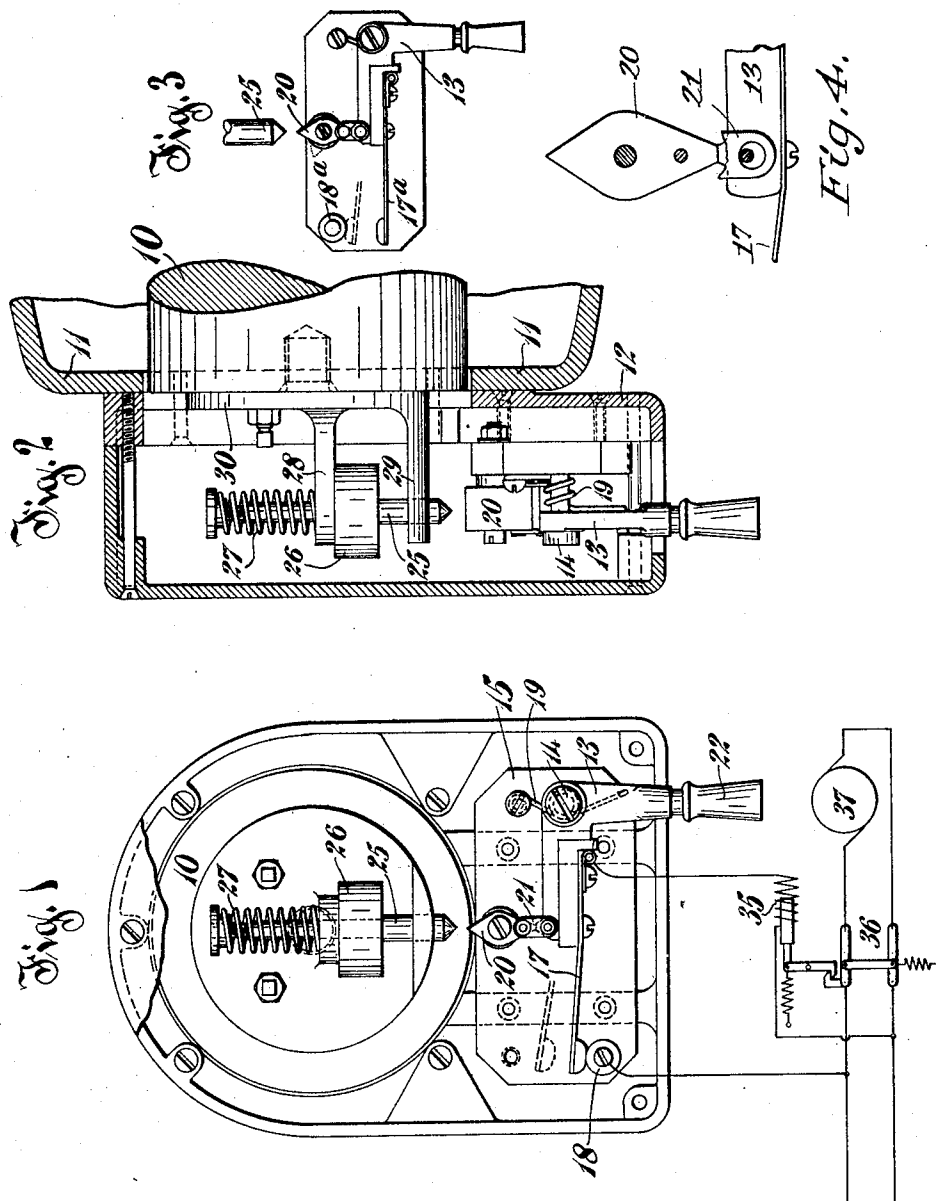


H. F. ELSHOFF.
SPEED LIMITING DEVICE.
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1,002,831.

Patented Sept. 12, 1911.



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UNITED STATES PATENT OFFICE.

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SPEED-LIMITING DEVICE.

1,002,831.

Specification of Letters Patent.

Patented Sept. 12, 1911.

Application filed April 20, 1908. Serial No. 428,192.

To all whom it may concern:

Be it known that I, HENRY F. ELSHOFF, a citizen of the United States, residing at Norwood, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Speed-Limiting Devices, of which the following is a full, clear, and exact specification.

My invention relates to speed limiting devices as applied to rotating parts of machines, and particularly as applied to dynamo-electric machines.

My present invention is an improvement on that set forth in the co-pending application of William D. Pomeroy and Anthony L. McHugh, filed March 9, 1905, Serial No. 249,185, and has for its main object to provide a speed limiting device which, having been tripped, can be positively and completely re-set.

The novel features of my invention will appear from the description and drawings and will be particularly pointed out in the claims.

Figure 1 represents an end view of a rotary member, such as a shaft of a dynamo-electric machine, equipped with my improved speed limiting device; Fig. 2 is a partial side elevation of such rotary member, with the casing of the speed limiting device in section; Fig. 3 shows a slightly modified form of the invention; and Fig. 4 is an enlarged view of the resetting mechanism, with some parts broken away.

Referring first to Figs. 1 and 2, the shaft 10 is arranged to rotate in a bearing of any desired form, the housing of the bearing being indicated at 11. The casing 12 of the centrifugally operated switch of my speed limiting device is fastened in any desired manner to the housing 11, while the operating means for said switch is fastened to the end of the shaft 10 and extends into said casing. The switch proper consists of the bell-crank lever 13 pivoted at 14 on a plate of insulation 15 fastened within the casing 12, and the bell-crank lever 13 carries the spring contact 17 arranged to engage the fixed contact 18 when the switch is set or in its normal position. A spring 19 tends to open the switch, but is normally prevented from doing so by a pivoted latch or dog 20, the lower end of which normally engages a boss on the horizontal arm of the bell-crank lever

13. The lower part of the dog 20 and the horizontal arm of the bell-crank lever are connected by a link 21, by means of which the switch, once having been tripped, can be positively and completely re-set by a movement of the handle 22 to the right (Fig. 1). This link is pivoted to the dog and the bell-crank lever loosely enough so that there is a very little lost motion. In Fig. 4 this lost motion is shown much exaggerated. The link 21 and the lower part of the dog 20 form a toggle joint.

The centrifugal operating means for the switch comprises a spindle 25 carrying a weight 26 and movable outward relatively to the axis of rotation of the shaft 10 against the action of the adjustable spring 27. The spindle moves in guides 28 and 29, extending from the plate 30 attached to the end of the shaft 10. These guides serve also to support the spindle 25 and weight 26 and to limit their movement. When the shaft 10 rotates at a speed which exceeds a predetermined maximum, this maximum being adjustable by means of the spring 27, the spindle moves outward relatively to the axis of the shaft 10, and, striking the upper end of the dog or latch 20, moves the latter so that its lower end is disengaged from the boss on the bell-crank lever 13. The spring 19 at once moves the bell-crank lever in a clockwise direction and disengages the contacts 17 and 18, thus breaking the circuit of the solenoid 35, which, being de-energized, allows the switch or circuit-breaker 36 to open and interrupt the supply of energy to or from the dynamo-electric machine or other device 37 to be protected. On account of the link 21, this movement of the bell-crank lever causes the upper end of the dog 20 to be moved positively out of the path of the spindle 25. This tripping operation is the same for either direction of rotation of the shaft 10. Once having been tripped, the speed limiting device may be re-set by moving the handle 22 to the right, thus causing the contact 17 again to engage the stationary contact 18 to energize the solenoid 35. On account of the toggle action of the link 21 and the dog 20, this movement of the handle 22 to the right also positively moves the dog 20 so that its lower end is brought directly over the boss on the bell-crank lever 13 and its upper end is brought

into position to cooperate with the spindle 25 when the speed of the shaft 10 next exceeds the predetermined maximum for which the device is set. In the movements 5 of the dog the lower end thereof clears the boss on the bell-crank lever because of the slight lost motion in the link 21. When the operator releases his pressure on the handle 22 the boss engages the lower end of the dog, 10 and the switch arm is thus prevented from moving to the position to which it is biased.

Instead of having the circuit-breaker 36 arranged so that it is tripped upon the disengagement of the contacts 17 and 18 and 15 the deenergization of the solenoid 35, it may be arranged to trip upon the engagement of such contacts and the energization of the solenoid. In such case, the stationary contact 20 shown at 18^a in Fig. 3, and the spring contact 17^a would be arranged in a position just the reverse of that shown in Fig. 1. Otherwise the arrangements would be precisely similar.

25 Many modifications may be made in the precise arrangements here shown and described, and all such which do not involve a departure from the spirit and scope of my invention I aim to cover in the following 30 claims.

What I claim as new is:—

1. In combination, a rotatable shaft, a switch in proximity thereto and controlling the supply of energy to the moving means 35 for said shaft, said switch being biased to one position, a latch which in one position engages an arm of said switch to hold the switch in the other position, a centrifugal device connected to said shaft and arranged 40 to move said latch out of such position to trip said switch upon a predetermined speed of the shaft, a handle for re-setting said switch, and a link pivoted to both the switch

arm and the latch and with the latter forming a toggle. 45

2. In combination, a rotatable shaft, a switch biased to one position and controlling the supply of energy to the means for moving said shaft, a dog which engages the switch and holds it in the other position, a 50 centrifugal device mounted on said shaft and arranged to trip said dog at a predetermined speed of said shaft, and a link joining said switch and said dog.

3. In combination, a switch biased to one 55 position, a dog which in one position engages the switch and holds it out of the position to which it is biased, means for moving said dog out of said holding position upon predetermined conditions, means for moving 60 said switch to the position in which it is held by the dog, and a link joining the switch and the dog so that the last named movement of the switch moves the dog into holding position. 65

4. In combination, a rotatable member, a switch mounted adjacent to said member and biased to one operative position, a dog which in its middle position engages said switch to hold it in another operative position, a centrifugal device mounted on said 70 rotatable member and arranged to move said dog out of its middle position when the speed of said rotatable member exceeds a predetermined value in either direction, and 75 a link connecting said dog and said switch whereby moving the switch to the second operative position referred to positively moves the dog to its middle position.

In testimony whereof I affix my signature, 80 in the presence of two witnesses.

HENRY F. ELSHOFF.

Witnesses:

GEO. B. SCHLEY,
FRED J. KINSEY.