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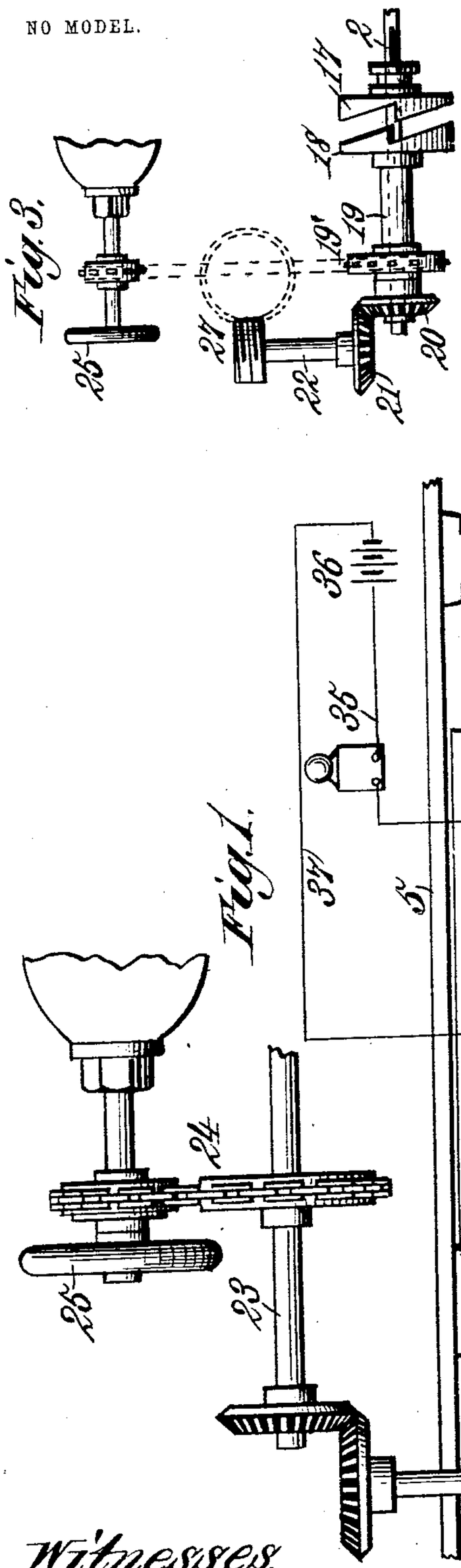
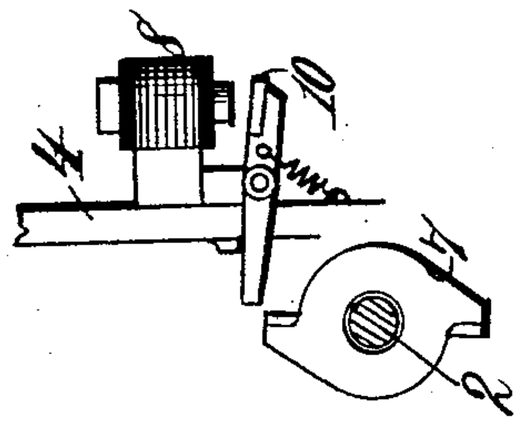
B. G. BARLOW.

ELECTRICALLY CONTROLLED MOTOR STOPPING APPARATUS.

APPLICATION FILED JUNE 16, 1903.

NO MODEL.





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No. 745,763. Patented December 1, 1903.

UNITED STATES PATENT OFFICE.

BERTUS G. BARLOW, OF MANCHESTER, NEW HAMPSHIRE.

ELECTRICALLY-CONTROLLED MOTOR-STOPPING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 745,763, dated December 1, 1903.

Application filed June 16, 1903. Serial No. 161,716. (No model.)

To all whom it may concern:

Be it known that I, BERTUS G. BARLOW, a citizen of the United States, residing at Manchester, in the county of Hillsboro and State of New Hampshire, have invented new and useful Improvements in Electrically-Controlled Motor-Stopping Apparatus, of which the following is a specification.

This invention relates to an electrically-controlled motor-stopping apparatus; and the object of the invention is to provide a simple, durable, and reliable apparatus of this character.

I do not limit myself to any particular use of the apparatus, but in practice have found it highly effective for causing the operation of the throttle-valve of a steam-engine, in which connection it will be described in detail in the following description.

Said apparatus in one simple embodiment thereof is clearly illustrated in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a diagrammatic elevation of an apparatus including my invention. Fig. 2 is a detail view of an electromagnet forming a part of the apparatus illustrated in said Fig. 1. Fig. 3 is a diagrammatic elevation of a slight modification.

Like reference characters refer to like parts in the different views.

The primary purpose of the adaptation of the apparatus illustrated in the accompanying drawings is to enable an engineer to stop an engine at a point distant from the engine-room. Said apparatus involves in its organization a shaft 2, which is represented as carrying at one end the power-driven member 3, consisting of a pulley and adapted to be belted up to an engine (not shown) in connection with which the apparatus operates. The shaft is supported by suitable bearings at the lower ends of hangers 4, depending from the plate or body 5, which is adapted to be attached to a suitable support in adjacence to the engine.

Upon the shaft 2, in proximity to the driven member 3, are the coöperating sleeves 6 and 7, the sleeve 6 being splined to said shaft for sliding movement thereon. It will be understood that the shaft is continuously driven from the engine while the same is in motion, and the reason for this will hereinafter appear. The sleeve 6, of course, is non-rotative upon the shaft, but it is free to slide thereon, while the sleeve 7 is rotative on said shaft. The sleeves have at their adjacent ends cam-faces of comparatively steep pitch, which are normally in contact, so that as the shaft rotates and carries the sleeve 6 therewith said sleeve 6 will normally rotate the companion sleeve 7. The rotation of the sleeve 7, as will hereinafter appear, is interrupted through the agency of electrically-governed means, and when an interruption occurs the cam-face of said sleeve by acting on the similar cam-face of the sliding sleeve 6 thrusts the latter to what is illustrated in Fig. 1 as the left, so as to operate mechanism for closing the throttle-valve.

An electromagnet 8 is mounted upon a bracket carried by that hanger 4 nearest the sleeve 7, the bracket being in proximity to said sleeve. The armature for the magnet is denoted by 10, it being of the lever type and pivoted at one end. When the magnet is energized, as will hereinafter appear, it attracts its armature so as to move the free end of the same into the path of one of the teeth or projections 11, extending outward from the sleeve 7. A wire 12 extends from one pole of the magnet to one pole of the battery 13, the wire 14 extending from the other pole of said battery to one terminal of a push-button 15 or other circuit-controller. The wire 16 extends from the other terminal of the push-button to the pole of the magnet opposite that to which the wire 12 is connected. When by the manipulation of the push-button the two contacts are moved into engagement, the circuit comprising the parts just described will be closed to energize the magnet 8. When the magnet is energized, it attracts its armature, thereby moving the latter into the path of the teeth 11, and consequently stopping the rotation of the sleeve 7. When the movement of the sleeve is arrested, said sleeve causes the sleeve 6 to be thrust in the direction hereinbefore indicated.

I have only described one push-button 15. Of course there may be a number of these located at different points in the building or at any other places that may be desired.

One member 17 of a clutch is splined to the

shaft 2 at a point remote from the sleeves 6 and 7. The complemental clutch member 18 is normally out of engagement with the clutch member 17 and is united to the sleeve 19, through which the shaft projects, said sleeve carrying at its outer end the bevel-gear 20, meshing with a similar bevel-gear 21, carried at the lower end of a suitably-supported vertical shaft 22, connected at its upper end by smaller bevel-gears with the horizontal shaft 23. The shaft 23 is connected by a sprocket-gearing (denoted in a general way by 24) with the stem of the throttle-valve, which stem carries a hand-wheel 25.

The shaft 2 is surrounded by the coiled spring 26, bearing at its opposite ends against the sleeve 6 and the hub of the clutch member 17.

The shaft 22 is connected by worm-gearing (denoted in a general way by 27,) with the shaft 28, to which is fastened a pinion 29, meshing with the teeth of the rack 30.

During the normal operation of the engine the shaft 2, as hereinbefore stated, is continuously operated by reason of its connection with said engine, the sleeve 6 and the clutch member 17 being rotated with said shaft and the sleeve 6 rotating the sleeve 7. The clutch member 18, of course, during such normal operation is at rest, and the same applies to the gear 20 and the parts which derive their motion therefrom. Upon the closing of the circuit, hereinbefore described, by the push-button 15 the magnet 8 will be energized, thereby attracting its armature 10 and moving the same into the path of the teeth 11, so that one of said teeth will strike the armature to arrest the rotation of the sleeve 7. When this takes place, the said sleeve being stationary serves to thrust the sleeve 6 toward the left, thereby yieldingly, through the spring 26, moving the clutch member 17 into engagement with the clutch member 18 to couple the latter to the shaft 2. When the clutch member 18 is coupled to the shaft, the gear 20 is caused to rotate, thereby rotating through the gear 21 the vertical shaft 22 and applying a like motion to the shaft 23 and sprocket-gearing 24 through the intermediate connections. Upon the motion of the sprocket-gearing the stem of the throttle-valve is rotated in a direction to close said valve.

The lever 31 is pivoted to an arm upon the hanger 4, which directly supports the sleeve 19, the lower end of the lever being bifurcated and the branches of the bifurcation having pins playing in a peripheral groove in the hub of the clutch member 17. When the clutch member 17 is disconnected from its companion, the lever 31 will occupy an angular position, as illustrated in Fig. 1. When, however, the sleeve 6 is slid along the shaft by the sleeve 7 in the manner hereinbefore described to transfer through the spring 26 a corresponding movement to the clutch member 17, said clutch member shifts the lever to an approximately vertical position, so that its upper or free end can be engaged by a tappet 32 upon the extreme right end of the rack 30 when said rack reaches the end of its advancing stroke. As the shaft 22 is rotated in the manner hereinbefore described the rack 32 is, through the intermediate connections with said shaft, moved toward the left in said Fig. 1, so as to carry the tappet toward the upper end of the lever 31. The advancing stroke of the rack, or that toward the left, is nearly concluded at about the time the throttle-valve is fully closed, the lever 31 in the meantime having been moved to a vertical position, so that on the slight further advancing movement of said rack the tappet will strike the lever and return the same to its initial position, thereby throwing the clutch member 17 out of engagement with the clutch member 18, and consequently stopping the shaft 22 and parts driven therefrom. As the throttle-valve was being closed the hand-wheel, of course, was rotated. To open the throttle-valve, the hand-wheel will be utilized, and as it is operated manually the sprocket-gearing 24 is operated in a direction opposite to that imparted under the action of the shaft 2 through the intermediate gearing, so that the rack-bar 30 through the intermediate connections is returned to its initial position.

I provide in connection with the apparatus means for operating a signal upon the closing of the circuit hereinbefore described, so that in case a person other than the engineer should close such circuit the engineer will be apprised of the fact by the signal. Such signal of course may be of any kind. In the present instance it is a bell.

The lever 31 constitutes part of the signal-circuit, and for this purpose it is made of some suitable conducting material. A wire 33 extends from the pivot of said lever to one contact of a bell 34, a wire 35 extending from the other contact of the bell to the battery 36, while a wire 37 extends from the other bell of the battery and terminates in spring-contacts 38, adapted to be engaged by the upper end of the lever 39 when the same is shifted to its approximately vertical position. Normally the upper end of the lever is out of engagement with the spring-contacts 38, so that the signal-circuit is open. When, however, the lever 31 is shifted to its vertical position, the upper end thereof will strike the spring-contacts 38 and close the bell-circuit, so as to sound the bell, which of course will ring until the lever is moved off the contacts 38 by the tappet 32. If for any reason the button 15 is pressed after the clutch-halves 17 and 18 are out of engagement and the valve closed, the spring 26 on the shaft 2 will permit the sleeve 6 to be operated without causing damage to any of the parts.

The invention of course is not limited to the construction hereinbefore described in

detail, for many variations may be adopted within the scope of my claims—for example, it is not essential that the rotation of the sleeve 7 be intermittently stopped by electrically-controlled means. In like manner other changes may be made which it is needless to specify, as they are obvious.

In Fig. 3 I have shown one slight modification. In this construction the collar 19, hereinbefore described, is connected directly to the stem of the throttle-valve, sprocket-gearing (denoted in a general way by 19') being illustrated for such purpose. With this exception the modified arrangement is the same as that represented in detail by Figs. 1 and 2.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An apparatus of the class described including a power-driven shaft, primary and secondary sleeves on said shaft, the secondary sleeve being splined to said shaft for sliding movement thereon, and the primary sleeve being normally rotative by the secondary sleeve and adapted, when arrested in its rotation, to slide the secondary sleeve along the shaft, a clutch, one member of which is splined to said shaft for sliding movement, a third sleeve on the shaft carrying the other clutch member, and yieldable means in position to transfer the thrust of the sliding secondary sleeve to the sliding clutch member for coupling the latter to its companion.

2. An apparatus of the class described including a power-driven shaft, primary and secondary sleeves on said shaft, the secondary sleeve being splined to said shaft for sliding movement thereon, and the primary sleeve being normally rotative by the secondary sleeve and adapted, when arrested in its rotation, to slide the secondary sleeve along the shaft, a clutch, one member of which is splined to said shaft for sliding movement, a third sleeve on the shaft carrying the other clutch member, and a coiled spring surrounding the shaft and bearing against the slidable sleeve and slidable clutch member for transferring the thrust of the former to the latter to couple said clutch member to its mate.

3. An apparatus of the class described including a power-driven shaft, primary and secondary sleeves on said shaft, the secondary sleeve being splined to said shaft for sliding movement thereon, and the primary sleeve being normally rotative by the secondary sleeve and adapted, when arrested in its rotation, to slide the secondary sleeve along the shaft, a clutch, one member of which is splined to said shaft for sliding movement, a third sleeve on the shaft carrying the other clutch member, yieldable means in position to transfer the thrust of the sliding secondary sleeve to the sliding clutch member for coupling the latter to its companion, a signal, and means for causing the operation of said signal when the clutch members are coupled.

4. An apparatus of the class described including a power-driven shaft, primary and secondary sleeves on said shaft, the secondary sleeve being splined to said shaft for sliding movement thereon, and the primary sleeve being normally rotative by the secondary sleeve and adapted, when arrested in its rotation, to slide the secondary sleeve along said shaft, means for arresting the motion of the primary sleeve whereby it can operate the secondary sleeve, a clutch, one member of which is splined to said shaft for sliding movement thereon, mechanism operatively connected with the other clutch member for actuating a valve or the like, a lever connected with the sliding clutch member, and an electric circuit containing a signal, said lever constituting a circuit-closer and serving to close said circuit when the members of the clutch are coupled.

5. An apparatus of the class described, including a power-driven shaft, primary and secondary sleeves on said shaft, the secondary sleeve being splined to said shaft for sliding movement thereon, and the primary sleeve being normally rotative by the secondary sleeve and adapted, when arrested in its rotation, to slide the secondary sleeve along said shaft, means for arresting the motion of the primary sleeve whereby it can operate the secondary sleeve, a clutch, one member of which is splined to said shaft for sliding movement thereon, a third sleeve on said shaft, carrying the other member of the clutch, the sliding member of the clutch being movable into engagement with its companion by the said sliding sleeve, a second shaft operatively connected with the other shaft and adapted to be connected with a valve or the like, for actuating the same, a lever connected with the slidable clutch member, and a device operable by said second shaft and provided with a tappet for engaging said lever to move the same in a direction to return the slidable clutch member to its normal position.

6. An apparatus of the class described including a power-driven shaft, primary and secondary sleeves on said shaft, the secondary sleeve being splined to said shaft for sliding movement thereon, and the primary sleeve being normally rotative by the secondary sleeve and adapted, when arrested in its rotation, to slide the secondary sleeve along said shaft, means for arresting the motion of the primary sleeve whereby it can operate the secondary sleeve, a clutch, one member of which is splined to said shaft for sliding movement thereon, a third sleeve on said shaft, carrying the other member of the clutch, the sliding member of the clutch being movable into engagement with its companion by the said sliding sleeve, a second shaft operatively connected with the other shaft and adapted to be connected with a valve or the like, for actuating the same, a lever connected with the slidable clutch member, a device operable

by said second shaft and provided with a tappet for engaging said lever to move the same in a direction to return the slidable clutch member to its normal position, and an electric circuit having a signal, said lever constituting a circuit-controller for said circuit.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

BERTUS G. BARLOW.

Witnesses:
ROBERT L. MANNING,
V. ELMER PRINCE.