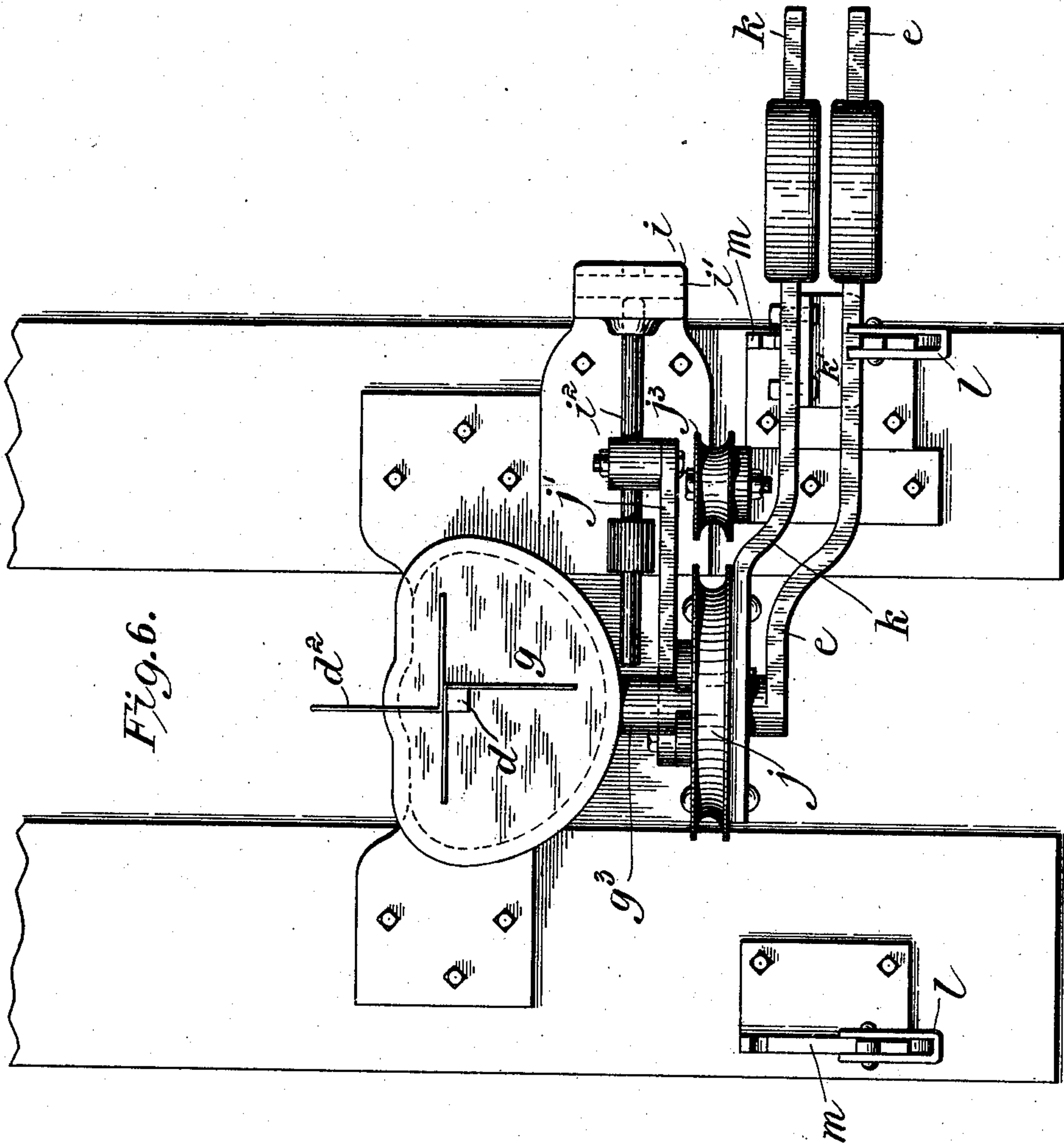
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5 SHEETS—SHEET 4.



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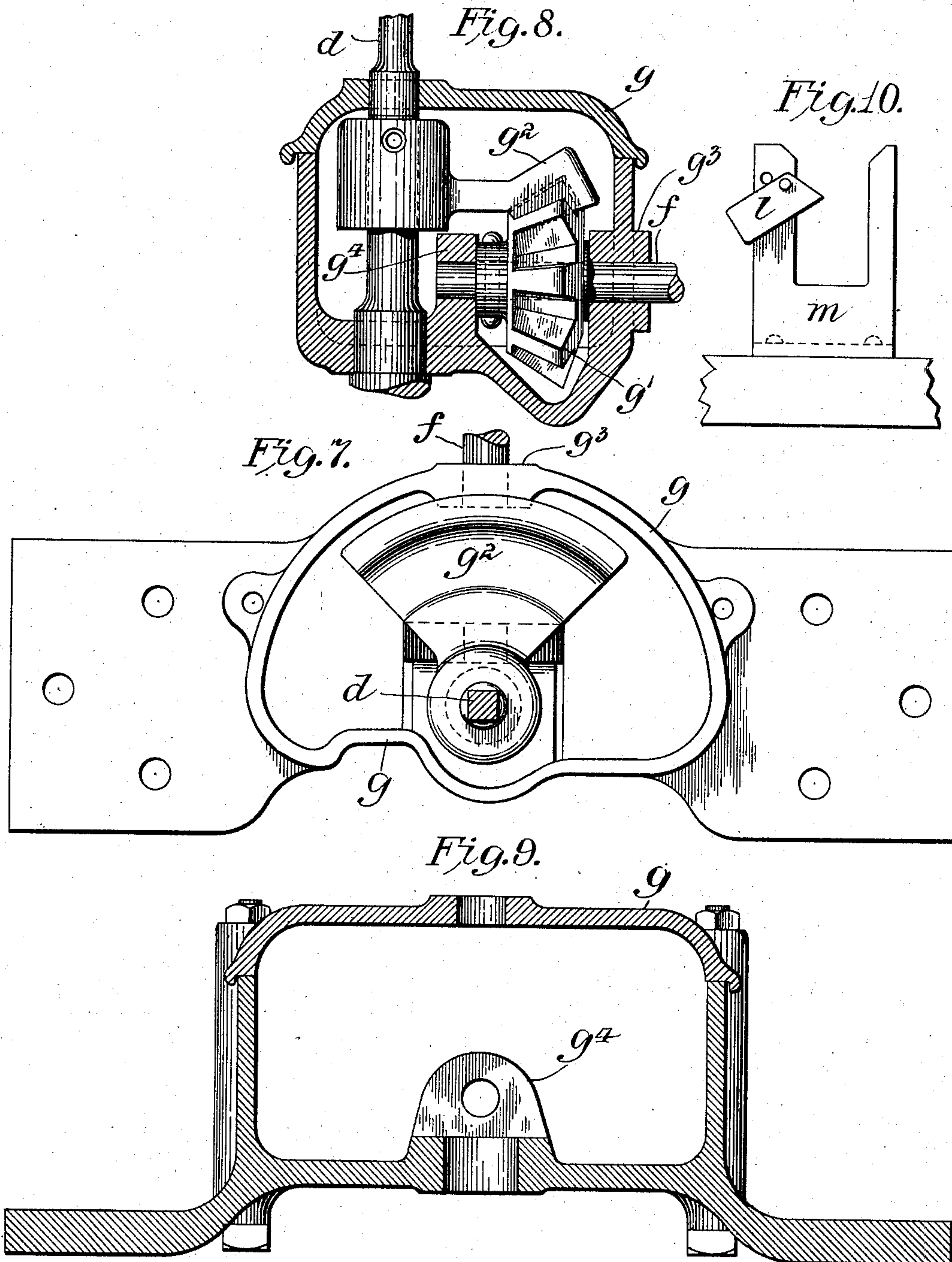
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5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

WILLIAM W. ALLEN, OF SLOATSBURG, NEW YORK, ASSIGNOR TO THE
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CORPORATION OF NEW JERSEY.

SWITCH-STAND.

SPECIFICATION forming part of Letters Patent No. 746,434, dated December 8, 1903.

Application filed October 31, 1902. Serial No. 129,512. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. ALLEN, a citizen of the United States, residing at Sloatsburg, Rockland county, in the State of New York, have invented certain new and useful Improvements in Switch-Stands, of which the following is a specification, reference being had to the accompanying drawings, forming a part hereof.

This invention relates to switch-stands and apparatus relating thereto for operating railway-switches.

One of the main objects of this invention is to produce a switch-stand which shall be capable of operating so as to operate a signal or semaphore located at a distance from the switch-stand so as to indicate either on the main line or siding the condition of the switch from a point distant therefrom and to effect the operation of such distant signal before the switch-stand has been unlocked and is capable of being operated to move the switch.

The device, mechanism, or apparatus which embodies my invention, whatever the details of construction thereof may be, is designed to be utilized in the following manner or relationship and for the accomplishment of the following results, viz: A switch being placed in position with the rails of a railway, a "switch-stand," so called, is located in such near juxtaposition thereto as by means of an operative connection the switch may be operated by the switch-stand. It is not enough that the switch shall be capable of being operated by the switch-stand so as to move the switch in one or the other position; but essentially the switch-stand must be capable of locking the switch in one or the other position before a train, car, or engine passes through the switch, and, again, in whatever position the switch may be left and there left locked ready for use, as just above stated, the switch-stand itself must be locked, so as to prevent the same from being inadvertently operated and from being tampered with or otherwise moved or disturbed by accident or otherwise. Connected with the switch-stand it is usual and preferable to locate a local signal designed to be operated by the movements of the switch-stand at some point in the op-

eration thereof or in the operation of the switch itself either wholly before the switch has commenced to move or synchronously with the movements of the switch or just after the switch has been wholly moved, so that in any event this local signal will indicate the position of the switch and whether it is open or closed. Again, it is also highly preferable to indicate by a suitable signal or "semaphore," as it is called, placed at a distance from the switch-stand, switch, and local signal the exact condition of the switch, whether it is open or closed, and while my invention embodies means and devices for the accomplishment of the foregoing purposes and by the use of my invention the foregoing purposes are more effectually realized, yet my invention also especially embodies means whereby the aforementioned distant signal, of whatever particular character it may be, can be effectively operated through the operation of the switch-stand by means connected therewith or forming a part thereof, so that such distant signal may be wholly operated or moved from one position to the other in the operation of such switch-stand before the switch has commenced to move and preferably before the switch-stand and switch have become unlocked or synchronously with the movement of the switch-stand and switch and local signal if the local signal is utilized with such switch-stand, whereby the distant signal would indicate to the engineer or conductor or other railway employee not only the exact condition of the switch in one or the other of its positions duly locked, but also in advance of the actual movement of the switch before it was unlocked, the position to which the switch was about to be momentarily moved, and this advanced indication also before the switch-stand and switch have been unlocked.

In the accompanying drawings, forming a part hereof, I have illustrated means, mechanism, apparatus, or combinations of parts and devices embodying my invention and capable of realizing the essential advantages thereof; but I do not intend to limit my invention to the precise construction, arrangement, and operation of means, mechanism, apparatus, or combination of parts and de-

vices shown in said drawings and hereinafter more particularly described, since the character and scope of my invention will not only be ascertained from an examination of the drawings and study of the description thereof, but also from an examination and study of the foregoing preamble and of the claims hereinafter following.

In the drawings, Figure 1 is a plan view of the switch-stand, showing a portion of a railway track and switch to which it is applied. Fig. 2 is a sectional view of the track shown in Fig. 1, the locking-bar being shown in elevation. Fig. 3 is a view in front elevation, on a larger scale, of the switch-stand, taken with the switch in its closed and locked position. Fig. 4 is a view in rear elevation of the switch-stand with the switch in its closed position, the locking-lever, however, having completed half of its unlocking stroke. Fig. 5 is a plan view of the switch-stand with the switch in its closed position, but unlocked. Fig. 6 is a plan view of the switch-stand with the switch in its open position. Fig. 7 is a plan view of the gearing interposed between the switch-operating lever and switch-operating bar. Fig. 8 is a sectional view through the casing inclosing said gearing, which is shown in elevation. Fig. 9 is a sectional view through said casing with the gearing omitted, showing the inner bearing for the switch-operating shaft. Fig. 10 is a detailed view of a portion of the switch-stand, showing one of the latches for automatically locking the switch-operating lever and the locking-lever.

In the illustration the invention is shown as applied to a simple form of switch, the rails of the main track being indicated at a a' and those of the turnout at b b' . The rails a' b' are firmly secured to the switch-operating bar c in any suitable manner, and means for adjusting the relative position of these two rails may be provided upon the bar c , said means, however, not being shown in the drawings. The bar c is also provided with a link c^2 , pivoted at c^3 and having its other end pivotally secured to a crank d' , formed upon the lower end of the target-spindle d , in the usual manner.

The actuation of the switch is effected through lever e , shaft f , and the gearing inclosed by casing g , which gearing is interposed between shaft f and bar c and comprises a pinion g' , secured upon shaft f and having a bevel-gear, and a sector g^2 , mounted upon spindle d and having a similar gear which meshes with the first-named gear. Shaft f is provided with a wide bearing g^3 , which is formed in casing g , and a second bearing g^4 is provided for said shaft within the casing, whereby said shaft is prevented from working loose and wobbling notwithstanding the heavy transverse strains to which it is continually subjected.

It is essential that the switch-operating lever e be fastened securely upon the end of shaft f in order to prevent any possibility of

its twisting off, and thereby endangering the safety of the switch. For this purpose a feather-and-groove connection is provided, the feather or pin e' resting in registering grooves which are cut in shaft f and lever e , and the feather e' is, moreover, provided with a groove e^2 , which a second pin e^3 engages, said pin e^3 preferably passing through both shaft f and lever e . In this way there is never any danger of the lever working loose upon the shaft so long as the interlocking pins e' and e^3 remain in position.

When the switch is set so as to cause a train passing through it to remain on the main track, which for simplicity will be termed the "closed" position of the switch, means are provided whereby to lock the switch in this position, and said means are operatively connected with a distant signal, which will always be caused to indicate the locked or unlocked condition of the switch. In connection with the locking device a locking-bar h is preferably provided, having a part h' secured to the rails a' b' , near the ends thereof, in which an adjusting device h^3 is preferably inserted, and a link h^2 pivotally secured to the part h' , the other end of the link h^2 engaging slot i' of a lock i . The link h^2 might have been secured to the part h' within the track, as has been customary; but it is thought preferable to make the connection outside the track in order to remove all mechanism as far as possible from between the rails. This lock i comprises a pin i^2 , suitably mounted to reciprocate in and out through slot i' to engage an opening in bar h , which registers with said pin when the switch is in its closed position. The reciprocation of said pin is effected by the partial revolution of a disk j , mounted to turn on shaft f and to which is pivotally secured a link j' , having its other end pivoted to pin i^2 . Disk j is also provided with a lock-operating lever k , which is arranged to turn the disk through half a revolution to lock the switch, while the backward movement of the lever through half a revolution effects the unlocking of the switch. Inasmuch as the terms "locking" and "unlocking" when used in describing the mechanism of switch-stands and similar apparatus may refer to different devices for fastening the switch or its associated parts in a particular position, it is noted here that when the terms are used hereinafter in this specification they are to be construed as referring to the locking device or mechanism just described.

It should be observed that the point of attachment of link j' upon disk j in the unlocked position of the switch is below the center of the disk and slightly to the side farthest from the lock and that in the locked position of the switch the point of attachment of said link upon the disk is above the center of said disk and slightly to the side nearest the lock. In this way the movement of the locking-lever k imparts a substantially harmonic motion to the pin i^2 and the unlocking does not take

place until the lever k has practically finished its unlocking stroke. It should be noted also that the locking-lever k may be secured to disk j , so as to lock the switch at either end of its (the lever k) stroke, and it is therefore necessary to provide a second point of attachment for the link j' on disk j , which point of attachment is indicated at j^2 . The locking-lever k when secured to disk j in its second position will be one hundred and eighty degrees in angular distance from its position with respect to disk j , illustrated in the drawings, and in the locked position of the switch the point j^2 will be below the center of the disk and slightly to the side nearest the lock, while in the unlocked position of the switch it will be above the center of the disk and slightly to the side farthest from the lock.

The provision of the bar h gives additional safety to the switch, inasmuch as it serves with the switch-operating bar to hold the switch firmly in its closed position, and should the switch-operating bar c be disturbed while the switch is closed the locking-bar would nevertheless hold the switch in its closed position. It will be understood, however, that so far as the locking mechanism is concerned the bar h may be omitted and pin i^2 may be arranged to lock the switch by engaging the switch-operating bar, and accordingly the invention is not to be understood as limited to the use of locking-bar h .

The disk j is provided with a grooved periphery, and thereby forms a wheel for the attachment and actuation of a chain j^4 , which in turn operates a semaphore or other form of distant signal. (Not shown.) Suitable bearings j^3 are also provided for the actuation and guidance of said chain. It will be obvious that any movement of the switch-operating lever e will not affect the chain j^4 or distant signal, but that the locking or unlocking of the switch by the actuation of lever k will cause the disk or wheel j to actuate the signal-chain j' . It will also be obvious that when the levers e and k are in the position shown in Figs. 1 and 3—that is, when the switch is locked in its closed position—it will be impossible to move the switch-lever e until the locking-lever k has been moved to unlock the switch. It will be evident, too, that when both levers are in the position shown in Fig. 6 either lever could be moved at pleasure but for a plate k' , which is provided upon lever k , whereby lever k cannot be moved from the position now under consideration without also moving the switch-lever e , although the latter may be moved without the former. It is clear, therefore, inasmuch as the movement of lever k sets the distant signal, that it will be impossible to open the switch without first setting the danger-signal and that it will also be impossible when the switch is open to set the safety-signal before closing the switch. Furthermore, it will be understood from what has been explained

above concerning the locking mechanism that the unlocking will not take place until the danger-signal has been fully set and, conversely, that the locking is effected the moment the signal begins to change from "danger" "to safety." Moreover, this arrangement offers a convenient and practical means for operating the switch for yard shifting, for in such shifting there is no necessity of continually operating the distant semaphore. The switch is merely required to be unlocked, which operation serves to set the danger-signal, the whole being accomplished by moving the lock-operating lever, the levers then being in the position shown in Fig. 5. The switch may now be opened and closed at will without disturbing the lock-operating lever or distant signal, which remains continuously set for "danger." With this arrangement it is unnecessary, as in other switches, to move the distant signal every time the switch is changed for purposes of yard shifting, which not only wears out the switch-stand, but in the event of moving a considerable mass of chain often is a burdensome undertaking. A local signal or target d^2 is provided upon the spindle d for purposes of yard shifting.

In order to provide a temporary automatic latch for the levers e and k and one from which said levers may be easily disengaged, a flat piece of steel l , bent into a U-shaped form, is pivoted near its edge at its open end upon one of the standards m , which form seats for the ends of the levers e and k at both ends of their stroke and between which standards the levers e and k are adapted to rest. It will be obvious by referring to the drawings that the levers are allowed to pass latch l in their downward movement, but if accidentally raised from their positions of rest they will strike the open end of the U-shaped piece or latch and will be firmly held from further upward movement by the engagement of the closed end of said latch with the standard upon which it is mounted. By lifting the closed end of the latch before raising the levers they are easily disengaged. A similar latch may be mounted upon both standards to engage each of the levers, respectively; but it is preferable to provide one latch only, as shown in the drawings, which latch engages directly the nearer lever and the plate k' on the other lever successively. It will be obvious that padlocks or similar devices may be employed upon the standards m or latches l or at any other convenient point in order to secure the operating-levers in any position and prevent any unauthorized tampering with the same.

I claim as my invention—

1. The combination with a switch-stand having a switch-operating lever and a lever adapted to lock the switch positively, of a distant signal, and operative connections between said signal and said locking-lever.

2. The combination with a switch-stand having a switch-operating lever and a lever

adapted to lock the switch positively, of a local signal, and operative connections between said signal and said switch-operating lever.

3. The combination with a switch-stand 5 having a switch-operating lever and a lever adapted to lock the switch positively, of a distant signal operatively connected with said locking-lever, and a local signal operatively connected with said switch-lever.
- 10 4. The combination with a switch-stand having a switch-operating lever and a locking-lever, of a distant signal, a locking device for the switch-operating lever, operative connections between said locking-lever and said 15 signal, and operative connections between said locking-lever and said locking device.
5. The combination with a switch-stand having a switch-operating lever and a locking-lever, of a switch-operating bar and a locking-bar operatively connected with said 20 switch-operating lever, and a locking-pin operatively connected with said locking-lever.
6. The combination with a switch-stand having a switch-operating lever and a locking-lever, of a locking-pin and distant signal, 25 both of which are adapted to be controlled by said locking-lever, and a switch-operating bar and a locking-bar, both of which are adapted to be controlled by said operating- 30 lever.
7. The combination with a switch-stand having a switch-operating lever and a locking-lever, of a switch-operating bar controlled by said operating-lever, a distant signal, and 35 means to lock said bar against movement, said means and distant signal being controlled and simultaneously actuated by said locking-lever.
8. The combination with a switch-stand 40 having a switch-operating lever and a locking-lever, of a switch-locking device and a distant signal, both of which are adapted to be controlled by said locking-lever, and a switch-operating bar and a local signal, both 45 of which are adapted to be controlled by the switch-operating lever.
9. In a switch-stand, the combination with a switch-operating lever, a target-spindle, a switch-operating bar, and connections between 50 the bar and spindle, of gearing interposed between said lever and spindle, a casing inclosing said gearing, a shaft connecting said lever and said gearing, and having a bearing in said casing, and a second bearing 55 for said shaft within said casing.
10. In a switch-stand, the combination with a switch-operating bar, of a device for locking said bar, a distant signal controlled by said locking device, said device comprising a disk, 60 a lock-operating lever secured to said disk, a locking-pin, and a link pivotally engaging said disk and pin whereby upon the movement of the lock-operating lever from its locking position, said pin will be moved so as to unlock the switch-operating bar just before said 65 lever has finished its unlocking stroke and the signal has been set, substantially as described.

11. In a switch-stand, the combination with a switch-operating bar, of a device for locking said bar, a distant signal controlled by said 70 locking device, said device comprising a disk, a lock-operating lever secured to said disk, a locking-pin, and a link pivotally engaging said disk and pin, the point of engagement of said link and disk being so disposed with reference 75 to said disk that in the locking position of the locking-lever said point will be to the side of the center of the disk nearest the lock and in the unlocking position of said locking-lever to the side of the center of the disk farthest 80 from the lock, whereby upon the movement of the lock-operating lever from its locking position, said pin will be moved so as to unlock the switch-operating bar just before said lever 85 has finished its unlocking stroke and the signal has been set, substantially as described.

12. In a switch-stand, the combination of a switch-operating lever, a shaft to which said lever is secured, both lever and shaft being 90 provided at their points of juncture with registering grooves, a feather in said registering grooves, said feather having a transverse groove, and a pin passing through said lever and shaft and engaging the groove in the feather, substantially as and for the purpose 95 set forth.

13. A latch for a railway-switch lever, said latch being mounted upon a standard and comprising a U-shaped piece of metal pivoted 100 near one edge at its open end upon said standard, whereby a downward pressure of the lever upon the open end of said U-shaped latch moves said latch to allow the lever to pass, and an upward movement of the lever against said latch is resisted by the engage- 105 ment of the closed end of said latch with said standard.

14. The combination with a switch-stand of means connecting said switch-stand to a switch, means adapted to be operated so as to 110 operate a distant signal before the switch-stand is unlocked and the switch moved, and means whereby the switch-stand may be unlocked and the switch moved to the desired position, substantially as set forth. 115

15. The combination with a switch-stand normally held locked, of means connecting said switch-stand to a switch, means for unlocking the switch-stand, means in operative 120 relation with said unlocking means for operating a distant signal before unlocking the switch-stand, means for moving the switch to the desired position, and means for securing the switch in the position to which it has been moved. 125

16. The combination with a switch-stand normally held locked, of means connecting said switch-stand to a switch, means for unlocking the switch-stand, means in operative 130 relation with said unlocking means for operating a distant signal before unlocking the switch-stand, means for moving the switch to the desired position, a local signal operatively connected with said switch-stand and adapted

to be moved when the switch-stand has been unlocked, and means for securing the switch in the position to which it has been moved.

17. The combination with a switch-stand normally held locked, of means connecting said switch-stand to a switch, means for unlocking the switch-stand, means in operative relation with said unlocking means for operating a distant signal before the switch-stand is unlocked and the switch moved, means adapted to be operated when the switch-stand is unlocked to move the switch, and a local signal whereby the switch and local signal may be operated without moving the distant signal until the switch-stand and switch are locked again.

18. In a switch-stand, the combination of means for operating the switch, a device for locking the switch-operating means when the switch is in its closed position, a distant signal operatively connected with said locking device and adapted to be set at danger as soon as the unlocking begins and to remain at danger until the locking of the switch is again completed, whereby the switch may be operated for yard shifting without changing the distant signal which is continuously set for danger, substantially as set forth.

19. In a switch-stand, the combination of a switch-operating lever, a locking-lever, means operatively connected with the first-named lever for actuating the switch, a locking device operatively connected with the second-named lever for locking the switch-operating means when the switch is in its closed position, a distant signal operatively connected

with said locking device and adapted to be set at danger as soon as the unlocking begins and to remain at danger until the locking of the switch is again completed, whereby the switch may be operated for yard shifting without changing the distant signal, substantially as set forth.

20. In a switch-stand, the combination with means for operating a switch, a device for locking the switch-operating means and a distant signal operatively connected with said locking device, of a switch-operating lever operatively connected with said switch-operating means, a locking-lever operatively connected with said locking device, and plate on said locking-lever whereby the switch-operating lever cannot be moved without moving the locking-lever when the switch is locked in its closed position and whereby the locking-lever cannot be moved without moving the switch-lever when the switch is in its open position.

21. In a switch-stand, the combination of a lever for operating the switch, a lever for locking the switch, said levers being arranged parallel with each other, a seat for the ends of said levers at either end of their stroke, and a plate upon one of said levers for engaging the other of said levers, substantially and for the purpose specified.

This specification signed and witnessed this 29th day of October, 1902.

WILLIAM W. ALLEN.

In presence of—

ALFRED S. BUSH,
S. O. O. MURPHY.