

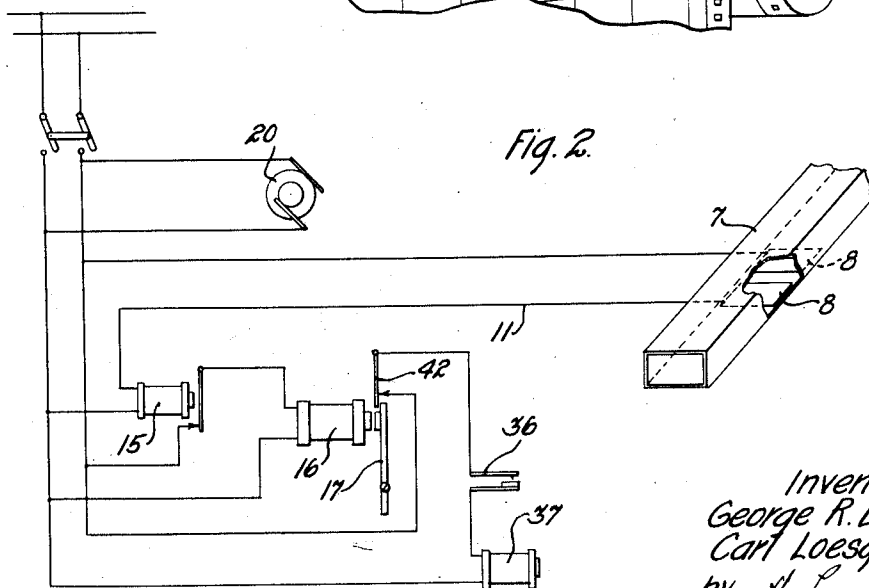
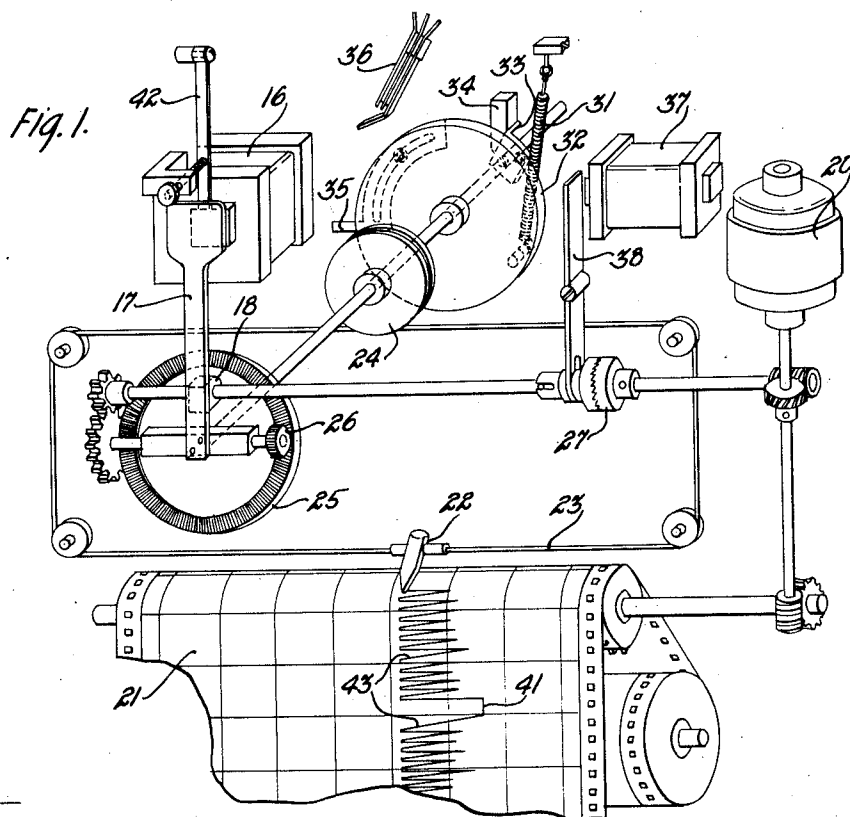
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G. R. BROWN ET AL

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RECORDING APPARATUS

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UNITED STATES PATENT OFFICE

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RECORDING APPARATUS

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This invention relates to a recording apparatus, and more particularly to an apparatus for recording the efficiency or operating characteristics of workmen.

In the production of piece parts requiring a definite cycle of operations, there are numerous factors which influence the efficiency of the operator. Sometimes the adjustment of the height of the operator's chair with respect to the workbench or a change in the angle of the light falling upon the work result in astounding differences of output. Also there are certain periods during the day when the efficiency of an operator is much greater than at other periods. In order to study the various factors which affect the efficiency of a workman it is necessary to have an accurate record of his output.

It is an object of the present invention to provide a simple and effective apparatus for recording the time required for the production of a part as well as the number of parts produced over a specified time.

In accordance with the general features of the invention, a recording element, immediately after the completion of a part, begins to record the time required for the completion of the next part and upon a completion thereof an electromagnet is energized to reset the recording element in the zero position to begin anew the recording of the time required to complete a part. In accordance with one embodiment of the invention, a device is provided for changing the form of the record if more than a predetermined time elapses for the production of a part.

It is believed that a complete understanding of the invention may be had by reference to the following description taken in conjunction with the accompanying drawings, in which

Fig. 1 is a perspective view of the recording apparatus, and

Fig. 2 is a circuit diagram of the recording apparatus with a schematic view of a device for controlling the recording apparatus.

Referring to the drawings in which the same reference characters designate similar parts in the several views, a device for controlling the recording apparatus in accord-

ance with the output of an operator is schematically shown in Fig. 2. When the operator completes a part it is placed in a chute 7 and as it slides down the chute it bridges a pair of conducting plates 8—8 closing an electric circuit and energizing a relay 15. The energization of the relay 15 will cause an electrical impulse to pass through an electromagnet 16 to actuate an armature 17 of the recording apparatus.

In the recording apparatus a record chart 21 is driven at a constant speed by means of a motor 20. Cooperating with the chart 21 is a recording element 22 which is moved along the chart by means of a cord 23 in accordance with the angular position of a pulley 24. Mounted on the same shaft as the pulley 24 is a wheel 25 which is frictionally engaged by a cork wheel 26 supported upon the armature 17 which is pivoted at 18. The cork wheel 26 is rotated by the motor 20 through a clutch 27. During the production of a part, the wheel 26 will be in engagement with the wheel 25 causing a rotation of the latter and thereby moving the recording element to the right along the sheet. As soon as a part is completed it is placed in the chute 7 and in sliding down the chute it will bridge the contacts 8—8 whereby the relay 15 will be closed energizing the electromagnet 16, withdrawing the wheel 26 from engagement with the wheel 25, and allowing a tension spring 31 attached to a wheel 32 to rotate the pulley 24 in the opposite direction until the recording element 22 is returned to its zero position at which point a stop member 33 attached to the wheel 32 engages a fixed stop member 34 to arrest the movement of the wheel 32. When the time required to complete a part is longer than normal the wheel 26 continues to drive the wheel 25 until an adjustable projection 35 on the wheel 32 engages a contact member of a switch 36 to close the circuit through an electromagnet 37. Upon the energization of the electromagnet 37 an armature 38 will be actuated to disengage the clutch 27. The disengagement of the clutch 27 will interrupt the movement of the recording element 22. However, the record chart will continue to move and a

record of the type indicated at 41 will be formed. A record of this type will be continued until the next part is completed which will send an electrical impulse through the 5 electromagnet 16 to actuate the armature 17, and the actuation of the armature 17 will open a switch 42 in the circuit of the electromagnet 37, deenergizing the electromagnet 37 to allow the clutch 27 to be reengaged. 10 When the impulse through the electromagnet 16 has passed, the switch 42 will again be closed. However, by this time the contact member 35 will be withdrawn from the switch 36 so that the electromagnet 37 will not be 15 energized upon the reclosing of the switch 42.

In the operation of the apparatus the recording element 22 will be moved toward the right during the production of an article 20 producing a line 43, as shown in Fig. 1, and the length of the time required to produce an article may be determined from the length of a line 43 produced by the movement of the recording element toward the right. When 25 the article is completed, the electromagnet 16 will be energized to release the wheel 26 from the wheel 25 allowing the recording element 22 to immediately return to its zero position. The number of articles produced 30 during a specified time may therefore be calculated from the number of reversals in the curve and the known speed of the chart. If no article is produced for an abnormal length of time, as for instance when the operator 35 leaves the machine, the clutch 27 will be disengaged to prevent the recording element 22 from being moved off of the chart and the record of the time during which the operator was away may be calculated from the 40 straight portion 41 of the curve.

It will be understood that the embodiment of the invention herein described and illustrated is merely a convenient and useful form of the invention which is capable of many 45 other modifications without departing from the spirit and scope of the invention.

What is claimed is:

1. In a recording apparatus having a recording surface movable at a predetermined 50 constant rate, a recording element, means for moving the recording element transversely to the direction of movement of the recording surface during the production of an article, and means effected by an article for reversing 55 the direction of movement of the recording element upon the completion of an article.

2. In a recording apparatus having a movable record chart, a recording element, means for moving the recording element during the 60 production of an article, and means for varying the movement of the recording element upon the lapse of an abnormal period of time for the production of an article.

3. In a recording apparatus having a movable 65 able record chart, a recording element, means

for actuating the recording element, means for disengaging said actuating means upon the completion of an article, and a second means for disengaging said actuating means responsive to an abnormal lapse of time in 70 the production of an article.

4. In a recording apparatus having a movable record chart, a recording element, a frictional drive mechanism for actuating the 75 recording element, a clutch mechanism, an electromagnetic device for disengaging the frictional drive mechanism, an electromagnetic device for disengaging the clutch mechanism, and means responsive to an abnormal period of engagement of the frictional drive 80 mechanism for energizing the electromagnetic device to disengage the clutch mechanism.

5. In a recording apparatus having a movable record chart, a recording element, a 85 frictional drive mechanism for actuating the recording element, an electromagnetic device for releasing the frictional drive mechanism, a clutch mechanism, an electromagnetic device for actuating the clutch mechanism, 90 means for energizing the electromagnetic device for the clutch mechanism when the frictional drive has been in operation a predetermined time, and means for deenergizing the electromagnetic device for the clutch mechanism 95 when electromagnetic device for the frictional drive mechanism is energized.

6. In a recording apparatus having a movable recording surface, a recording element 100 associated therewith, means for moving the recording element from zero position in a lineal direction during the production of an article, and means controlled solely by a completed article for reversing the direction 105 of movement of the recording instrument to return it to the zero position.

7. In a recording apparatus having a movable record chart, a recording element, means for driving the recording element, means 110 controlled by a completed article for disconnecting the recording element from the drive mechanism, and means for interrupting the movement of the recording element upon the lapse of a predetermined time in the completion of an article. 115

8. In a recording apparatus having a record chart adapted to be advanced continuously, a recording element engaging the record chart to inscribe a continuous line on the record chart, and means for moving the recording 120 element transversely of the record chart at a constant rate to indicate the number of articles produced and the time required to produce each article.

In witness whereof, we hereunto subscribe 125 our names this 16th day of November, A. D. 1927:

GEORGE ROMAIN BROWN.
CARL LOESGES.