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APPARATUS FOR SETTING MACHINERY FOR A DEFINITE NUMBER OF OPERATIONS

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Fig. 1.

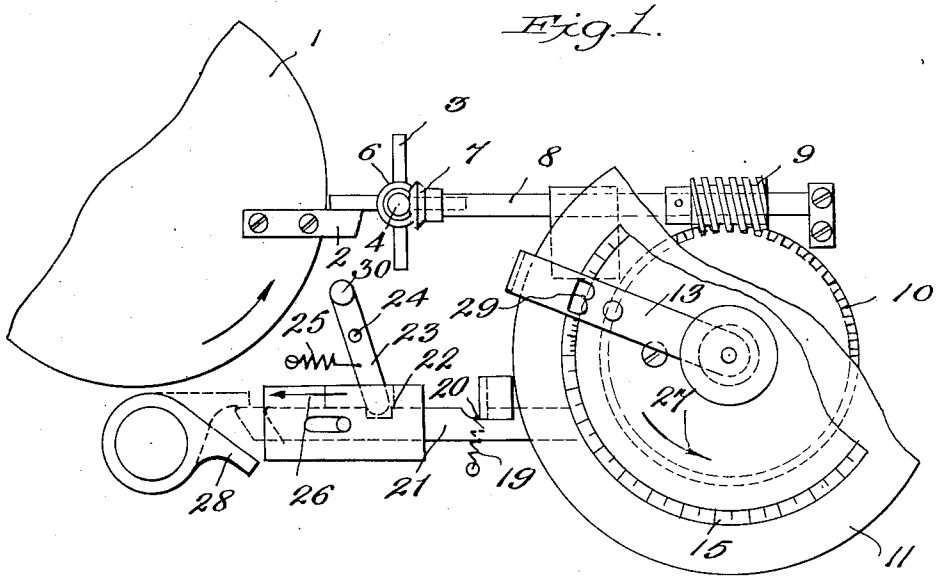
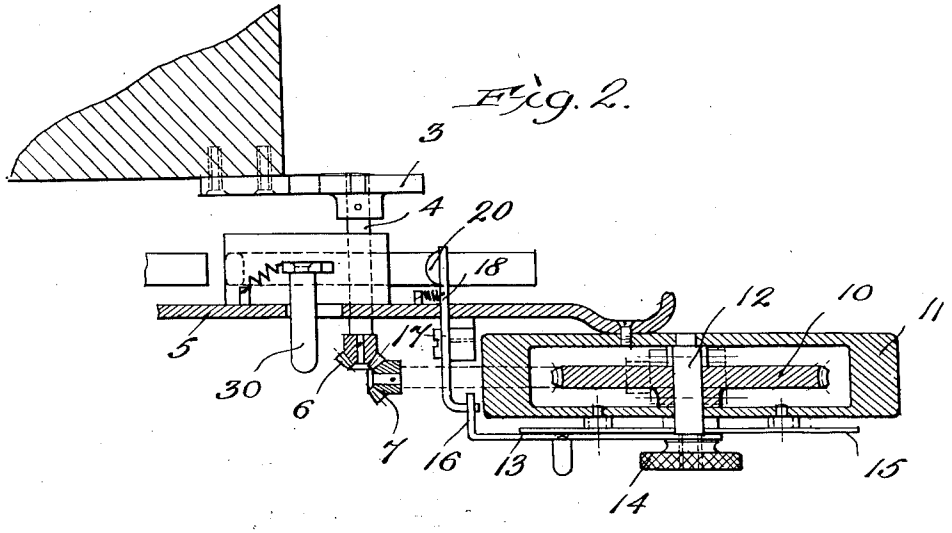


Fig. 2.



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APPARATUS FOR SETTING MACHINERY FOR A DEFINITE NUMBER OF OPERATIONS

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5 Claims. (Cl. 192—139)

The present invention relates to an apparatus for setting machinery for a definite number of operations, and more particularly, to an apparatus for setting duplicating machines to print a predetermined number of copies.

Heretofore, the devices of the character described have embodied a ratchet wheel mechanism with one or several ratchet wheels in combination with pawls, springs and the like. All of the devices known in the art had the common disadvantage of being rather inaccurate, especially when they have been set for a large number of copies. The principal reason of the inaccuracy was the unreliability of ratchet wheels. The only way to overcome the unreliability of ratchet wheels was to construct them in dimensions which were all out of proportion in size when compared to the machine or apparatus to be governed. In addition, the ratchet wheels also had the disadvantage that single teeth could easily be jumped whereby the number of copies obtained was smaller than the desired number. Furthermore, the ratchet wheel mechanisms necessarily embodied springs which broke easily on account of mechanical fatigue caused by the continuous strain. The art was confronted with a problem for the solution of which numerous proposals were made. As far as I am aware, no satisfactory machine has been designed which is wholly satisfactory and successful.

I have discovered that the shortcomings and disadvantages of prior devices can be avoided and that a machine can be provided which will function satisfactorily for setting machinery for a definite number of operations.

It is an object of the present invention to provide a simple and reliable apparatus for setting machines for a definite number of operations.

It is another object of the present invention to provide automatic means for duplicating machines to stop operation of such machines after a predetermined number of copies has been printed.

It is also within contemplation of the invention to provide a reliable and fool-proof setting apparatus for duplicating machines which can easily be set or reset for any desired number of operations and which stands up satisfactorily under the strain of continuous operation.

Other and further objects of the invention will become apparent from the following description taken in conjunction with the accompanying drawing, in which:

Fig. 1 is a side elevational view, somewhat fragmentary, of a duplicating machine embodying the invention; and

Fig. 2 illustrates a plan view, somewhat fragmentary, of the machine shown in Fig. 1.

Generally speaking, I provide, according to the principles of my invention, a worm and wheel drive cooperating with the printing drum of a duplicating machine. On the worm wheel, I provide a lever adjustably fastened thereto and a latch, control contact, or the like protruding into the reach of said lever and capable of interrupting the drive, or of releasing a signal or the like when engaged and displaced by said control lever. To obtain easy and accurate adjustment for a large number of copies, I prefer to drive the worm by a transmission, for example, by a pin wheel, a cross piece or the like driven by the printing drum in some cases in combination with spur gears, whereby the control lever will be moved intermittently or in steps. Of course, it is possible to move the worm continuously by means of a spur gear transmission driven by the printing drum.

Referring more particularly to the drawing, a printing drum 1 of a duplicating machine operating according to the principles of the mirror script duplicating process is provided on one of its front sides with a pin or catch 2 extending beyond the circumference of the drum and protruding into the reach of the arms of a pin wheel 3. In the illustrative embodiment shown, the pin wheel 3 is equipped with four arms which will cause axle 4 to make one quarter of a revolution for each revolution of the printing drum. Axle 4 of the pin wheel protrudes through side wall 5 of the duplicating machine and carries a bevel gear 6 on its other end which engages a bevel gear 7 attached to shaft 8. This shaft is arranged alongside of side wall 5 and at right angles to axle 4 and is provided with a worm 9. A worm wheel 10, which is enclosed in casing 11 alongside of wall 5 of the apparatus, cooperates with worm 9. An axle 12 of the worm wheel extends through the casing and carries an adjustable control lever 13 which may be set in any desired position on the wheel axle 12 and may be secured by means of an adjusting screw 14. The control lever travels over a dial provided on the exterior surface of casing 11. One end of control lever is equipped with a catch 15 capable of engaging lever 18 pivoted in axle 17 and held with its other end in a notch 20 of a slide member 21. A lever 23 pivoted in axle 24 is inserted into a second notch 22 of slide member 21, said lever being under the pressure

of a spring 25 which tends to move same and thereby also slide member 21 in the direction of arrow 26.

From the aforesaid description, the operation of the apparatus will be readily understood by those skilled in the art. When the printing drum 1 is rotated, pin wheel 3 will intermittently turn and will drive through bevel gears 6, 7 and worm drive 9 and 10, the axle 12 and thereby likewise the control lever 13 in the direction of arrow 27. During its rotation, control lever 13 will strike against lever 18 whereby the other end of lever 18 will be lifted out from notch 20 in slide member 21 so that the slide member will be displaced by the action of spring 25 in the direction of arrow 26. In this manner, the front end of slide member 21 will project into the path of the rotating stop 28 and will prevent further rotation of same which may be used to switch off the drive of the printing drum in some known manner. For example, a cam may be detained by stopping catch 28 and the pin of a latch coupling the printing drum with its drive and sliding over said cam may be lifted out of the latch wheel whereby the drive of the printing drum will be interrupted.

It can be easily seen that the number of revolutions of the drum and therefore the number of copies printed depends on the distance the control lever 13 or its stop 16 has to travel before it strikes lever 18. For this reason I provide a dial 15 for the control lever having a scale calibrated corresponding to the transmission ratio and indicating the number of copies to be printed for the individual settings of the control lever. Before starting the operation of the duplicating apparatus, control lever 13 will be set by loosening adjustment screw 14 according to the number of copies desired and tightened again in this particular position by the screw. Preferably control lever 13 is provided with a hand-like point 29 to facilitate exact setting of the lever on dial 15. In order to repeat the same number of operations after the duplicating apparatus has been switched off by control lever 13, lever 23 is provided with a handle 30 protruding through a cut in side wall 5. Lever 23 and slide 21 may be moved back into their initial position against spring 25 by means of handle 30 whereafter the apparatus is ready for printing an identical number of copies.

Although I have described a preferred embodiment of my invention, variations and modifications may be resorted to by those skilled in the art without departing from the spirit and scope of the invention as defined by the appended claims.

I claim:

1. In a device for setting duplicating apparatus for a predetermined number of operations, the combination comprising a catch secured to the printing drum and extending beyond the circumference thereof, a pin wheel within the reach of said catch and adapted to be moved intermittently when engaged by same, a worm and wheel drive co-operating with said pin wheel, a control lever adjustably secured to said worm wheel, a displaceable member protruding into the reach of said control lever, and means for interrupting the drive of the printing drum when said displaceable member is engaged and displaced by said control lever.

2. In a device for setting duplicating apparatus for printing a predetermined number of copies, the combination comprising a catch secured to the printing drum of the duplicating apparatus and extending beyond the circumference thereof, a pin wheel in the reach of said catch and adapted to be moved intermittently when engaged by same, gearing associated with said pin wheel, a worm and wheel drive co-operating with said gearing, a control lever adjustably secured to said worm wheel, a displaceable member protruding into the reach of said control lever, and means for interrupting the drive of the printing drum when said displaceable member is engaged and displaced by said control lever.

3. In a device for setting duplicating apparatus for printing a predetermined number of copies, the combination comprising, a catch secured to the printing drum of the duplicating apparatus and extending beyond the circumference thereof, a pin wheel within the reach of said catch and adapted to move intermittently when engaged by said catch, gearing associated with said pin wheel, a worm and wheel drive co-operating with said gearing, a control lever adjustably secured to said worm wheel, a contact lever having one of its ends within the reach of said control lever, a slide member having a notch for the other end of said contact lever, a spring for displacing said slide member, and means for interrupting the drive of the printing drum, when said contact lever is engaged by said control lever and permits displacement of said slide member by said spring.

4. In a device for setting duplicating apparatus for a predetermined number of operations, the combination comprising means including a pin wheel co-operating with a revolving member of the duplicating apparatus and capable of converting continuous rotation into intermittent rotary motion, a worm and wheel drive intermittently actuated by said means, adjustable control means on said worm wheel, stationary contact means adapted to be engaged by said control means in a predetermined position of said worm wheel, and means for interrupting operation of the duplicating apparatus when said contact means are engaged by said control means.

5. In a device for setting duplicating apparatus for a predetermined number of operations, the combination comprising, means secured to a revolving member of the duplicating apparatus and extending beyond the circumference thereof, a pin wheel within the reach of said means and adapted to be intermittently engaged and rotated step by step by same, a worm and wheel drive geared to said rotatable member, adjustable control means on said worm wheel, stationary contact means adapted to be engaged by said control means in a predetermined position of said worm wheel, and means for interrupting operation of the duplicating apparatus when said contact means are engaged by said control means.

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