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J. SHOECRAFT.

AUTOMATIC GEARING DEVICE.

APPLICATION FILED NOV. 9, 1905.

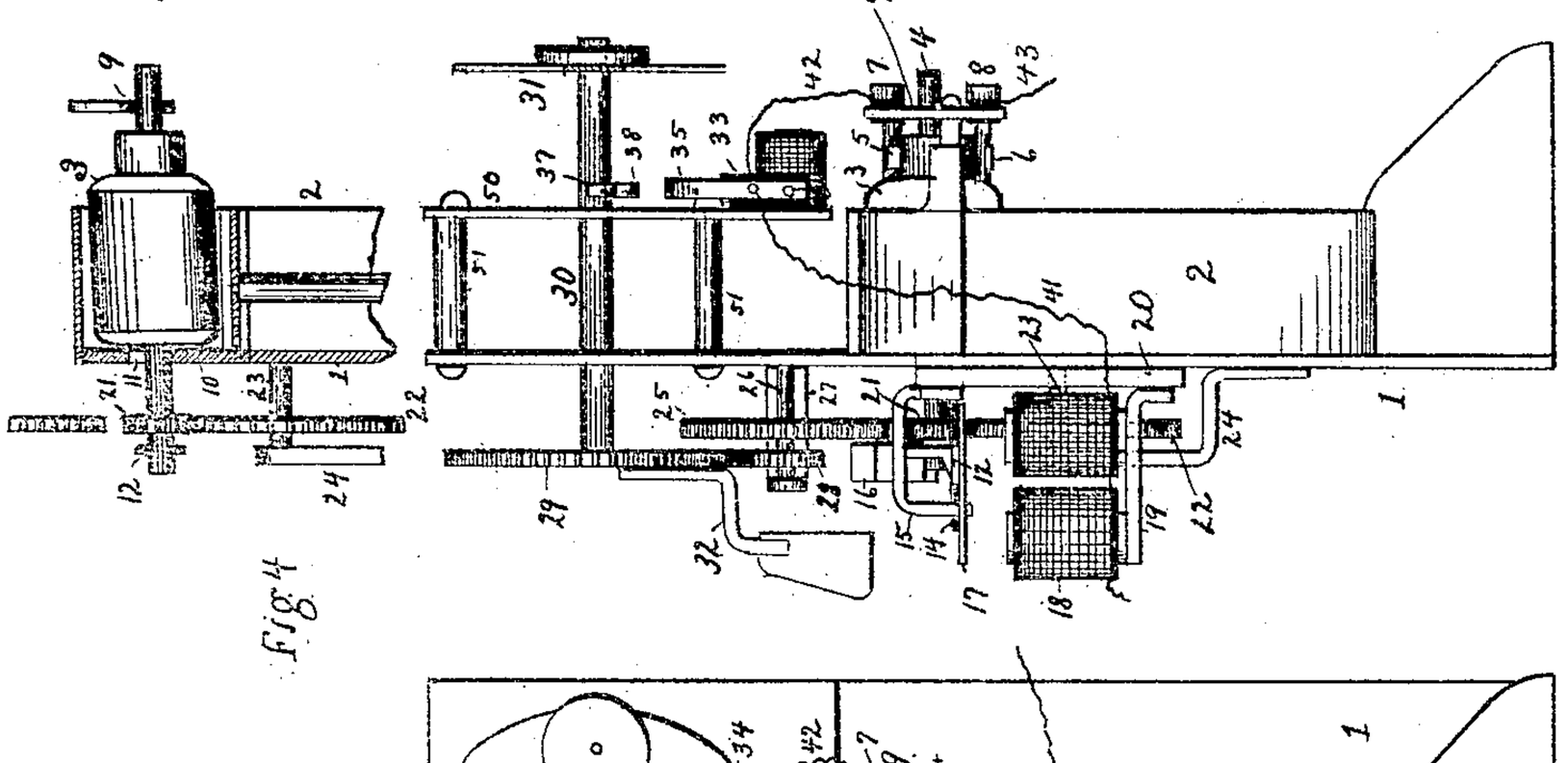

Fig. 3

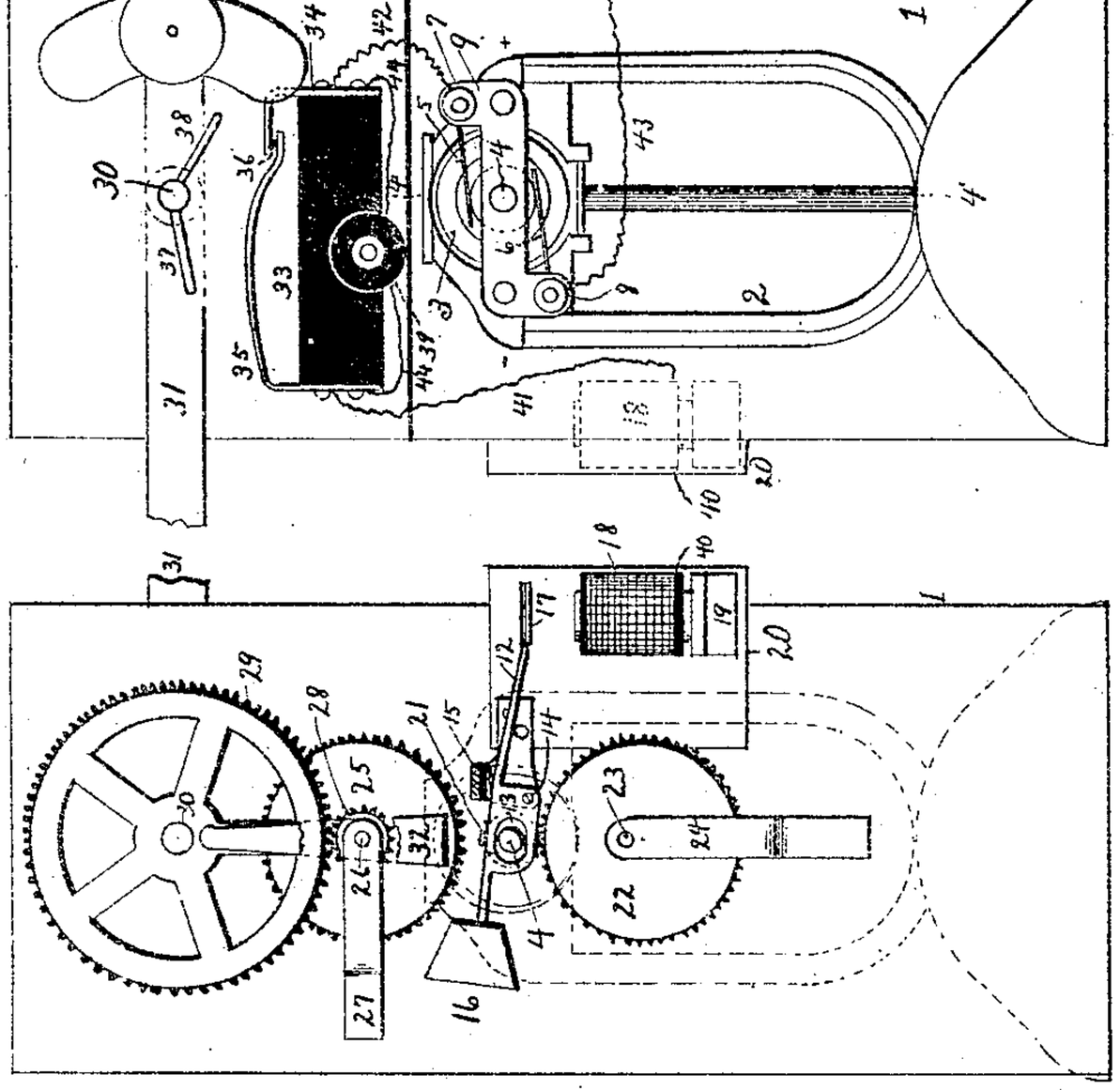

Fig. 2

Fig. 1

Fig. 4

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UNITED STATES PATENT OFFICE.

JUDSON SHOECRAFT, OF ESKRIDGE, KANSAS.

AUTOMATIC GEARING DEVICE.

No. 816,259. Specification of Letters Patent. Patented March 27, 1906.

Application filed November 9, 1905. Serial No. 286,479.

To all whom it may concern:

Be it known that I, JUDSON SHOECRAFT, a citizen of the United States, residing at Eskridge, in the county of Wabaunsee and State of Kansas, have invented a new and useful Improvement in Automatic Gearing Devices, of which the following is a specification.

In Patent No. 795,864, granted to me August 1, 1905, for improvements in reversing mechanism I have shown a reversible motor adapted to actuate a signal device in two directions, the signal device being returned to normal position by the force of gravity. In the gearing therein shown, however, the signal device in returning to normal position also turns the armature of the motor, making, as it were, a dynamo out of the motor, whereby a heavier weight is required than if such weight merely returned the signal device without also operating the motor-armature, and such heavier weight also obviously requires a stronger current for its operation.

It is the object of the present invention to arrange the gears between the motor and the signal device so that said signal device may be automatically returned to normal position without operating the motor during such return, whereby much less current will be required in the operation of devices of this kind than heretofore, and although reference is made to the Patent No. 795,864 it is to be understood that such reference is made for the purpose of illustrating more clearly the present invention and that I do not confine its use to a conjunction with the mechanism described or claimed in that patent.

The invention consists of the parts, improvements, and combinations particularly pointed out and claimed herein.

In the drawings accompanying and forming part of this specification and in the description of the drawings I have illustrated the invention in its preferred form and have shown the best mode of applying the principles thereof; but it is to be understood that the invention itself is not confined to these drawings and the description of the drawings, that it may be applied to other uses, that parts and combinations thereof, as herein separately claimed, may be used in connection with other devices of a similar general nature, and that I contemplate changes in form, proportions, material, arrangement, transposition of parts, and the substitution of equivalent members without departing from the spirit of the invention.

In the drawings, Figure 1 is an elevation view from one side. Fig. 2 is a similar view of the opposite side. Fig. 3 is an end or edge elevation. Fig. 4 is a vertical section showing the bearings for the motor-armature, taken approximately through the line 4′ 4′ of Fig. 2. Fig. 5 shows the slot in the plate at one end of the armature, through which the shaft extends, which allows of a slight vertical motion.

Like reference-numerals indicate like or corresponding parts throughout the several views.

1 is a standard, and 2 is the permanent field of the reversible motor, and 3 is the rotating armature on shaft 4. 5 6 are the commutator-brushes, and 7 8 the brush-holders, respectively. One end of the armature-shaft has its bearing in the plate 9. The other end extends through the vertical slot 11 of plate 10 and has its bearing in the slot 13 of lever 12, which is pivoted to spindle 14 in bracket 15. One end of the lever is provided with a weight 16 and the other with an armature-bar 17. This bar is normally out of the field of the electromagnet 18, mounted on bracket 19, secured to plate 20, but is adapted to be brought within such field and to be held by the magnet whenever the weighted end of the lever 12 is raised and the armature-bar lowered, as will be hereinafter explained. Secured to the same end of the armature-shaft 4 is a pinion 21, which normally meshes with a gear 22, which is mounted eccentrically on shaft 23, extending between plate 1 and bracket 24. Normally, too, said pinion is out of gear with the gear 25 on shaft 26, extending between plate 1 and bracket 27, and carrying also a pinion 28, meshing with the large gear 29 on shaft 30, which also carries the signal device, here shown as a semaphore-blade 31. The weight 32 is secured to the large gear 29 to hold it and the signal device in normal position, here shown as "danger."

To a plate or standard 50, secured to standard 1 by stay-rods 51 51 or any suitable means, is a block 33 of insulation, to the opposite ends of which are secured the contact-springs 34 and 35, respectively, making and breaking contact at 36. Normally the contact is closed at 36; but it will be broken whenever the signal-blade 31 is either raised or lowered,

thereby bringing rods 38 or 37 respectively into engagement with spring 35.

39 is a resistance-coil.

The circuit through the apparatus may be traced as follows: through wire 40, magnet 18, wire 41, spring 35, contact 36, spring 34, wire 42, holder 7, brush 5, armature 3, brush 6, holder 8, wire 43, to line. This is a normally open circuit, whereby the signal is normally at "danger." When the flow is in one direction, the apparatus will set the signal at "clear"; when in the other direction, it will be set at "caution."

Supposing the circuit to be closed through the apparatus, the operation may be explained as follows: As the pinion 21 is rotated with the armature and armature-shaft it is raised by reason of the cam-like action of the eccentric gear 22, and with it is raised the weighted end of the lever 12, while the armature end 17 is depressed toward the magnet 18. The pinion, together with these other parts, is elevated until at about the point of the longest radius of the eccentric the pinion 21 is brought into complete engagement with the gear 25 and the armature-bar 17 is brought within the magnetic field of the magnet 18. Thereupon, through gears 25, 28, and 29, the signal device will be raised or lowered, according to the direction of the flow of current through the armature. The further rotation of the pinion 21 will release the eccentric 22, which will fall to its normal position with the longest radius down, the short radius up, so as to be out of engagement with the pinion 21, and said pinion 21 will be held in complete engagement with gear 25 by reason of the action of magnet 18 on armature-bar 17. When the signal-blade has been driven to its extreme position, either up or down, the circuit will be broken at 36 by reason of either 37 or 38 engaging with spring 35, and the circuit will be shunted through the shunt-circuit 44 and resistance or "choke" coil 39. This cuts off the current enough to stop the motor, but allows enough current to pass to hold the motor and the signal-blade in the position to which it has been driven and also to hold down the armature-bar 17. When the signal-gears are driven, it is of course to be seen that they work against the weight of the weight 32. Now when the circuit is broken again the armature-bar 17 is immediately released, which permits the other end of the lever 12 to drop to normal position (with pinion 21 in engagement with eccentric 22 and out of gear with gear 25) and at the same time the weight 32 is permitted to restore the signal-blade to normal position, and this restoring is accomplished without, as heretofore, rotating the armature of the motor.

Obviously the intermediate gears 25 and 28 may be dispensed with if it be not desired to gear up the mechanism to such an extent, in which case the larger gear would be substituted for 25. Obviously, too, the eccentric 22 may be without teeth, as an eccentrically-mounted friction-wheel, or any suitable cam-like action substituted therefor.

What I claim is—

1. The combination of a motor-shaft normally out of engagement with the mechanism to be driven, a cam-like device normally engaging the shaft and adapted on rotation of the shaft to bring same into engagement with the work, a lever connecting the shaft and an armature-bar, and an electromagnet in circuit with the motor for holding the shaft in engagement with the work.

2. The combination of an electric motor, mechanism adapted to be driven by the rotary member thereof but normally out of engagement therewith, a cam-like device to bring the rotary member into engagement with the work upon the rotation of said member, and an electromagnet adapted normally not to actuate said member but also adapted to hold it in engagement with the work after having been brought there by said cam-like device.

3. The combination of a motor, mechanism adapted to be driven by the rotary member thereof but normally out of engagement therewith, an eccentric normally engaging said rotary member and adapted on rotation thereof to bring said rotary member into engagement with the driven mechanism aforesaid, and an electromagnet adapted to hold said rotary member in engagement with said driven mechanism.

4. The combination of a motor, a pinion on the armature-shaft, an eccentric normally engaging the pinion, gearing to be driven by the pinion but normally out of engagement therewith, rods 37, 38 to break the motor-circuit, a shunt including a resistance-coil around said circuit-breaker, a pivoted lever 12 engaging the shaft, an armature-bar 17 on said lever, an electromagnet 18 in circuit with the motor.

5. The combination of a reversible motor, mechanism adapted to be driven thereby and having means independent of the motor for restoring it to normal position, an eccentric normally engaged by the motor and adapted on rotation thereof to bring the motor into engagement with the driven mechanism aforesaid, and an electromagnet controlled by the motor-circuit for holding the motor in engagement with said driven mechanism and adapted on breaking circuit to permit said motor to go to normal position out of engagement with said driven mechanism, whereby the said mechanism is by its independent means restored to normal position without turning the motor.

6. The combination of a reversible motor, a motor-circuit including a circuit-breaker, a shunt around the breaker including a resist-

ance-coil, a pinion carried by the motor-shaft normally engaging an eccentric and out of engagement with the mechanism to be driven, an eccentric adapted on rotation of the motor-shaft to carry the pinion into engagement with said driven mechanism, an electromagnet controlled by the motor-circuit, an armature therefor normally out of the field thereof, a rod connecting the armature with the pinion, said rod being adapted to bring the armature into the field of the magnet by the operation of the eccentric with said pinion; together with means independent of the motor for restoring said driven mechanism to normal position upon breaking the motor-circuit.

In testimony whereof I have hereunto signed my name in the presence of subscribing witnesses.

JUDSON SHOECRAFT.

Witnesses:
JOHN A. HULIT,
Z. T. FISHER.