

(No Model.)

2 Sheets—Sheet 1.

J. D. IHLDER.
AUTOMATIC STOP MOTION SNAP SWITCH.

No. 596,512.

Patented Jan. 4, 1898.

Fig. 1.

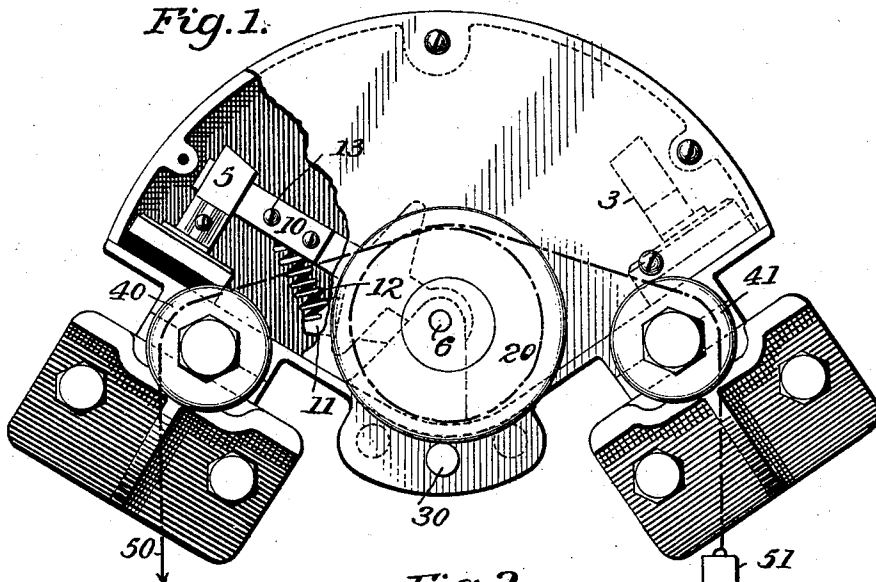


Fig. 2.

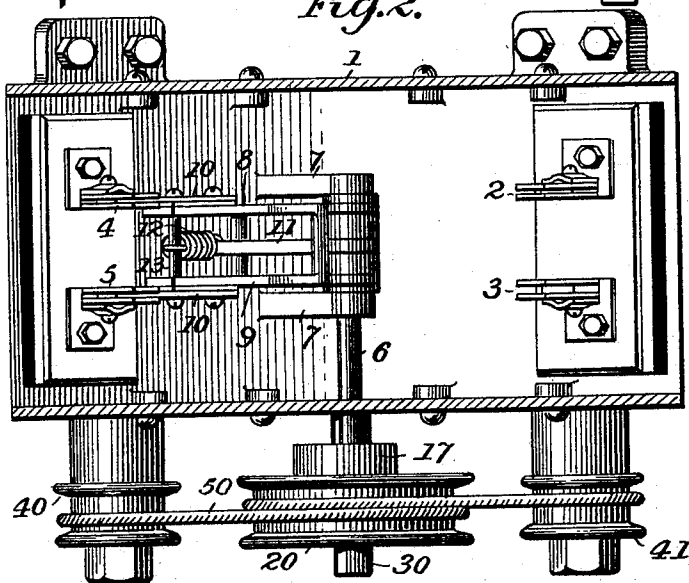
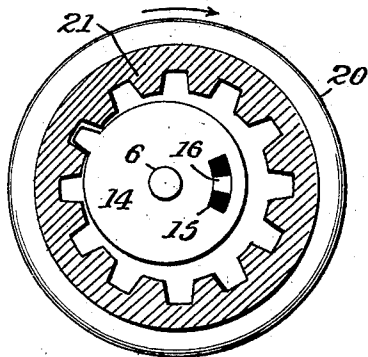


Fig. 3.



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Fig. 4.

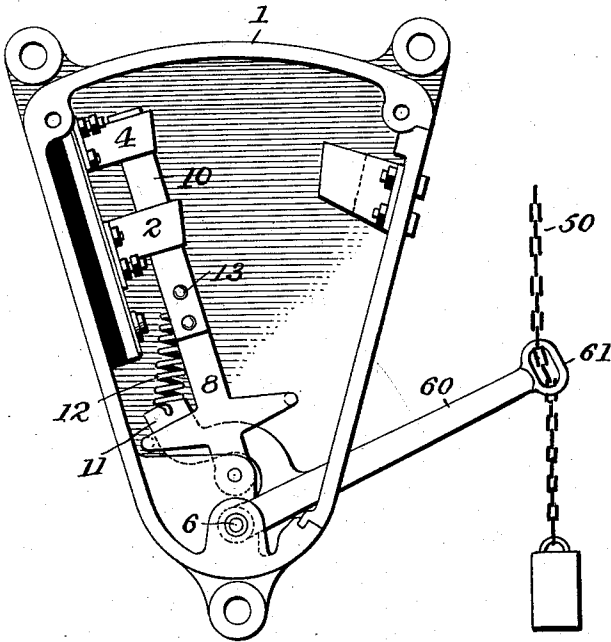


Fig. 5.

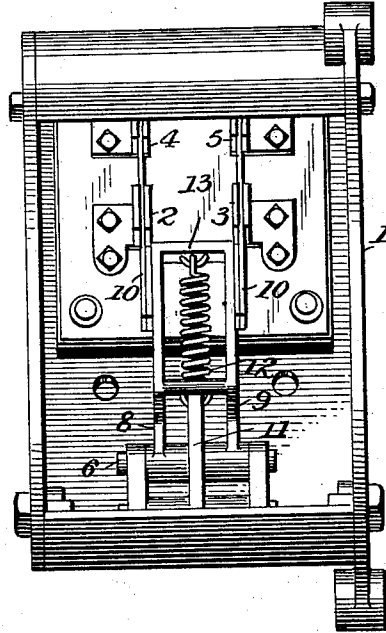
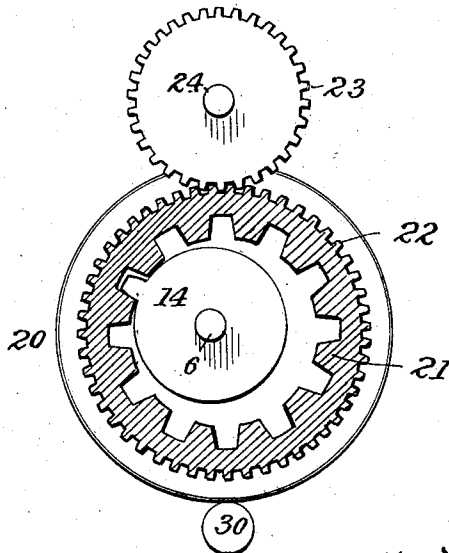


Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN D. IHLDER, OF YONKERS, NEW YORK, ASSIGNOR TO THE OTIS BROTHERS & COMPANY, OF NEW YORK, N. Y.

AUTOMATIC STOP-MOTION SNAP-SWITCH.

SPECIFICATION forming part of Letters Patent No. 596,512, dated January 4, 1898.

Application filed August 11, 1896. Serial No. 602,429. (No model.)

To all whom it may concern:

Be it known that I, JOHN D. IHLDER, a citizen of the United States, residing at Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Automatic Stop-Motion Snap-Switches, of which the following is a specification.

My invention may be termed an "automatic stop-motion snap-switch;" and it has for its object to provide means for automatically making the circuit or breaking the circuit, and it is especially useful in electric elevators, where the circuit is made when the car is in one position and is automatically and immediately broken if the car commences to move in an opposite direction; and to these ends my invention consists in the construction and arrangement of parts substantially as herein-
after more particularly set forth.

Referring to the accompanying drawings, Figure 1 is a side view, in part section, of a device embodying my invention. Fig. 2 is a vertical plan view, partly in section. Fig. 3 is a vertical section of the driving-sheave and gear or pinion. Figs. 4, 5, and 6 illustrate modifications.

It will be understood that the parts of my invention may be applied in many and various ways and in connection with various apparatus and different kinds of switches, and while I have shown it as applied to a specific form it will be understood that the invention is not limited thereto.

Referring to the form illustrated in Figs. 1 to 3, 1 is a case containing a switch, which in the present instance is of a conventional snap-switch variety, having terminals 2 3 4 5. There is a shaft 6 supported in the bearings 7 7, and pivotally mounted on the shaft are the knife-arms 8 9, carrying the usual switch-knives 10. Rigidly mounted on the shaft 6 is an arm 11, connected by a spring 12 to a cross-piece 13, uniting the knife-arms 8 9, thus forming a well-known form of snap-switch, which need not be further explained, as it forms no part of my present invention and is simply given as illustrative.

Mounted on the shaft 6 is a mutilated gear 14, and this may be positively connected

therewith or may be provided with a slot 15, in which enters a stud 16 on a sleeve 17, rigidly mounted on the shaft 6, thereby giving a little lost motion to the gear 14.

Surrounding the gear 14 is a driving-sheave 20, having an internal gear 21 somewhat larger than the gear 14, and this is supported on a stud 30, on which the flange of the driving-sheave 20 rotates. In the present instance, as shown in Fig. 3, the gear 14 has but a single tooth, although there may be several, and the sheave is supported at such a height that this tooth engages the internal gear 22 near the top, leaving a clearance at the bottom and at one side, according to the position in which the driving-sheave happens to be. Thus it will be seen that in the position shown in Fig. 3 the single tooth of the gear 14 engages the internal gear 21 of the driving-sheave; but if the tooth were diametrically opposite to the position shown it would not engage the internal gear.

If now, assuming the parts to be in the position shown in Fig. 3, the driving-sheave is rotated in the direction of the arrow, it manifestly will rotate the gear 14 partially around until its tooth escapes from the internal gear, due to the sheave rocking on its supporting-stud 30, when the driving-sheave can continue rotation without affecting the gear 14. If now force is applied to rotate the sheave in a direction opposite to the arrow, it will rock the sheave 20 on the stud 30 to the left to bring the gear 21 into engagement with the tooth on the gear 14 and cause the same to make a partial rotation in the opposite direction until the internal gear is carried away from the tooth, when the sheave can continue to rotate in that direction without affecting the gear.

In Figs. 1 and 2 I have shown two pulleys 40 and 41, and I have shown a chain or other equivalent device 50 over the pulleys 40 and 41 and around the driving-sheave, making a turn thereon to prevent slipping. The other end of the rope or chain 50 is provided with a weight 51. If now power is applied to the rope or chain 50 in the direction of the weight, it is evident that it will rotate the driving-sheave in the direction of the arrow, Fig. 3,

thereby rotating the gear 14 and moving the switch-shaft 6, breaking the circuit, and when the tooth of the gear 14 arrives at the proper position it will be disengaged from the internal gear 21 and the driving-sheave may continue its rotation without affecting the switch. If, however, the rope or chain 50 is moved in the opposite direction, it immediately pulls the driving-sheave over toward the pulley 40, rocking it on its stud 30 until the internal gear 21 engages the tooth of the gear 14, and this gear will be partially rotated until the tooth escapes from the internal gear 21, when the driving-sheave can be rotated without affecting the gear.

The tooth or teeth of the gear are so arranged as to clear the internal gear 21 about the time the knife-blades reach the terminals in one direction or the other of their movement.

In Fig. 6 I have illustrated a modification in which there is a mutilated gear 14 and an internal gear 21, but instead of being connected to a driving-sheave it is provided with an exterior gear 22, engaging a pinion 23, suitably supported on a stud or shaft 24 above and in line with the stud 30. It will be seen that this accomplishes the same purpose and operates in the same way as the driving-sheave and cord or chain—that is, as the pinion 23 is rotated in one direction or the other it first moves the gear 21, so as to overbalance on one side or the other of the stud 30 and carries the gear 14 around to a greater or less extent until its tooth clears the internal gear, when it can be rotated continuously in the same direction for any length of time without affecting the gear 14. As soon, however, as a reverse movement is imparted to the pinion 23 it immediately engages the mutilated gear 14 and gives it a partial rotation until there is a clearance on the other side between it and the internal gear, when the motion can continue without affecting it.

In Figs. 4 and 5 I have illustrated a somewhat crude apparatus, although a practical one, for accomplishing the same general result. In this case the switch is constructed substantially as in Figs. 1 and 2, and on the shaft 6 is a lever 60, having an eye 61, arranged at an inclination thereto, and through this eye passes a chain 50, connected to a weight or other moving object, and there is more or less friction between the chain and eye of the lever, so that as the chain is moved in one direction it first moves the lever to operate the switch, and then the chain can pass on farther, sliding through the eye of the lever, and when the movement of the chain is reversed the switch is immediately moved to the opposite position and the chain then passes on freely, as before. While this apparatus will accomplish the movement of the switch at the beginning of the movement of the chain in either direction, it is objectionable in practice, owing to the amount of friction and wear,

and I therefore prefer one of the constructions shown in the other figures.

From the above it will be seen that my invention is capable of being embodied in various modifications, and it is adapted for use for many and various purposes. One especially useful purpose is operating the switch in connection with an electric elevator, the switch being automatically closed in advance of the breaking of the supply-circuit, so as to include a resistance in the circuit and thereby apply a braking force tending to stop the motor and aiding in the ordinary operations of stopping the car.

Of course the switch may be a single-contact switch and the current may be made and broken, or it may be a double-contact switch where the current is broken in one and made in the other, according to the purposes for which it is applied.

What I claim is—

1. The combination with a switch and traveling means for operating it, of connections between the switch and traveling operating means constructed and arranged so that on moving the traveling operating means in one direction the connections will initially operate the switch and then permit the continuous movement of the traveling operating means without affecting the movement of the switch, but will initially operate the switch on a reversal of the movement of the traveling operating means, substantially as described.

2. The combination with a switch and shaft for operating it, of a mutilated gear connected to the shaft, an internal gear, arranged to engage the mutilated gear and a support for said internal gear, substantially as described.

3. The combination with a switch and shaft for operating it, of a mutilated gear, an internal gear of larger diameter, and a support for said internal gear to normally hold it eccentrically to the mutilated gear, substantially as described.

4. The combination with a switch and shaft for operating it, of a gear connected to the shaft having a single tooth, a larger internal gear eccentrically arranged with relation to the first gear, a support therefor, and means for operating the internal gear, substantially as described.

5. The combination with a switch and shaft for operating it, of a mutilated gear secured thereto, a driving-sheave eccentrically supported with relation thereto and having an internal gear, pulleys arranged on either side of the driving-sheave, and a rope or chain passing over the pulleys and sheave, substantially as described.

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

JOHN D. IHLDER.

Witnesses:

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EDWARD A. FORSYTH.