No. 688,781. Patented Dec. 10, 1901.

# G. A. HASSEL.

## CUT-OUT FOR CRANES.

(Application filed July 27, 1901.)

(No Model.)

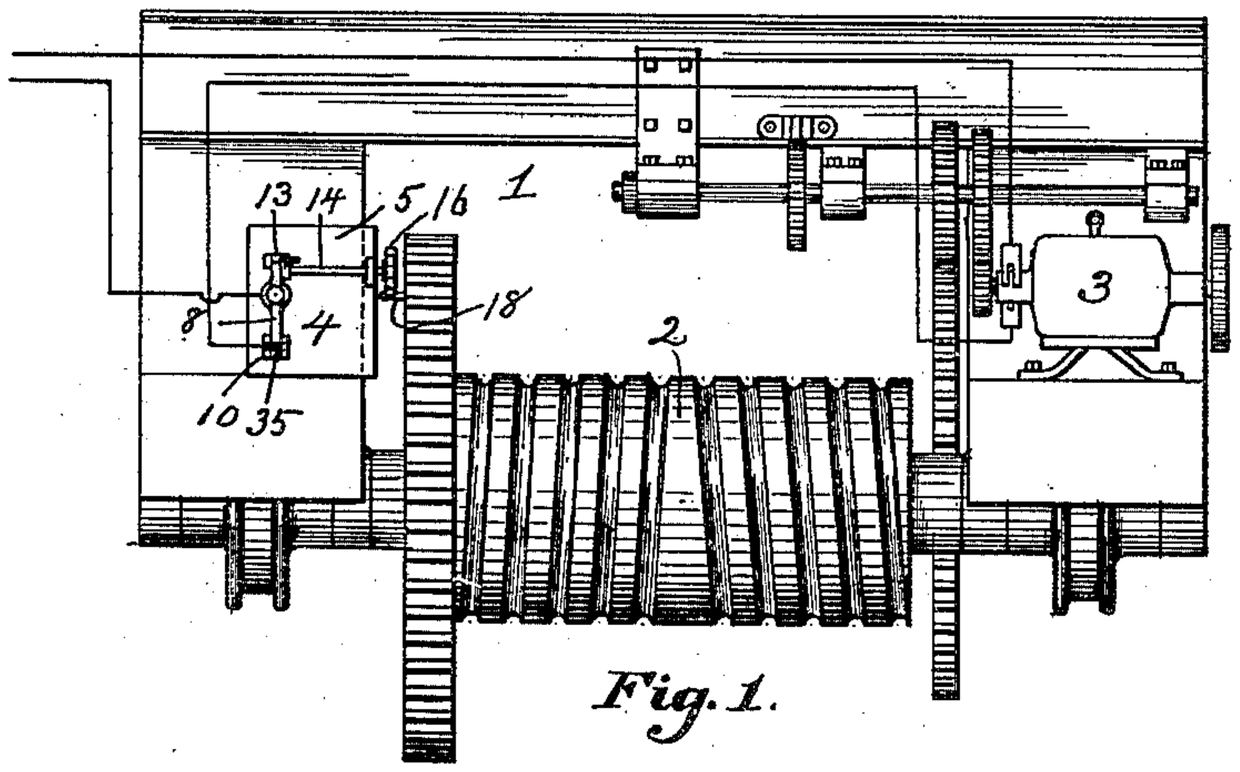



Fig. 1.

Fig. 2.

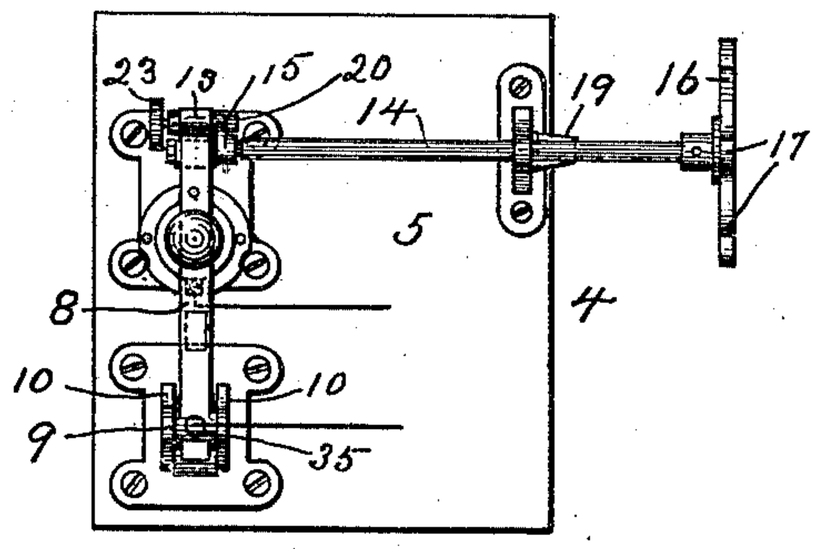



Fig. 3.

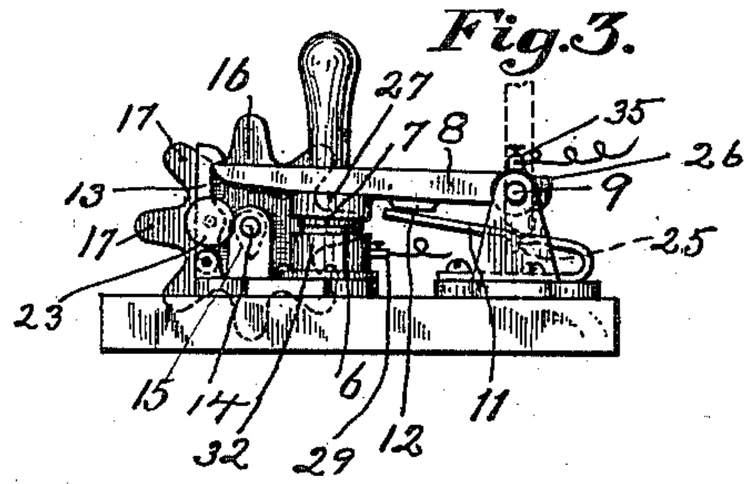



Fig. 4.

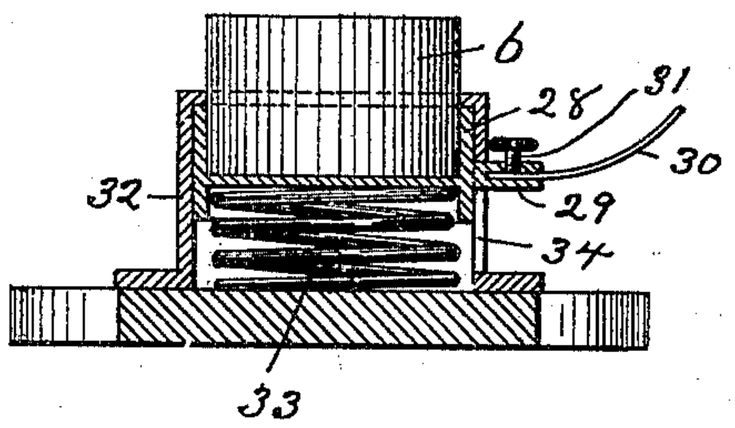
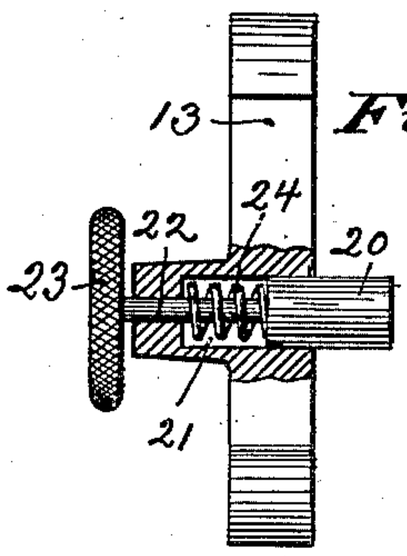



Fig. 5.

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# UNITED STATES PATENT OFFICE.

GUSTAV A. HASSEL, OF McKEESPORT, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO STEWART JOHNSTON, OF PITTSBURG, PENNSYLVANIA.

## CUT-OUT FOR CRANES.

SPECIFICATION forming part of Letters Patent No. 688,781, dated December 10, 1901.

Application filed July 27, 1901. Serial No. 69,908. (No model.)

*To all whom it may concern:*

Be it known that I, GUSTAV A. HASSEL, a resident of McKeesport, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Cut-Outs for Cranes; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to cut-outs for hoisting apparatus, and more especially to such apparatus wherein the hoisting-drum is driven by an electric motor.

The object of my invention is to provide a cut-out in the motor-circuit which is actuated from the hoisting-drum, so as to stop the motor and said drum after a predetermined number of revolutions of the latter and prevent damage to the apparatus which would result if the block or hook on the end of the hoisting chain or cable came in contact with some part of the apparatus by reason of the failure of the operator to stop the motor at the proper time.

To this end my invention consists in certain details in the construction of a cut-out provided with separable contacts and means controlled from the hoisting-drum for separating said contacts.

In the accompanying drawings, Figure 1 is a front elevation of so much of one form of hoisting apparatus as is necessary to disclose the application of my cut-out thereto. Fig. 2 is an elevation of the cut-out. Fig. 3 is a side view of the same. Fig. 4 is a sectional detail of the lower contact, and Fig. 5 a detail of the locking-latch.

In the drawings, 1 represents a portion of the frame of the hoisting apparatus—such, for instance, as the bridge or trolley of a crane, or it may be a portion of the frame of an elevator or any other hoisting apparatus. Suitably journaled on this frame is the hoisting-drum 2, which is driven from the electric motor 3 by means of any approved intermediate gearing. Also mounted on the frame 1 is the cut-out 4, which is in the motor-circuit and which is adapted to be actuated from the hoisting-drum 2, as will now be described.

The cut-out comprises a suitable base 5, of wood, slate, or any other suitable insulating material, which is secured to the frame 1, and upon which the operative parts of the cut-out are mounted. To this base is secured the stationary contact 6, while the movable contact 7 is mounted on a switch arm or blade 8, which is pivoted at 9 between brackets 10, suitably secured to the base 5. A bent plate-spring 11 is also secured between the brackets 10 and bears against a lug 12 on the blade 8, said spring tending normally to hold the contact 7 away from the contact 6. Suitably pivoted to the base 5 is a latch 13, which normally engages the outer end of the blade 8 and prevents the separation of the contacts by the spring 11. Also mounted in suitable brackets on the base-plate 5 is the tripping-shaft 14, which is provided with an arm or finger 15, which is adapted to contact with the latch 13 or a suitable projection or pin thereon and disengage the same from the blade 8, thereby permitting the spring 11 to separate the contacts 6 and 7. This tripping-shaft 14 is provided on its outer end with a suitably-insulated toothed wheel 16, the same being preferably formed of fiber or other suitable insulating material. This wheel is provided with teeth or projections 17 in number one more than the number of revolutions which are permitted to the drum 2 before the hook or block on the hoisting chain or cable will come in contact with any part of the hoisting apparatus. This wheel is adapted to be engaged by a suitable stud or projection 18 on the hoisting drum or gear, so that in the operation of the hoisting apparatus this projection 18 will move the said wheel forward the distance of one tooth at each revolution of the drum, so that after the predetermined number of revolutions of the drum 1 the shaft 14 will have been rotated to such position that the finger 15 thereof will come in contact with the latch 13 and disengage the latter from the switch-blade 8 and permit the spring 11 to open the said switch, as will be readily understood. The toothed wheel 16 is secured on the shaft 14 by any suitable means which will permit its ready removal and replacement by a similar wheel having either a greater or a less number of teeth, according to the number of revolutions which are to be permitted to the hoisting-drum. In case the hoisting-drum has a very

large number of revolutions, it will be advisable to interpose gearing between the drum and the part carrying the stud or projection 18, so that the latter will come in contact with the toothed wheel only after every second, third, or other multiple number of revolutions of said drum. Instead of using the toothed wheel 16 and stud 18 the shaft 14 may be geared directly to the hoisting-drum by such intermediate gearing as will give the shaft 14 the desired rotation by the predetermined number of revolutions of the drum.

To prevent the tripping-shaft 14 from revolving idly, it is provided with a suitable friction device, such as the spring 19 or other means which will tend to hold the said shaft in the position in which it is rotated until again positively moved by the stud or projection 18. Instead of forming the toothed wheel 16 of fiber or other insulating material it may be formed of metal and suitably insulated from the shaft 14, or, if it is preferred, the bearings of said shaft may be insulated from the other parts of the switch.

It will be observed that with the above apparatus the switch-blade will be thrown open by the spring 11 after a predetermined number of step-by-step rotary movements of the tripping-shaft 14, and it will be further observed that when thus opened the finger or projection 15 on the said shaft 14 will be in such position as to prevent the latch 13 from again being engaged with the blade 8 to close the switch, which closing is necessary in order to again start the motor. It will of course be understood that the tripping-shaft 14 must not be rotated by hand to permit the latch to clear the arm or finger 15; otherwise the switch will not operate at the proper time in the revolution of the drum 2. In order to permit the closing of the switch and the engagement of the latch 13 therewith, I form the portion of the latch with which the finger 15 engages so that it can be withdrawn to permit the latch to pass the finger or projection 15 and engage the switch-blade. This portion is preferably formed as a bolt 20, and it may be mounted in various ways so as to permit its withdrawal, the preferred manner, however, being that illustrated, in which the said latch is provided with a socket 21 therein, into which the bolt 20 can be withdrawn by means of the stem 22 and the insulated button or knob 23. A a suitable spiral spring 24 in the socket 21 is provided for holding said projection outward. After the switch has been automatically opened in the manner above described and it is desired to close the same the blade 8 is depressed with one hand, while the operator with the other hand grasps the insulated knob 23 and draws the bolt 20 into the socket 21 in the latch, thereby permitting said latch to pass the finger or projection 15 on the tripping-shaft 14.

When the switch has been automatically opened by means of the spring 11, it is essential that it should not again rebound and momentarily close the circuit to the motor, and to prevent this the spring 11 is formed with a saddle or depression 25, and the switch-blade 8 is provided with a heel 26, which when the blade flies open passes into the saddle or depression 25, so that the spring will hold the said blade in its open position, as indicated in dotted lines in Fig. 3.

The contacts 6 and 7 are formed of broad flat-faced carbon blocks, thereby providing a large contact-surface which offers little resistance to the passage of the current. The upper carbon block 7 is mounted in a cup 27, secured in any suitable way to the lower side of the switch-blade 8, and the lower carbon block 6 is suitably secured in a short sleeve or cup 28, which is provided with an extension 29, to which is suitably secured one of the circuit-wires 30, as by means of a binding-screw 31. The sleeve 28 is slidably mounted in the cup 32, suitably secured to the base 5, and the said sleeve 28, together with the carbon block 6, is held normally elevated by means of the spiral spring 33, interposed between the bottom of the sleeve 28 and the base 5. The projection 29 on the sleeve 28 extends through a slot 34 in the cup 32, as shown. By this construction the current as it passes to the carbon 6 does not pass through the spiral spring 33, so that the latter cannot become heated by the current and its resiliency destroyed thereby. The other circuit-terminal is shown as an ordinary binding-post 35, secured directly to the switch-blade 8, so that the current in passing from the switch does not pass through the pivotal joint 9 of the switch with the brackets 10. This is desirable for the reason that a good contact cannot always be maintained between the switch and the brackets in which it is pivoted. This construction, furthermore, prevents any part of the current from passing through the leaf-spring 11, so that the latter is not heated by the current and its resiliency cannot be destroyed thereby.

The operation of the switch as a whole will be readily gathered from the foregoing description. The current coming to the motor 3 enters through the circuit-wire 30, through the carbon blocks 6 and 7, thence through the switch-blade 8 to the binding-post 35, and thence to the motor, thereby driving the latter and through suitable gearing rotating the winding-drum 2. A wheel 16, with the requisite number of teeth for the particular hoisting apparatus, has been placed on the tripping-shaft 14, so that during the operation of the hoisting apparatus the said shaft is given a step-by-step rotary movement, this movement being given to it irrespective of the direction in which the drum is rotated, the direction of rotation of the tripping-shaft, however, depending upon the direction of the rotation of the drum. After the latter has been rotated in either direction as far as is safe the finger 15 on the tripping-shaft will engage the bolt or projection 20 on the latch 13, there-

by releasing the blade 8 and permitting the spring 11 to separate the contacts. When it is again desired to start the motor, the blade 8 will be depressed and the latch 13 engaged therewith, the bolt or projection 20 having been first withdrawn into the socket in said latch, so as to clear the finger or projection 15.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a cut-out, the combination with the stationary contact, of circuit connections thereto, a movable contact, a pivoted switch-blade on which said movable contact is mounted, circuit connections mounted directly on said blade, a latch for engaging said switch-blade, and an intermittently-actuated tripping-shaft for releasing said latch.

2. In a cut-out, the combination of separable contacts comprising carbon blocks having broad, flat contacting faces, means for yieldingly holding the same together, a lock for said holding means, and an intermittently-actuated tripping-shaft for releasing said lock.

3. In a cut-out, the combination with a stationary contact, of circuit connections thereto, a movable contact, a pivoted switch-blade on which said movable contact is mounted, circuit connections mounted directly on said blade, a base to which said blade is pivoted, a spring mounted on the base and bearing directly on said blade for opening the same, a lock for said blade, and an intermittently-actuated tripping-shaft for releasing said lock.

4. In a cut-out, the combination with a stationary contact, of a cup in which the same is mounted, circuit connections directly to said cup, a spring bearing against the cup for yieldingly holding said contact against the movable contact, a movable contact, a pivoted switch-blade on which the same is mounted, circuit connections mounted directly on said blade, a lock for said blade, and an intermittently-actuated tripping-shaft for releasing said lock.

5. In a cut-out, the combination of separable contacts comprising carbon blocks having broad, flat contacting surfaces, a cup provided with a slot, a sleeve slidably mounted in said cup and bearing one of the carbon blocks, a spring for pressing said sleeve and block upward, and circuit connections on said sleeve projecting through the slot in the cup.

In testimony whereof I, the said GUSTAV A. HASSEL, have hereunto set my hand.

GUSTAV A. HASSEL.

Witnesses:

F. W. WINTER,

ROBERT C. TOTTEN.