A. E. JUPP AND R. CROOKS.

AUTOMATIC CONTROL FOR MILLS.

APPLICATION FILED OCT. 11, 1920.

1,416,211.

Patented May 16, 1922.

2 SHEETS—SHEET 1.

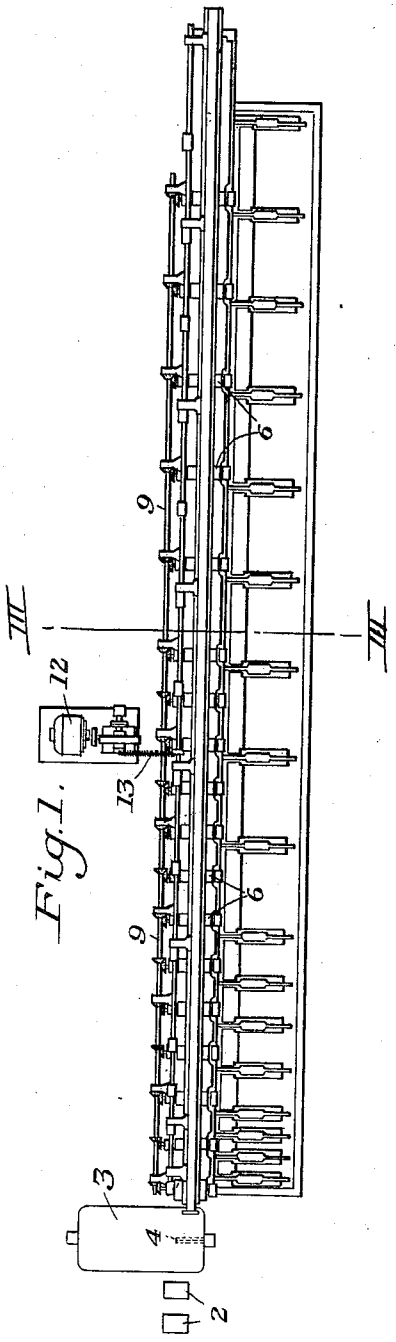


Fig. 1.

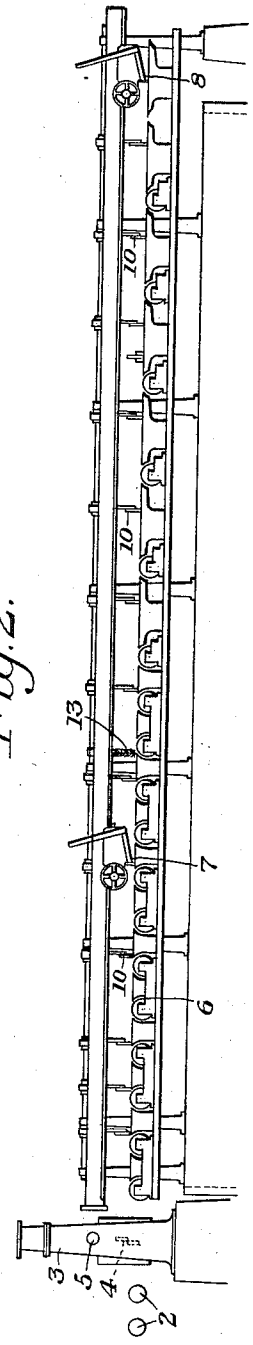


Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 3.

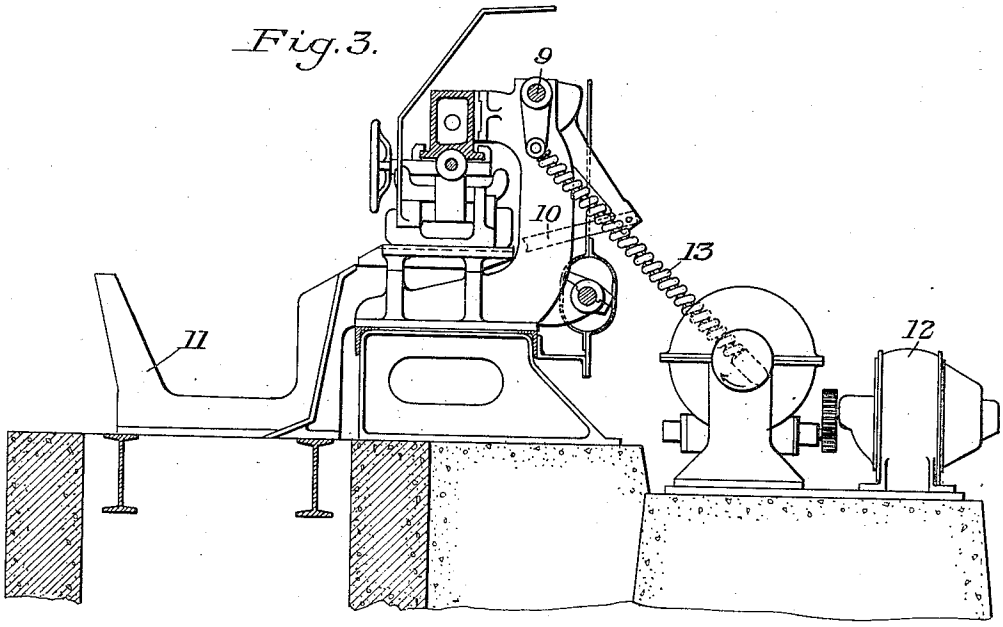


Fig. 4.

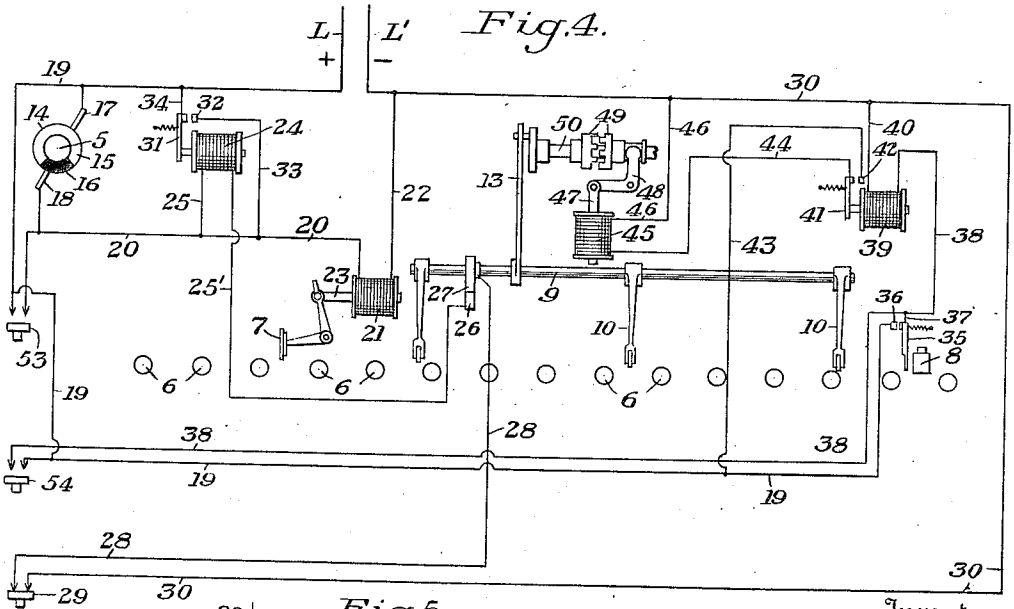
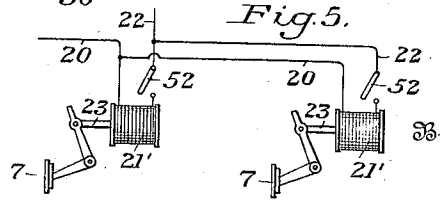


Fig. 5.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC CONTROL FOR MILLS.

1,416,211. Specification of Letters Patent. Patented May 16, 1922.

Application filed October 11, 1920. Serial No. 416,069.

To all whom it may concern:

Be it known that we, ALFRED E. JUPP and ROXIE CROOKS, both citizens of the United States, and residing at Youngstown, in the county of Mahoning and State of Ohio, have invented a new and useful Improvement in Automatic Controls for Mills, of which the following is a full, clear, and exact description.

The present invention relates broadly to finishing or other rolling mills, and more particularly to a delivery mechanism for such mills.

The principal object of the present invention is to provide in mills of the character described an automatically controlled and operated mechanism for transferring the rolled pieces from the shears to the bundling rack.

A further object of the present invention is to automatically gauge the length of such pieces before they are sheared to prevent croppage losses in shearing.

A still further object of the invention is to eliminate the hand operations and hand labor which have ordinarily been required with mills of the character referred to.

The foregoing and other objects, together with their attendant advantages, will be apparent as the invention becomes better understood, by reference to the accompanying specification and drawings forming a part thereof, it being premised that changes may be made in the various details and the manner of operation, within the scope of the appended claims, without departing from the spirit of the invention.

Figure 1 is a diagrammatic plan view of a mill employing the improved invention.

Figure 2 is a side elevation of the construction illustrated diagrammatically in Figure 1.

Figure 3 is a transverse sectional view on an enlarged scale on the line III—III of Figure 1 looking in the direction of the arrows.

Figure 4 is a diagrammatic illustration of the automatic controlling mechanism, and

Figure 5 is a diagrammatic view of a modified system of control.

Referring more particularly to the drawings, there is illustrated a series of rolls 2 constituting a portion of the roller table by means of which the rods, bars, or other material being operated upon, are carried to the shear stand 3. The shear stand may be of any well-known type comprising co-operating blades 4, one of which is reciprocated by a shaft 5 journaled in the stand.

From the shear stand the metal passes on to a roller table 6, the rolls of which may be operated intermittently or continuously in any well-known manner. Co-operating with the table 6 is an adjustable gauge or gate 7 against which the ends of the rods or bars impinge to properly gauge the length being sheared. It is customary at the present time after the lengths have been sheared, to manually move the gauge 7 out of the path of the sheared lengths and permit them to travel along the table until they are engaged by a second stop 8. The lengths are then removed from the table by a suitable kick-off device, here illustrated as comprising a longitudinally extending shaft 9 carrying a series of kick-off fingers 10 adapted to transfer the sheared lengths to a bundling rack 11. In mills of this character, it is customary to intermittently control the operation of the shaft 9 by a suitable motor 12 and a pitman 13, the operation of the motor being manually controlled.

According to the present invention, as will be more fully apparent hereinafter, there is provided means for automatically raising the gauge 7 and for automatically controlling the operation of the motor 12. Referring more particularly to Figure 4, the shaft 5 of the shear stand is illustrated as provided with a rotating contact 14 comprising a conducting segment 15 and an insulating segment 16. At diametrically opposite sides of the contact 14 may be provided brushes 17 and 18 respectively. The brush 17 is connected by a wire 19 to one side of a power line L. The segments 15 and 16 are so arranged that just as the shears 4 have completed a shearing operation both of the brushes 17 and 18 will be in engagement with the conducting segment 15. Such contact will permit flow of current from the line wire L through the segment 15 to the brush 18, and thence through wire 20 to one side of a solenoid 21, the opposite side of which is connected by a wire 22 to the line wire L′. The armature 23 of the solenoid is suitably connected to the gauge 7 whereby when the solenoid is energized the gauge will be lifted out of the path of the material on the roller table 6. At the same time, current will also flow from the wire 20 to a second solenoid 24 through a

connecting wire 25. The circuit to the opposite side of the solenoid 24 is completed through a wire 25′ to a fixed contact 26 which is engaged by a contact 27 carried by the shaft 9. The contact 27 is, in turn, connected by wire 28, switch 29, and wire 30 with the line wire L′. It will thus be seen that the solenoid 24 will also be energized at the conclusion of the shearing operation thereby drawing the armature 31 into engagement with contact 32 which is connected by wire 33 with the wire 20 leading to the solenoid 21. As the armature 31 has a connection 34 with the wire 19 leading to the line wire L, it will be apparent that with the armature in engagement with the contact 32 current may flow to the solenoid 24 through the wire 33, wire 20 and wire 25. Due to this wiring, the solenoids 24 and 21 will remain energized irrespective of the positions assumed by the brushes 17 and 18 on the segments 15 and 16.

The gauge 7 having been lifted from the path of the sheared lengths, these lengths are now free to pass to the stop 8. At the same time that the lengths of material engage the stop 8, they are also adapted to engage a suitably disposed contact member 35 and move the same into engagement with a fixed contact 36. With these contacts in engagement, the current will flow from the line wire L and wire 19 to the contact 36, and thence through contact member 35 to the wire 37 in electrical connection with wire 38 leading to solenoid 39. The opposite side of the solenoid winding is connected by wire 40 to the wire 30 so that operation of the contact member 35 energizes the solenoid 39. This will result in drawing the armature 41 into engagement with the fixed contact 42, thereby permitting current to flow from line wire L, wire 19, and wire 43 to contact 42, and thence through armature 41 to wire 44 leading to one side of a solenoid 45, the opposite side of which is connected by wire 46 to line wire L′ through the wire 30. Upon energizing the solenoid 45 its armature 47 will operate the bell-crank 48 to engage the clutch members 49 and rotate the shaft 50 to operate the pitman 13 connected to the kick-off shaft 9. It will be obvious that one of the clutch members 49 is mounted for rotation by the motor 12.

After the kick-off shaft 9 has been rotated to remove the sheared lengths from the roller table 6, it is desirable that the gauge 7 be again lowered so as to engage the new material fed through the shear stand. The lowering of the gauge 7 is automatically accomplished by rotation of the kick-off shaft 9 which moves the contact 27 out of engagement with the fixed contact 26 and thereby breaks the circuit to the solenoid 24 permitting the armature 31 to be drawn out of engagement with the contact 32. This will result in breaking the circuit of the solenoid 21 so that the gauge 7 will return to its normal position. These operations will occur in automatic succession as the sheared lengths of material engage the stop 8 and as the shears are operated to rotate the contact 14.

In some instances, it is desirable to provide a series of gauges 7, and where such a construction is utilized there may be provided a series of solenoids 21′ connected in parallel one with the other and in circuit, as described in connection with the solenoid 21. The manually controlled switches 52 may be provided for determining which of the solenoids 21′ shall operate.

The advantages of the present invention arise from the provision of means for automatically operating the gauge for the sheared lengths and for automatically operating the kick-off mechanism for such lengths.

In order that these mechanisms may, however, be controlled manually if desired, there may be provided a switch 53 adapted, when operated, to connect the wires 19 and 20, and thus shunt the contact 14 to start the series of operations independently of the operation of the shears. A second switch 54 may be provided for connecting the wires 19 and 38, irrespective of the position of the contact member 35 and thereby energize the solenoids 39 and 45 to operate the kick-off mechanism at any desired time. Movement of the switch 29 out of engagement with the wires 28 and 30 will de-energize the solenoid 24 and result in lowering of the gauge 7 as will be apparent.

From the foregoing, it will be apparent that the present invention adapts itself either to automatic or manually control at will.

We claim:

1. The combination with a roller table, of shears, a contact device operated by the shears, a gauge, a kick-off, and electrically operated means controlled by said contact device for operating said gauge and kick-off, substantially as described.

2. The combination with a roller table, of a shearing mechanism, a contact device operated by said mechanism, a plurality of gauge blocks, a kick-off, and electrically operated means controlled by said contact device for operating any of said gauge blocks and said kick-off, substantially as described.

3. The combination with a roller table, of a shearing mechanism, a contact device operated by said mechanism, a gauge block, and electrically operated means controlled by said contact for operating said gauge block, substantially as described.

4. The combination with a roller table, of a shearing mechanism, a contact device operated by said mechanism, a plurality of

gauge blocks, and electrically operated means controlled by said contact device for operating any of said gauge blocks, substantially as described.

5. The combination with a roller table and a bundling rack, of a shear mechanism, means for transferring sheared material from the roller table to the bundling rack, and electrically controlled means rendered operative at the end of the shearing operation for automatically operating said transfer means, substantially as described.

6. The combination with a roller table and a bundling rack, of a shear mechanism, a kick-off for transferring sheared lengths from the roller table to the bundling rack, and electrically controlled means operated by said shear mechanism for controlling the operation of said kick-off, substantially as described.

7. The combination with a roller table, of a shear mechanism, a gauge for determining the length of the sheared material, a kick-off for removing the sheared lengths from the roller table, and electrically controlled means for automatically operating said gauge and said kick-off, substantially as described.

8. The combination with a roller table, of shears, a gauge, a kick-off, and electrically-controlled means rendered operative upon completion of the shearing operation for actuating said gauge and kick-off, substantially as described.

9. The combination with a roller table, of a shearing mechanism, a contact device, a plurality of gauge blocks, and electrically-operated means controlled by said contact device for operating any of said gauge blocks, substantially as described.

10. The combination with a roller table and a bundling rack, of a shear mechanism, a kick-off for transferring sheared lengths from the roller table to the bundling rack and electrically-controlled means rendered operative upon completion of the shearing operation for controlling the operation of said kick-off, substantially as described.

In testimony whereof, we have hereunto set our hands.

ALFRED E. JUPP.
ROXIE CROOKS.