No. 806,299. PATENTED DEC. 5, 1905.

F. W. SNOW.

SWITCH STAND.

APPLICATION FILED DEC. 16, 1904.

2 SHEETS—SHEET 1.

Fig. 1.

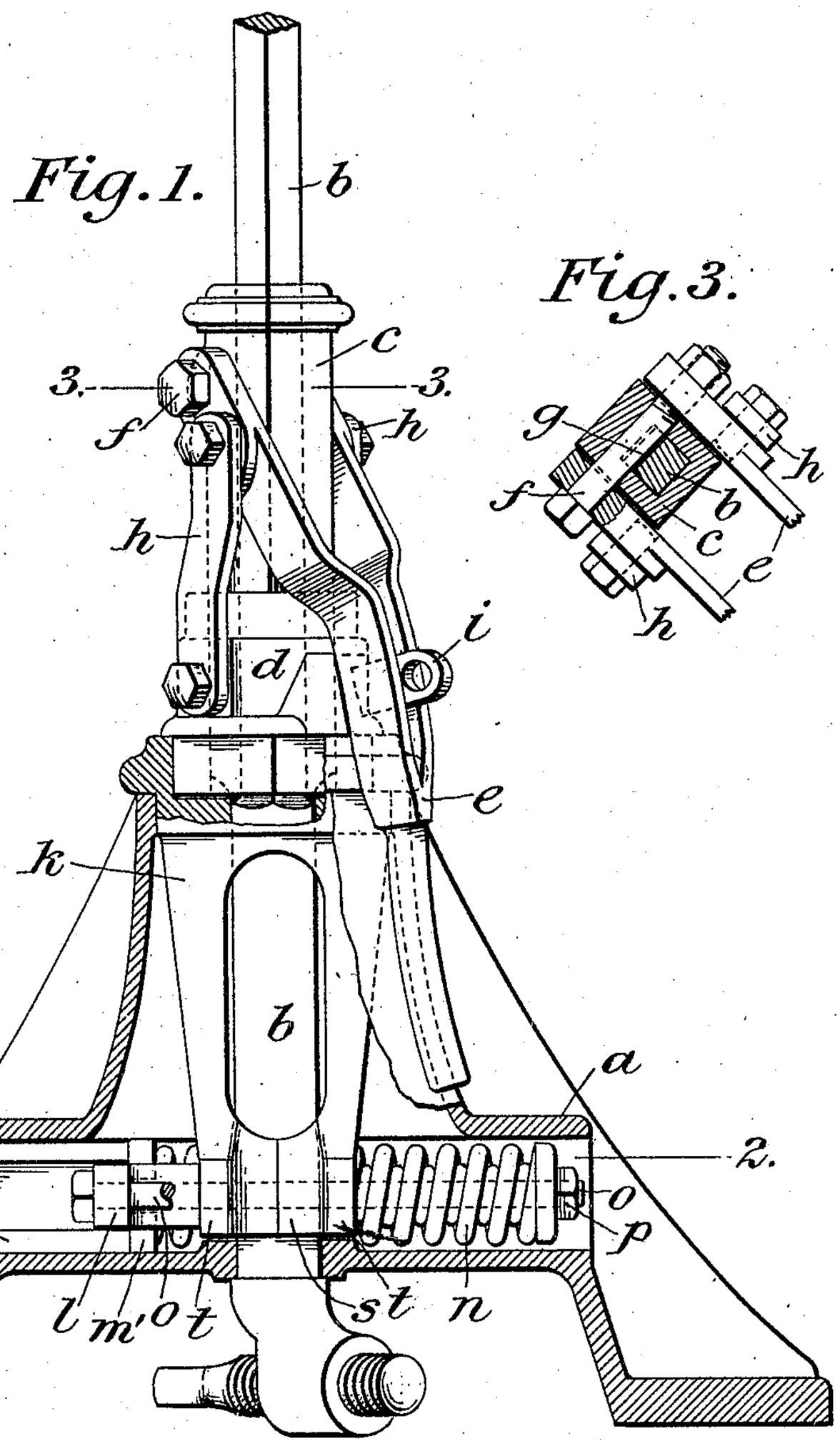

Fig. 3.

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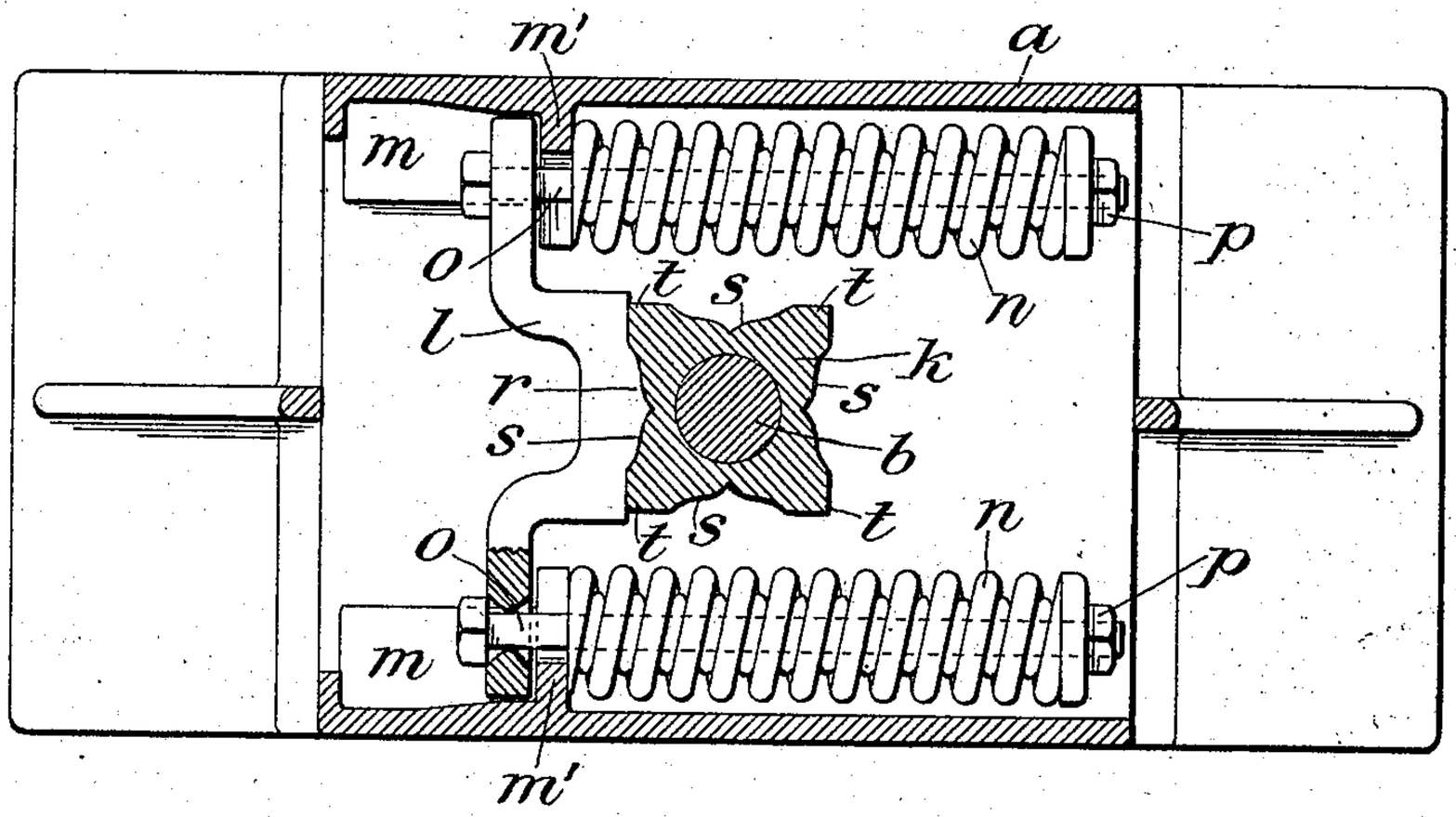
2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

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SWITCH-STAND.

No. 806,299. Specification of Letters Patent. Patented Dec. 5, 1905.

Application filed December 15, 1904. Serial No. 236,936.

To all whom it may concern:

Be it known that I, FRED W. SNOW, a citizen of the United States, and a resident of Hillburn, county of Rockland, and 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 more particularly to what are generally known as "automatically-operating" switch-stands, in which, for instance, means are provided for permitting the switch to be thrown by a passing train, the switch, nevertheless, being held securely in its turned position, so that it is always safe from being tampered with by unauthorized persons. It is a prime essential in such switch-stands that the mechanism through which the impulse of the moving train is transmitted to the switch shall operate decisively or in a positive manner—that is, it is necessary that the mechanism shall operate to effect the complete motion of the switch contemplated and to cause the switch to remain when thrown in its thrown or limiting position. In many stands of the general character referred to the switch is often left incompletely thrown or works out of its thrown position, so that a train passing through it is liable either to be derailed or to meet with some accident—as, for instance, such as might happen from being shifted onto the wrong track.

Without discussing in detail the construction of the switch-stands referred to to show why they fail in effecting complete operations of the switches contemplated or predetermined it may be stated generally that in the automatic switch-throwing mechanism of such stands there are centers or dead-points or some other such points where the mechanism tends to halt and over which the original impulse received from the passing train sometimes fails to carry it. The switch is thus only partially thrown and in such condition is obviously a menace to all the traffic passing through the same. Again, when thrown against a rail the switch may bound back or in some way work back from against the rail when the force which holds it against the rail is not sufficient to keep it there.

One of the objects of the present invention is to provide an automatic switch-throwing mechanism which shall not have any of the imperfections hereinbefore recited, but which, on the contrary, will operate uniformly in all positions, whereby the impulse of the passing train will be sufficient to insure its being carried completely from one of its resting or limiting positions to the other and in which the force acting upon the shaft to affect its rotation is uniform, and therefore not substantially weaker when the switch is in its limiting positions.

Other objects of the invention consist in embodying such mechanism in a convenient and practicable stand, which shall be simple in construction and easy for the yardman or trainman to operate. These objects will appear in the description of the invention which follows, reference being had to the accompanying drawings.

Figure 1 is a view, partly in elevation and partly in central section, of a switch-stand embodying the invention. Fig. 2 is a horizontal section of the same on the plane indicated by the line 2 2 of Fig. 1, and Fig. 3 is a detail cross-section on the plane indicated by the line 3 3 of Fig. 1.

Through the base *a* of the switch-stand the usual vertical shaft or target spindle *b* may extend, the lower end of the shaft or spindle *b* being operatively connected to the tongue of the switch in any well-known manner, but preferably so that a quarter-turn of the shaft *b* will bring the switch from one of its limiting positions to the other—as, for instance, from one rail or track to another rail or track. The upper portion of the shaft *b* is preferably square and has a square sleeve *c* thereon, around which fits a collar *d*, adapted to have vertical motion with respect to the sleeve. A handle *e*, which may be provided with a bifurcated end, is pivoted at that end to the sleeve *c* by a bolt or pin *f*, which extends through the sleeve and preferably through a groove *g* in the shaft *b*, whereby the shaft and adjacent parts are firmly locked together. The handle *e* may be connected to the collar *d* by links *h*, so that as it is raised and lowered the collar is also raised and lowered, respectively. The under side of the collar *d* is preferably squared to form one member of a clutch, and a block *k* around the lower end of the shaft *b*, which lower end is rounded, has its upper end formed with a

square recess which fits the square member upon the collar *d* and serves as the other member of the clutch. When the handle is in its lowermost position, as in Fig. 1, the two members of the clutch engage each other, and in this position the switch may be locked. For this purpose a projection *i* is provided upon the collar and extends through the handle, while a padlock or some other similar fastening device may be extended through an opening in the end of this projection to prevent the handle *e* from being raised.

Bearing against the block *k* is a bar or yoke *l*, adapted to slide in guides *m*, in which the ends of the bar or yoke are received, and the bar or yoke is held with considerable force against the block *k*, preferably by springs *n*, one at one end of the bar or yoke and the other at the other end. Each spring surrounds a bolt *o*, which has a limiting-nut *p* upon the end thereof, through which nut it may be adjusted, the thrust of the springs being received by the ends of the guide-pieces *m'*. The other ends of the bolts *o* are extended into the ends of the guides *m'* and through the ends of the bar *l*.

The bar *l* is formed, preferably at its central part, with a projecting portion *r*, which is adapted to fit approximately into corresponding recesses *s* in the lower end of the block *k*, there being four of such recesses, which determine the limiting positions of the switch. Between these recesses the block *k* is formed with relatively sharp or pointed portions *t*, which as the block is rotated travel one at a time upon the surface of the projection *r* upon the bar *l*. When any one of these sharp portions of the block *k* is caused to travel upon the surface of the projection *r*, it will move from one spring toward the other spring, and while the block is traveling on one side of the projection the pressure of the yoke upon the block will be due largely to the tension upon the spring on that side and will retard the rotation of the block. Likewise when said sharp portion of the block *k* reaches the other side of the projection *r* the pressure of the yoke upon the block will be due chiefly to the tension of the other spring and will accelerate the rotation of the block. By keeping the tension of each spring substantially constant or uniform while the pressure of the yoke upon the block is controlled by that spring the pressure of the yoke against the block will be substantially uniform and there will be no centers or dead-points, and therefore no tendency of the mechanism to halt and effect an incomplete throw of the switch, and the pressure of the bar against the block as the bar approaches its limiting positions will remain uniform and will therefore not be substantially weaker than when the block is not in its limiting positions. Accordingly there will be no tendency of the switch to bound back from the rail when thrown or to work away from its limiting or thrown positions or to fail to complete its throw. In order to secure this uniformity of action, the projection *r* upon the yoke has a curved surface which is preferably a substantially double-ogee surface, each side of the center of the projection constituting substantially an ogee curve. The center of the projection runs into a sharp surface or point, whereby there may be no tendency for halting when the sharp portion of the block reaches this point.

When the switch-stand is set up by the side of a track and the lower end of the shaft or target-spindle *b* has been properly connected with a switch, said switch may be set in the desired position and shifted at will by the yardman or trainman by simply unlocking the handle *e*, raising it, and thereby disengaging the two parts of the clutch, uniting the collar *d* and block *k*, and turning the shaft *b* until the switch is brought into the desired position. As before stated, when the switch has been set and is locked the projection *r*, having the ogee surfaces, rests in one of the four recesses in the block *k*. When, however, a train or car or engine or other heavy vehicle operated upon the railroad runs through the switch in a certain direction, (depending, of course, how the switch has been set,) the switch will be thrown over in any well-known manner, while the drawing force will be sufficient to rotate the block *k* against the pressure of the bar or yoke *l* acting against it. As the block is rotated in the manner just described one of the sharp surfaces on the block will travel over the double-ogee surface on the bar or yoke *l*, thereby insuring a uniform pressure or action of the bar or yoke against the block. In this way the movement of the block from recess to recess will always be completed and the switch will always be left in its proper limiting position, it being obvious that if the pressure of the bar against the yoke is always uniform there will be no tendency of the switch to leave the limiting position to which it has been thrown.

It is obvious that many changes in construction may be made in the switch-stand without altering the nature of the invention. The surfaces on the projection *r*, herein referred to as "ogee" surfaces, it will be understood, are capable of variation, both in the nature of the curvature thereof and in the proportions of the different parts of the curve. Such departures therefore may be made from the precise construction illustrated and described herein without departing from the spirit of the invention.

I claim as my invention—

1. In a switch-stand, the combination of a

rotatable shaft and means acting substantially uniformly as the shaft rotates to affect its rotation.

2. In a switch-stand, the combination of a rotatable shaft and adjustable pressure-applying means acting substantially uniformly as the shaft rotates to affect its rotation.

3. In a switch-stand, the combination of a shaft, means acting substantially uniformly as the shaft rotates to affect its rotation, and a hand-lever to turn the shaft and adapted to disengage it from said means.

4. In a switch-stand, the combination of a shaft, means acting substantially uniformly as the shaft rotates to affect its rotation, a hand-lever pivoted to the shaft, and a clutch member upon the lever adapted to engage and disengage a corresponding clutch member on said means.

5. In a switch-stand, the combination of a shaft, means acting substantially uniformly as the shaft rotates to affect its rotation, a hand-lever pivoted to the shaft, a clutch member upon the lever adapted to engage and disengage a corresponding clutch member on said means, and means connecting said lever and first-named means whereby the engagement and disengagement of the two clutch members may be effected by the movement of the lever.

6. In a switch-stand, the combination of a shaft, and a spring acting substantially uniformly as the shaft rotates to affect its rotation.

7. In a switch-stand, the combination of a shaft, a spring on each side thereof, a bar, the ends of which are actuated by the springs to cause it to affect uniformly the rotation of the shaft.

8. In a switch-stand, the combination of a shaft, a block thereon, a bar against the block, and a spring at each end of the bar to cause the bar to affect the rotation of the block, the block or bar being formed so that the effect upon the rotation of the block is substantially uniform.

9. In a switch-stand, the combination of a shaft, a block thereon, a bar against the block, and a spring at each end of the bar to cause the bar to affect the rotation of the block, said bar being formed so that the effect upon the rotation of the block is substantially uniform.

10. In a switch-stand, the combination of a shaft, a block thereon, a bar against the block, and a spring at each end of the bar to cause the bar to affect the rotation of the block, said bar being formed with a curve against which the block moves so that the effect upon the rotation of the block is substantially uniform.

11. In a switch-stand, the combination of a shaft, a block thereon, a bar against the block, and a spring at each end of the bar to cause the bar to affect the rotation of the block, said bar having in its surface a substantially ogee curve against which portion of the surface of the bar the block moves in its rotation.

12. In a switch-stand, the combination of a shaft, a block thereon, a bar against the block, and a spring at each end of the bar to cause the bar to affect the rotation of the block, said bar having in its surface a substantially double-ogee curve against which portion of the surface of the bar the block moves in its rotation.

13. In a switch-stand, the combination of a shaft, a block thereon, a bar against the block, a spring at each end of the bar to cause the bar to affect the rotation of the block, said bar having in its surface a symmetrical curve with a pointed center and said block having a pointed portion which, during the rotation of the block, moves across the symmetrically-curved surface of the bar.

14. In a switch-stand, the combination of a shaft, a block thereon, a bar against the block, and a spring at each end of the bar to cause it to affect the rotation of the block, said bar having in its surface a substantially double-ogee curve with a pointed center and said block having a pointed portion which during the rotation of the block moves across the double-ogee-curved surface of the bar.

15. In a switch-stand, the combination of a shaft, a block thereon having recesses formed therein, a bar acting substantially uniformly against the block to affect its rotation, said bar having a projection which is adapted to fit the recesses in the block to determine the limiting positions of the block.

16. In a switch-stand, the combination of a shaft, a block thereon having recesses therein at regular intervals, a bar acting substantially uniformly against the block to affect its rotation, said bar having a projection with a double-ogee surface against which the block moves as it rotates, said projection being adapted to fit the recesses to determine the limiting positions of the block.

17. In a switch-stand, the combination of a shaft and a spring-actuated engaging device acting substantially uniformly and adapted to lock the shaft in either of its limiting positions.

18. In a switch-stand, the combination of a shaft, a block thereon, a bar formed with a curved surface against which the block engages and on which the block is adapted to move as the shaft rotates and means for maintaining the bar against the block under substantially uniform pressure.

19. In a switch-stand, the combination of a rotatable shaft and means acting substantially uniformly as the shaft rotates to resist the shaft during the first half of its rotation and to assist the shaft during the last half of its rotation.

20. In a switch-stand, the combination of a rotatable shaft, and a spring acting substantially uniformly as the shaft rotates to retard

the shaft during the first half of its rotation and to accelerate the shaft during the last half of its rotation.

21. In a switch-stand, the combination of a rotatable shaft operatively connected with a switch and means acting substantially uniformly to resist the rotation of the shaft during substantially the first half of said rotation and to assist the rotation of said shaft during substantially the last half of said rotation in order to complete the throw of the switch and to keep the switch in its thrown position.

This specification signed and witnessed this 13th day of December, A. D. 1904.

FRED W. SNOW.

In presence of—

ETHAL M. TATE,

THOS. M. HOPPER.