No. 870,912. PATENTED NOV. 12, 1907.

J. D. TAYLOR.

MECHANICAL CLUTCH.

APPLICATION FILED DEC. 5, 1906.

2 SHEETS—SHEET 1.

Fig: 1.

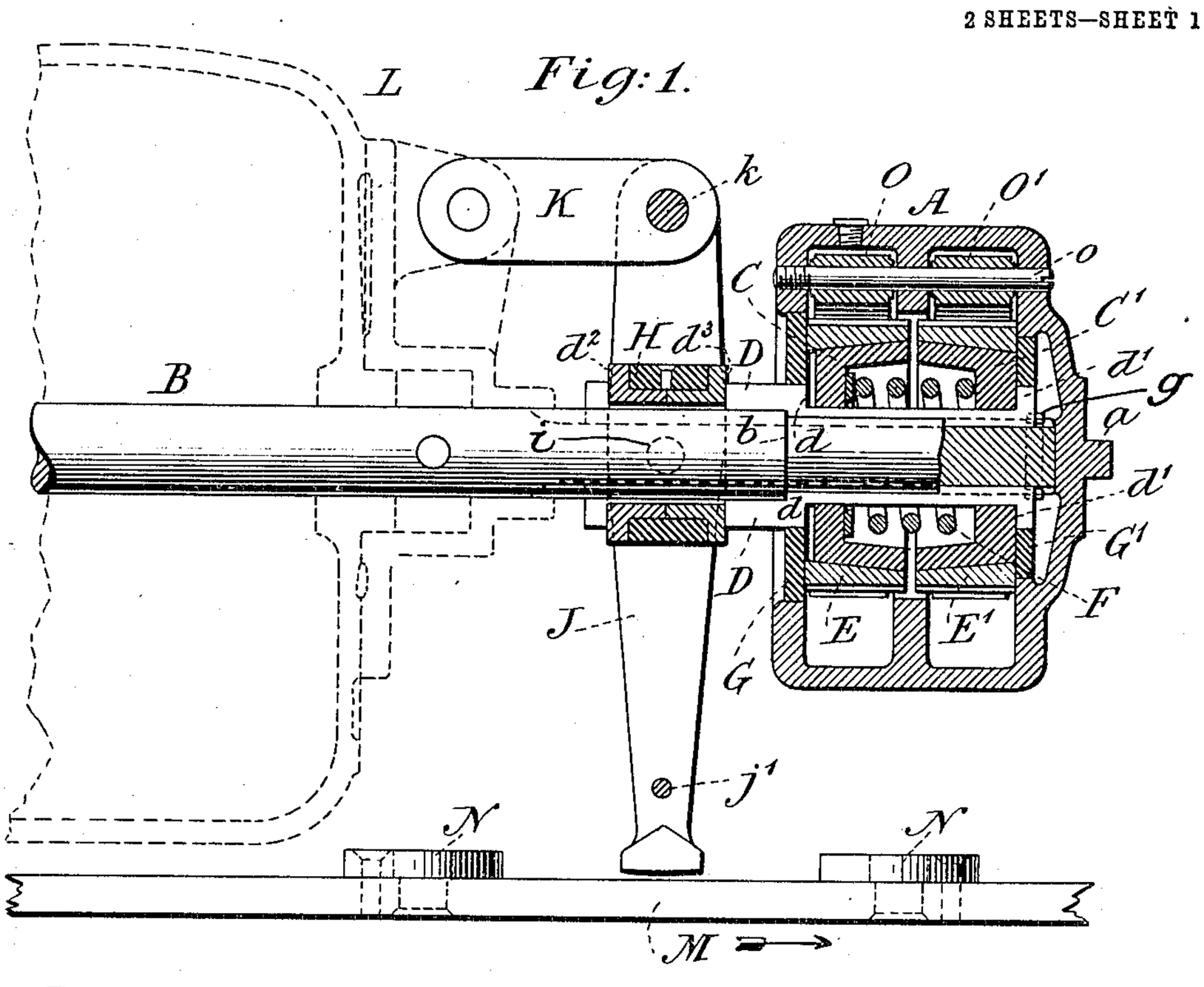
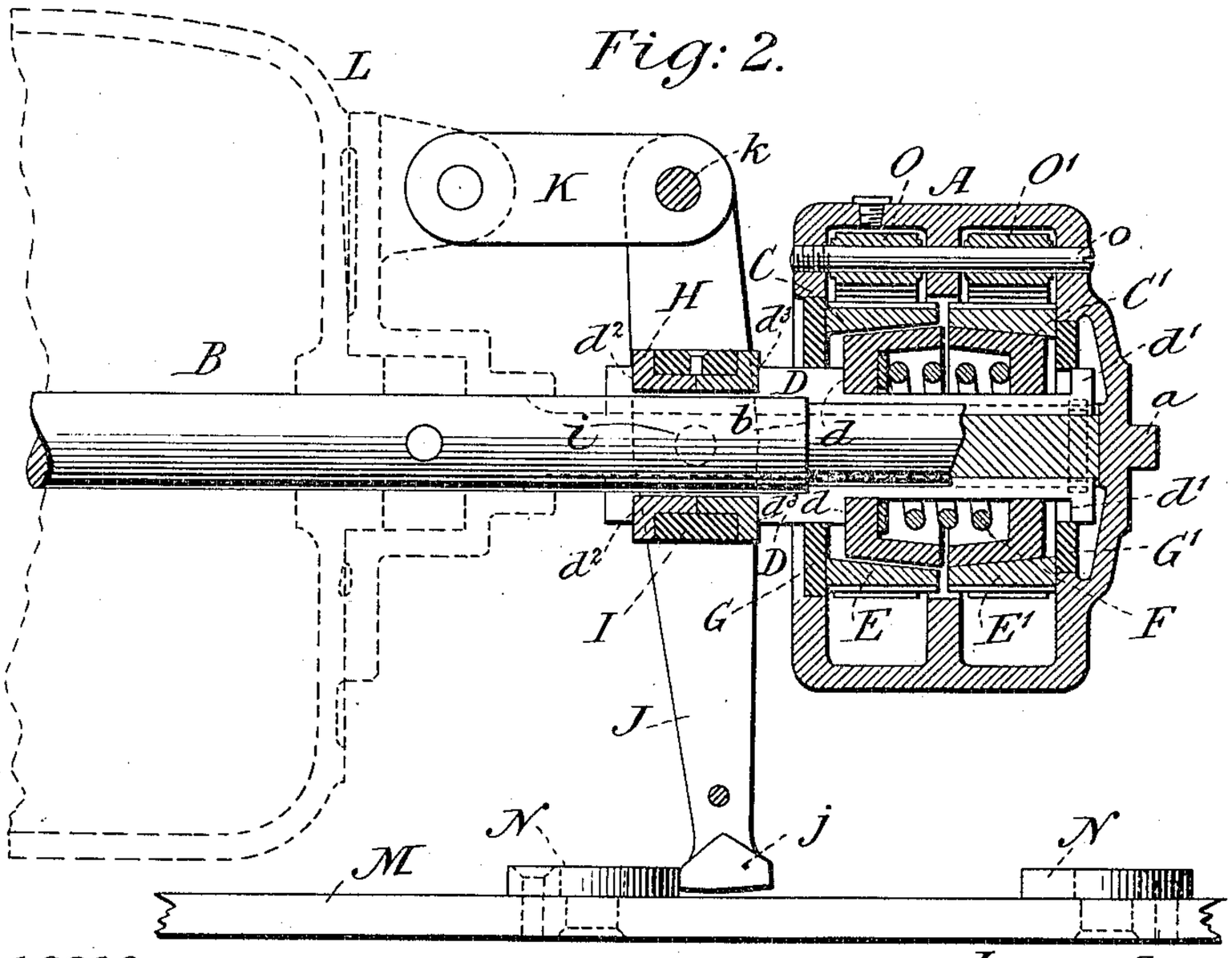


Fig: 2.



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2 SHEETS—SHEET 2.

Fig: 3.

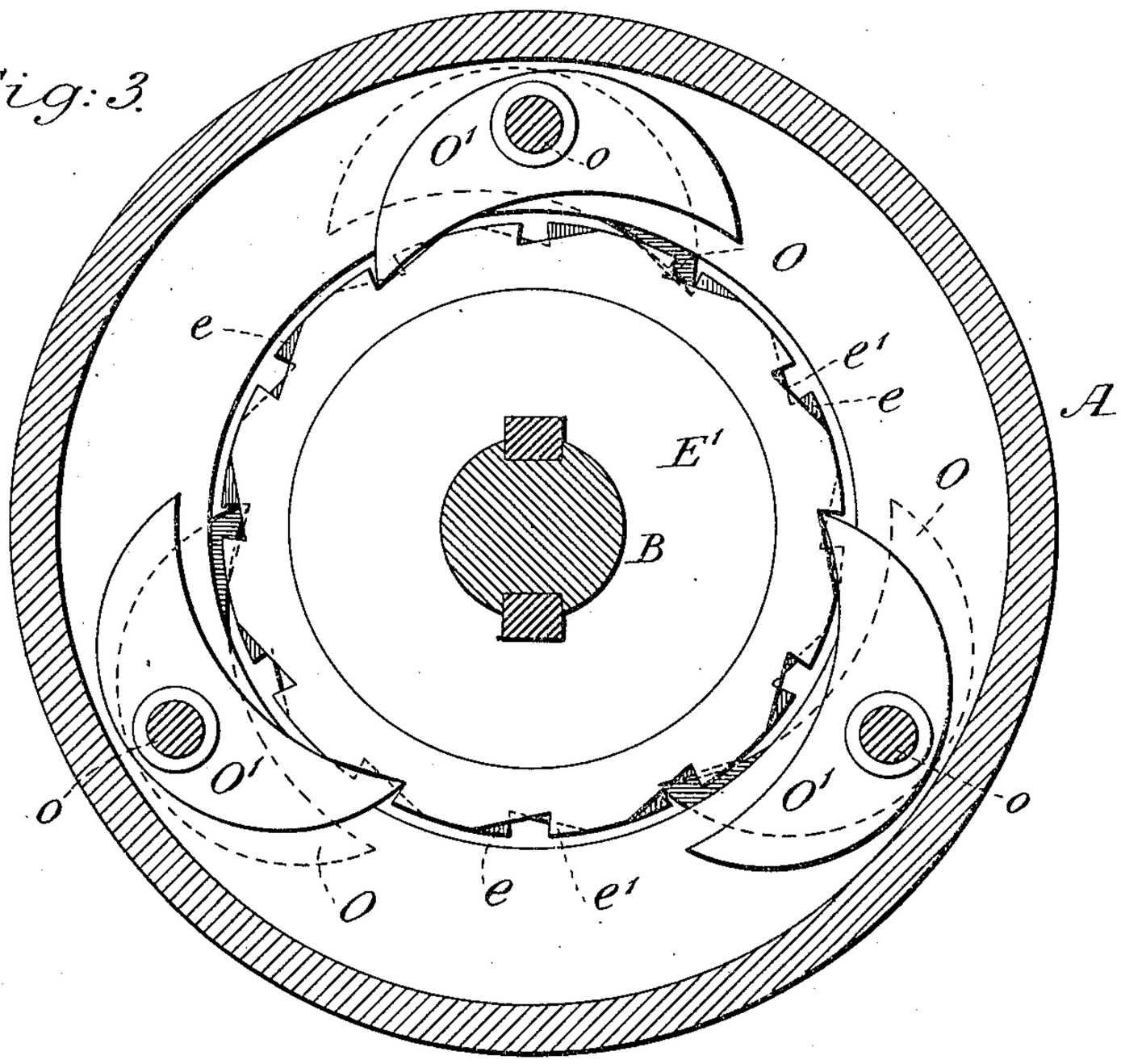


Fig: 4.

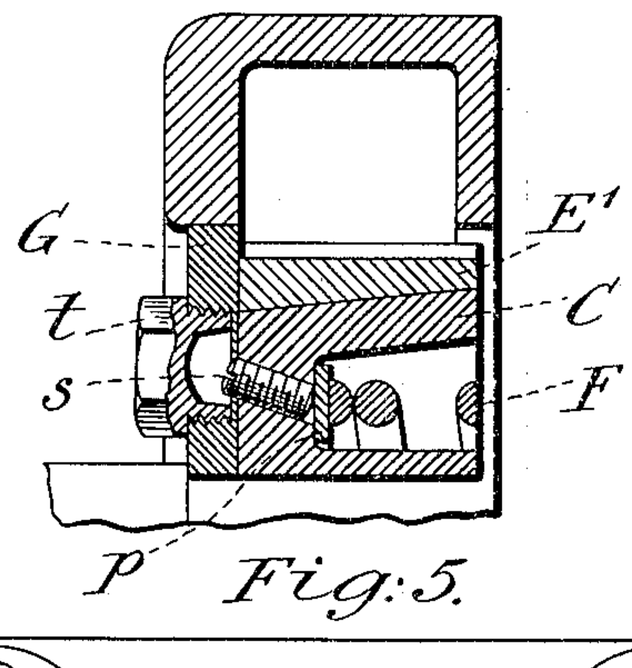
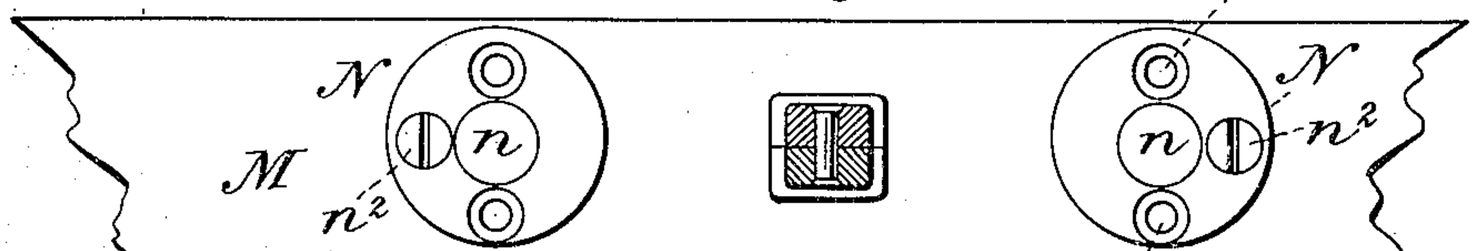


Fig: 5.



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UNITED STATES PATENT OFFICE.

JOHN D. TAYLOR, OF EDGEWOOD PARK, PENNSYLVANIA, ASSIGNOR TO THE UNION SWITCH AND SIGNAL COMPANY, OF SWISSVALE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

MECHANICAL CLUTCH.

No. 870,912. Specification of Letters Patent. Patented Nov. 12, 1907.

Application filed December 5, 1906. Serial No. 346,395.

To all whom it may concern:

Be it known that I, JOHN D. TAYLOR, a citizen of the United States, now residing at Edgewood Park, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Mechanical Clutches, of which the following is a specification.

This invention relates to clutch mechanism to be interposed between an electric motor and reducing gearing, and is especially designed for use in connection with railway switch and lock mechanism, although it may advantageously be used in connection with other mechanisms. The object of the invention is to provide a clutch rigid enough to transmit the maximum torque of the motor when running in either direction, to the part to be moved, as a switch, and yet yielding enough to prevent straining any of the parts should the switch points (or other object to be moved) be obstructed, and to disengage the motor from the gearing when the movement is completed, thereby permitting the motor to run free.

I will describe a preferred embodiment of my invention and then point out the novel features in claims.

In the accompanying drawings, Figure 1 is a sectional view of a clutch embodying my invention. Fig. 2 is a similar view showing some of the parts in different positions. Fig. 3 is a side view, partly in section, showing ratchet and pawl mechanism. Fig. 4 is a sectional detail of a means for adjusting the tension of a spring, and Fig. 5 is a plan view of adjustable dogs on a movable part.

I have not deemed it necessary to show an electric motor, or any reducing gearing as these parts may be of any desired construction, and it is sufficient to state that the motor shaft will be connected to the casing A at *a* in any suitable manner, and that the reducing gearing will be connected to the shaft B. The clutch mechanism is designed to transmit movement from the motor to the shaft in either direction and also to permit the motor and the casing to run free without moving the shaft.

The driven members of the clutch are indicated by C C′ and have the shape of truncated cones with their bases opposing each other. These cones are fitted to slide on a reduced end portion of the shaft B and are keyed thereto by keys D D which are also free to slide in the keyways formed in the shaft and cones.

The driving members E E′ are in the form of rings having ratchet teeth *e*, *e*′, respectively on their peripheries, and tapered bores to fit the peripheries of the cones C C′. The cones are recessed to receive a spring F which tends to force them apart and wedge them in the ratchets. The ratchets are prevented from moving laterally under the pressure of the spring by thrust-plates G, G′ which are perforated for the passage of the reduced end of the shaft B and also provided with slots for the passage of the keys D. The plate G rests against a shoulder *b* on the shaft B. The plate G′ is held in place by keys *g* having the form of circular arcs seated in an annular key seat in the shaft B and the keys are held in place by fitting into a recess in the plate G′. The keys are segments of rings and spaces are left between them for the passage of the keys D. Each key D has two shoulders *d* and *d*′, the shoulders *d* being adapted to engage the cone C to move it against the force of the spring F, and the shoulders *d*′ to engage the cone C′ to move it against the force of the springs.

A flanged collar H, made in two sections for convenience in assembling the parts, surrounds the shaft B and lies between two shoulders d^2 and d^3 on each of the keys D and a ring I lies between the flanges of the collar H and is provided with trunnions *i* to connect it to a lever J. Only one section of this lever is shown in the drawing but in practice another section similar to that shown will be employed with the shaft B extending between them. Both sections will be pivoted on a pin *k* in a link K pivotally connected to a casing L, which will inclose the reducing gearing, and each section has a toe *j* at its lower end, which toes will engage each other and the lower ends of the sections will be tied together by a pin or bolt *j*′.

The letter M indicates a portion of a locking bar such as is commonly employed to lock a switch and this bar is provided with two circular dogs N between which the lower end of the lever J extends in position to be engaged by both. As shown in Fig. 5 these dogs N are eccentrically pivoted at *n* on the bar and each is provided with three holes *n*′ for the passage of a set screw n^2 into the bar M for the purpose of locking them against rotation. As shown in Fig. 5 these dogs are in their middle position and by turning them in one direction through an arc of 90° the space between them will be diminished, and, by turning them in the opposite direction through an arc of 90° the space between them will be increased and the time of their engagement with the lever J may thus be varied.

As shown in Fig. 3, the teeth *e* and *e*′ are oppositely arranged and two series of pawls O and O′ are provided to engage the respective ratchet teeth. These pawls are pivotally supported on pins *o* secured in the casing A and when the latter is rotated by the motor in one direction the shaft B will be driven in the same direction by one ratchet and when rotated in the opposite direction the other ratchet will drive the shaft B. There are no springs used to press the pawls into engagement with the ratchets as their inertia alone is found to be sufficient to cause them to engage with certainty. The ratchet teeth are slightly undercut to prevent the pawls slipping off.

Assuming the locking-bar M to be moving in the direction indicated by the arrow in Fig. 1 the ratchet

E will be working and when the left-hand dog N engages the lever J the latter will, by further movement of the bar, be pushed to the position shown in Fig. 2, which will cause the keys D to push the cone C out of engagement with the ratchet E and movement of the shaft B will cease, but the motor may still continue to run free. The parts are now in position when the switch is in one of its extreme positions and locked. In order to move the switch in the opposite direction it is necessary to reverse the movement of the motor and when this is done the ratchet E′ will work and the shaft B will revolve in the opposite direction to that first assumed and the locking bar will move in the opposite direction. Such movement of the bar will first permit the cone C to engage its ratchet and further movement will cause the keys D to move the cone C′ out of engagement with the ratchet E′, when the motor may again run idle.

The tension of the spring F will be sufficient to insure positive driving of the shaft B to operate the switch mechanism under normal conditions, but if the points should be obstructed the spring will permit the ratchets to slip on the cones and thus prevent the parts from becoming strained or broken.

In order to provide adjustment for the spring F, I provide a ring *p* within one of the cones against which one end of the spring abuts and this ring may be adjusted by a screw *s* which extends through the end wall of the cone and engages the ring. To afford easy access to the screw, the thrust plate is provided with a threaded opening large enough to admit a tool to turn the screw which opening is closed by a screw-threaded plug *t*. See Fig. 4.

Without limiting myself to the precise details of construction illustrated and described, I claim:—

1. In a clutch mechanism, the combination of a rotatable casing, a shaft extending into said casing, a pair of oppositely arranged cones connected to said shaft to turn therewith, a pair of circular ratchets having conical bores to receive the respective cones and ratchet teeth on their peripheries, the teeth of one ratchet being oppositely disposed to those of the other ratchet, oppositely disposed pawls carried by the casing and engaging the respective ratchet teeth, means for normally holding both cones in engagement with the ratchets, and means for moving either of said cones out of engagement with its ratchet.

2. In a clutch mechanism, the combination with two oppositely disposed cones, a shaft, keys mounted in key-ways in the shaft and cones and slidable therein, said keys having shoulders to engage the respective cones, a pair of circular ratchets having conical bores to receive the respective cones and having teeth on their peripheries, a spring interposed between the cones and normally forcing them into the bores of the ratchets, and means for moving the keys to disengage either cone from its ratchet.

3. In a clutch mechanism, the combination with two oppositely disposed cones, a shaft, keys mounted in key-ways, in the shaft and cones and slidable therein, said keys having shoulders to engage the respective cones, a pair of circular ratchets having conical bores to receive the respective cones and having teeth on their peripheries, a spring interposed between the cones and normally forcing them into the bores of the ratchets, means for preventing lateral movement of the ratchets under the influence of the spring, and means for moving the keys to disengage either cone from its ratchet.

4. In a clutch mechanism, the combination with two oppositely disposed cones, a shaft, keys mounted in key-ways in the shaft and cones and slidable therein, said keys having shoulders to engage the respective cones, a pair of circular ratchets having conical bores to receive the respective cones and having teeth on their peripheries, a spring interposed between the cones and normally forcing them into the bores of the ratchets, means for preventing lateral movement of the ratchets under the influence of the spring, means for adjusting the tension of the spring, and means for moving the keys to disengage either cone from its ratchet.

5. In a clutch mechanism, the combination with two oppositely disposed cones, a shaft, keys mounted in key-ways in the shaft and cones and slidable therein, said keys having shoulders to engage the respective cones, a pair of circular ratchets having teeth on their peripheries and circular bores to receive the respective cones, a spring normally forcing the cones into the bores of the ratchets, an endwise movable bar, separated dogs on said bar, a lever pivoted at one end to a fixed support and its other end extending in the path of movement of said dogs, and connections between the lever and the keys.

6. In a clutch mechanism, the combination with two oppositely disposed cones, a shaft, keys mounted in key-ways in the shaft and cones and slidable therein, said keys having shoulders to engage the respective cones, a pair of circular ratchets having teeth on their periphery and circular bores to receive the respective cones, a spring normally forcing the cones into the bores of the ratchets, an endwise movable bar, two dogs eccentrically pivoted on said bar with a space between them, means for adjusting said dogs to vary the space between them, a lever pivoted at one end to a fixed support and its other end extending in the path of movement of said dogs, and connections between the lever and the keys.

In testimony whereof I have signed my name to this specification in the presence of two subscribed witnesses.

JOHN D. TAYLOR.

Witnesses:
J. C. SCHREUDER,
W. L. MCDANIEL.