

No. 630,331.

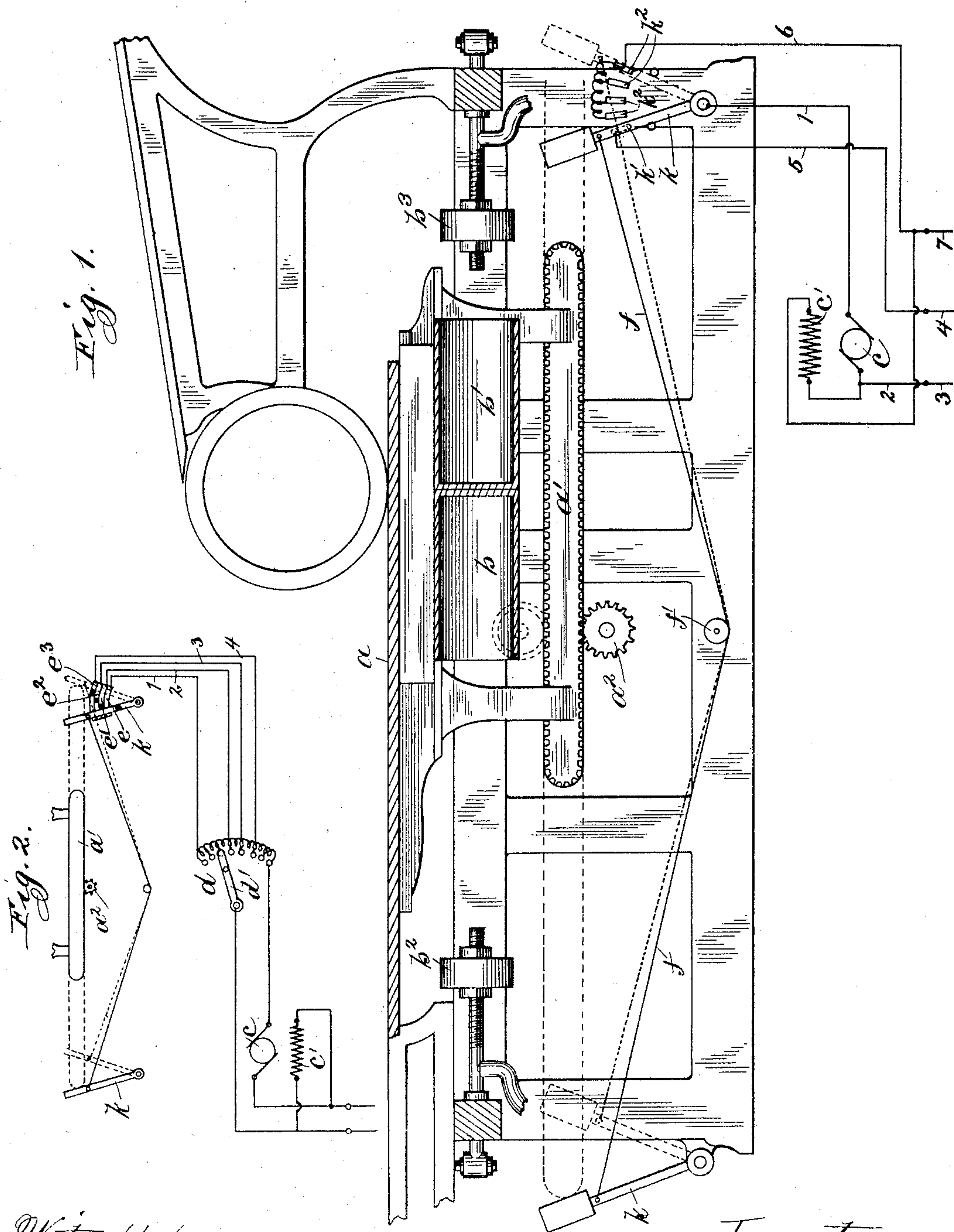
Patented Aug. 8, 1899.

H. H. CUTLER.

MOTOR CONTROLLER FOR PRINTING PRESSES.

(Application filed Aug. 22, 1898.)

(No Model.)



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UNITED STATES PATENT OFFICE.

HENRY H. CUTLER, OF CHICAGO, ILLINOIS.

MOTOR-CONTROLLER FOR PRINTING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 630,331, dated August 8, 1899.

Application filed August 22, 1898. Serial No. 689,173. (No model.)

To all whom it may concern:

Be it known that I, HENRY H. CUTLER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Motor-Controllers for Printing-Presses, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to a motor-controller for printing-presses of the type in which a reciprocating table is provided adapted to be driven by an electric motor, the object of my invention being to provide means whereby the speed of the table upon the return stroke may be accelerated to thereby increase the output of the machine without affecting the operation of the table upon the advance or working stroke.

In printing-presses of the type to which the present invention relates, wherein a reciprocating table is provided, it has been customary to provide air-compression cylinders or equivalent devices for checking the movement of the table at the ends of the travel thereof to bring the same gradually to rest, and the employment of these checking means subjects the driving-motor to an increased force at the ends of the travel of the table, thereby necessitating an increase in the torque developed by the motor in order to produce an effective operation of the motor. In an application, Serial No. 689,172, filed by me August 22, 1898, I have shown and described mechanism whereby the torque of the motor may be increased at the ends of the travel of the table and also whereby the speed of the motor may be increased to accelerate the travel of the table upon the return stroke. In the structure illustrated in the above-mentioned application a switch-arm is provided adapted to be moved by the engagement of the table therewith at the end of its stroke and a retaining-magnet is provided adapted to maintain the switch-arm in position to cause the motor to run at increased speed during the return stroke of the table, the magnet being de-energized to release the switch-arm when the table reaches the end of its return stroke.

It is the object of the present invention to provide means whereby the accelerated speed

during the return stroke of the table may be produced without the provision of a retaining-magnet or electrical connections extending between the two ends of the travel of the table, as illustrated in the application above mentioned.

My invention also contemplates the association of the driving electric motor with the speed-controlling device and the electrical circuits in such a manner that the speed of the motor may be automatically controlled by changing the voltage of the current energizing the motor.

I have illustrated my invention in the accompanying drawings, in which—

Figure 1 is a view of a printing-press equipped in accordance with my invention. Fig 2 is a view of a modification thereof.

Like letters and numerals refer to like parts in both figures.

The table *a* carries beneath the same a rack *a'*, having gear-teeth upon the upper and lower edges and upon the ends thereof, and a pinion *a''*, deriving motion from the motor, meshes with the rack to advance the same. When the table reaches the forward end of its travel, the pinion passes to the upper edge of the rack, and while continuing to rotate in the same direction engages the rack to drive the same in the opposite direction, and thus moving the table upon its return stroke. Beneath the table air-cylinders *bb'* are provided, with which the pistons *b''b'''* are adapted to respectively engage as the table approaches the ends of its travel to thus compress air within the cylinders and gradually check the motion of the table. At each end of the travel of the table a pivoted lever *k* is provided, the levers being mechanically connected by means of a wire or rope *f*, guided by the pulley. The lever *k* upon the right is connected by means of a conductor 1 with the armature *c* of the motor, the opposite brush being connected by conductor 2 with one of the mains 3 of a three-wire supply system. The main 4 is connected by conductor 5 with the contact *k'*, upon which the arm *k* rests when moved to the left. A series of rheostat-terminals *k''k'''* is provided, over which the arm *k* is adapted to be moved, the end terminal being connected by conductor 6 with the main 7. The difference of voltage

between the mains 3 and 4 of a three-wire system is usually one hundred and ten degrees, while the voltage between the mains 3 and 7 is two hundred and twenty degrees.

5 The field-coil c' is connected between the conductor 2 and the main 7 and is thus subjected to a voltage of two hundred and twenty degrees.

The several parts of the apparatus being
10 in the positions illustrated in Fig. 1, circuit may be traced from the main 3 through the armature c of the motor, conductor 1, arm k , terminal k' , conductor 5 to the main 4, the armature being thus subjected to a voltage
15 of one hundred and ten degrees and running at the lower of its two speeds, while the table a is moved to the right upon its advance stroke. When the rack a' or other moving part of the table engages the arm k , the same
20 is moved across the terminals k^2 of the rheostat, thus closing the same in circuit and then gradually cutting out the resistance until the arm rests upon the last terminal of the rheostat. In this position circuit may be
25 traced from the main 3 and conductor 2 through the armature c of the motor, conductor 1, arm k , terminal k^2 , conductor 6 to main 7. The motor-armature is thus subjected to a voltage of two hundred and twenty volts
30 and the power of the motor is increased to assist the motor in reversing the travel of the table, and then as the resisting forces to which the motor is subjected decrease the speed of the motor rises to practically double the
35 former speed to thus cause the table to travel upon its return stroke at an accelerated speed practically double that of the advance stroke. The arm k remains to the right until the table reaches the end of its return stroke, when the
40 pivoted arm k upon the left is engaged by the rack and rotated to the left thereby, due to the connecting-cable f rotating the arm k upon the right to the left to gradually cut resistance into the armature-circuit and then
45 move the arm k into engagement with contact k' to thus subject the armature to one hundred and ten volts and reduce the speed thereof to advance the table at the lower speed.

50 In Fig. 2 I have illustrated a modification wherein the rocking arms k serve to cut resistance into and out of a rheostat to thereby control the speed of the motor. The arm k carries a series of brushes adapted as the
55 same is rotated to successively make contact with a series of terminals e e' e^2 e^3 , connected, respectively, by conductors 1 2 3 4 with the coils of a rheostat d , connected to one brush of the motor-armature c , while the other brush
60 is connected with one of the mains. The removable element or arm d' of the rheostat is connected with the other main, while the field c' of the motor is shown as connected in the present instance in shunt with the armature.
65 As the table approaches the end of its advance stroke it engages and rotates the arm k to thereby successively short-circuit the ter-

minals e to e^3 and gradually remove resistance from the rheostat, thereby increasing
70 the power of the motor to effect the reversal of the table and increase the speed of the table to accelerate its return. When the table reaches the end of its return stroke, the pivoted arm k upon the left is engaged and
75 rocked, thereby rocking arm k upon the right to gradually insert resistance into the armature-circuit and decrease the speed of the motor while the table is performing its advance stroke.

While I have described my invention with
80 particular reference to printing-presses, I am aware that certain features of my invention are applicable to other machines, particularly where the machine has a reciprocating or moving part requiring increased power for its op-
85 eration at certain points in the cycle of operation.

Having described my invention, what I claim as new, and desire to secure by Letters
90 Patent, is—

1. The combination with a printing-press
95 or other machine having a reciprocating table, of an electric motor for operating the same, a motor-controller, movable parts for operating the controller, one at each end of the
travel of the table and connected so that the movement of one moves the other, and means
for moving the parts as the table approaches the opposite ends of the travel thereof, substantially as described.

2. The combination with a printing-press
100 or other machine having a reciprocating table, of an electric motor for operating the same, a motor-controller, a pair of arms for operating said controller the same being mechan-
105 ically connected together and situated one at each end of the travel of the table, and means for moving the arms as the table approaches the opposite ends of its travel, substantially as described.

3. The combination with a printing-press
110 or other machine having a reciprocating table, of an electric motor for operating the same, a high-voltage and a low-voltage circuit, a controller for connecting the motor in circuit
115 with either to vary the voltage and means operated as the table approaches the end of its travel for actuating the controller, substantially as described.

4. The combination with a printing-press
120 or other machine having a reciprocating table, of an electric motor for operating the same, a high-voltage and a low-voltage circuit, a controller for connecting the motor in circuit
125 with either to vary the voltage, movable parts for operating said controller one at each end of the travel of the table the same being connected together and means for moving said
130 parts as the table approaches the opposite ends of its travel, substantially as described.

5. The combination with a printing-press
or other machine having a reciprocating table, of an electric motor for operating the same, a controller for increasing the voltage of the

current to which the motor is subjected, movable parts for operating the controller one at each end of the travel of the table, the same being connected together and operated by the travel of the table and means for moving the parts to increase the voltage during the return stroke of the table and to decrease the same during the advance stroke, substantially as described.

10 6. The combination with a machine having a moving part requiring increased power or torque for its operation at certain points in the cycle of operation, of an electric motor for operating the same, a high-voltage and

a low-voltage circuit, a controller for connecting the motor in circuit with either to vary the voltage, and means automatically operated by a moving part of the machine for actuating the controller to increase the voltage of the supplied current, substantially as described. 15 20

In witness whereof I have hereunto subscribed my name in the presence of two witnesses.

HENRY H. CUTLER.

Witnesses:

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