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IN STARTING MACHINERY AND FOR SIMILAR PURPOSES.

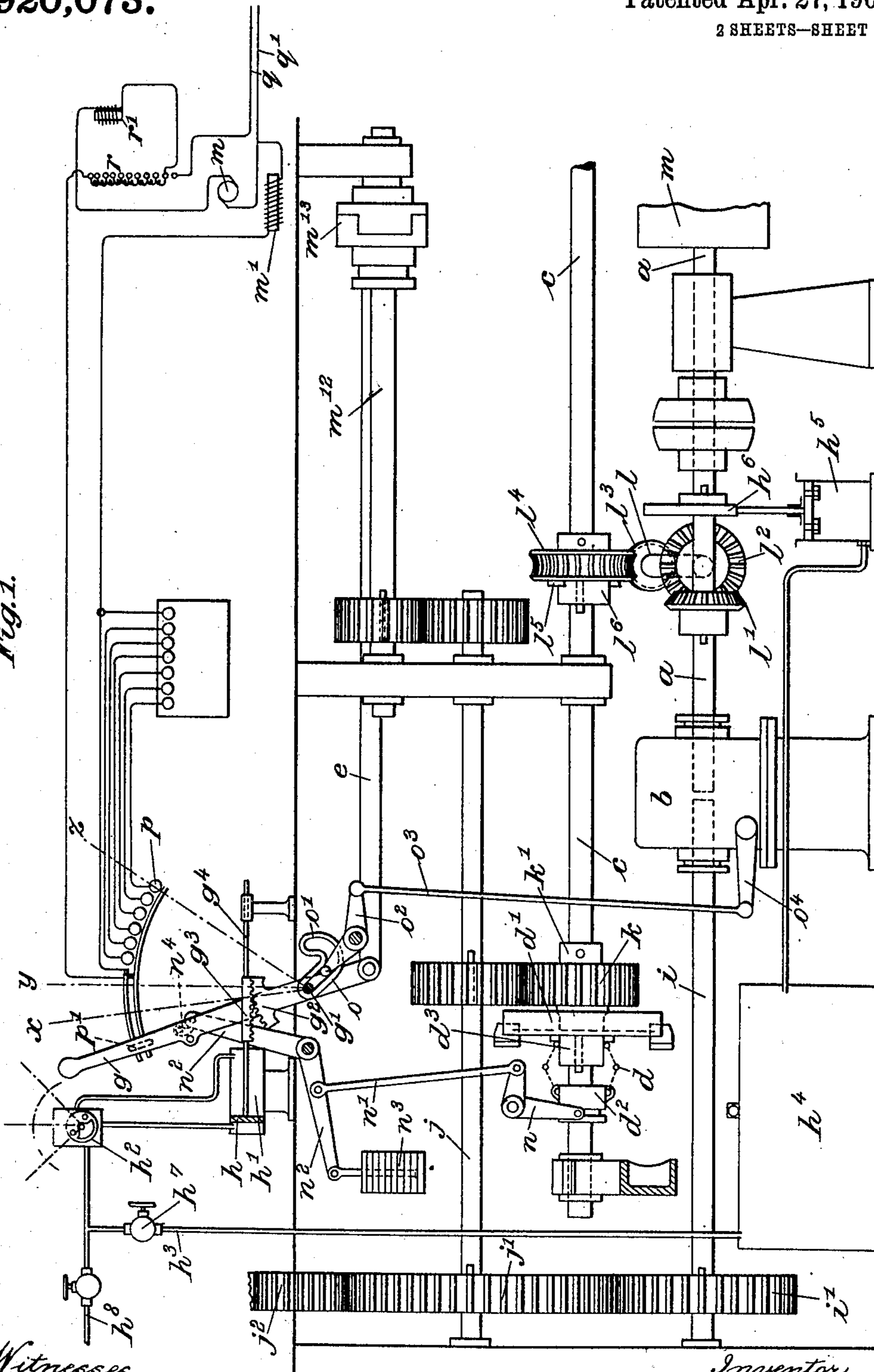
APPLICATION FILED APR. 9, 1906.

920,073.

Patented Apr. 27, 1909.

2 SHEETS—SHEET 1.

Fig. 1.



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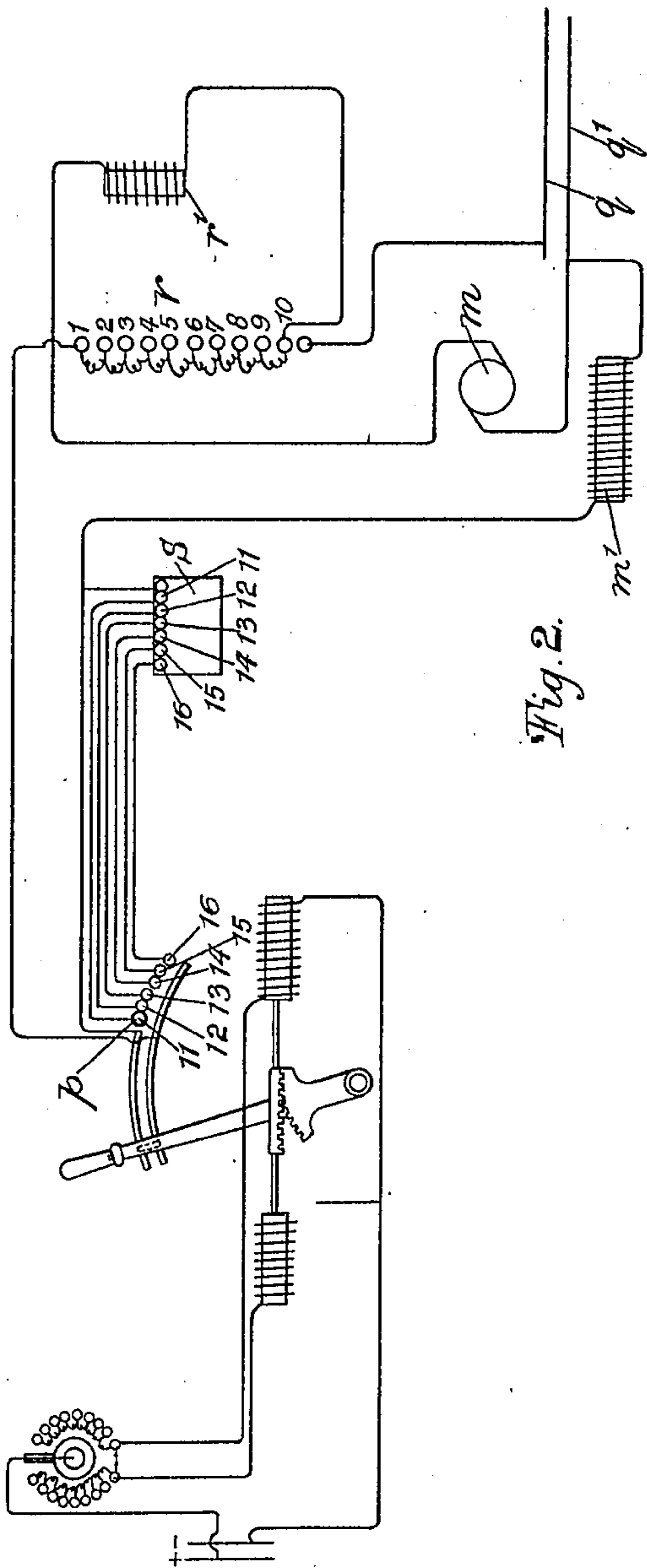
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2 SHEETS—SHEET 2.



Witnesses.  
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# UNITED STATES PATENT OFFICE

GEORGE W. MASCORD, OF LONDON, ENGLAND.

APPLICATION AND DISTRIBUTION OF ELECTRIC MOTIVE POWER, PARTICULARLY FOR  
USE IN STARTING MACHINERY AND FOR SIMILAR PURPOSES.

No. 920,073.

Specification of Letters Patent.

Patented April 27, 1909.

Original application filed January 9, 1905, Serial No. 240,257. Divided and this application filed April 9, 1906.  
Serial No. 310,748.

*To all whom it may concern:*

Be it known that I, GEORGE WILLIAM MASCORD, a subject of the King of Great Britain and Ireland, residing at 5, The Crescent, Church Road, Barnes, London, England, have invented certain new and useful improvements relating to the application and distribution of electric motive power particularly for use in starting machinery and for similar purposes, of which the following is a specification.

This invention relates to the application and distribution of motive power, particularly in starting machinery where electro-motors are employed as the source of motive power, and where a powerful starting effort is required.

The invention relates more especially to the subject matter of the prior application for Letters Patent in the United States filed January 9th, 1905, Serial No. 240,257, of which the present application is a division.

According to the invention I provide means for increasing the speed of the driven machine or press after it has attained its normal speed by providing the control lever to have a movement beyond the position assumed by it for giving normal speed, so that in this further movement resistance may be switched in by which the motor fields may be weakened and thus the speed of the motor accelerated.

The invention is illustrated in the accompanying drawing, in which—

Figure 1 is a diagram illustrating a control lever with the motor connections and clutch mechanism as applied to a rotary printing press. Fig. 2 is a similar but enlarged and more detailed diagram and in which the movement of the lever is electrically controlled.

In Fig. 1 means are shown for putting the press into motion from the continuously running motor *m*, either by means of a hand lever *g* or by pneumatic pressure. The hand lever *g* and the controlling piston *h* of the pneumatic cylinder *h'* is shown in the position assumed when the press is stopped or is

ready for starting. The main motor shaft *a* is shown provided with a clutch *b* which is preferably a friction clutch such as that known as the "Hele-Shaw" clutch, by which connection is effected with the shaft *i* provided with a gear wheel *i'* in gear with a gear wheel *j'* upon the counter shaft *j*, which gear wheel *i'* transmits motion to the machine at normal speed. The motion to the press mechanism is transmitted through the gear wheel *j<sup>2</sup>* which meshes with the gear wheel *j'* mounted upon the counter shaft *j*. The slow moving shaft *c* is provided with a second clutch *d* which is advantageously of the jaw gripping type in which the engaged part *d'* is formed integral with the gear wheel *k* which is freely mounted upon the slow motion shaft *c* and is set in position against the collar *k'*. This clutch *d* is operated by a tripping device by which it is released when the operating hand lever *g* passes the position indicated at *x* as herein- after described. The clutch *d* is engaged on the movement of the boss *d<sup>2</sup>* toward the clutch *d*, to which boss *d<sup>2</sup>* the toggle levers of the gripping jaws are connected. The part *d<sup>3</sup>* of the clutch carrying the gripping jaws it will be understood is keyed to the slow motion shaft *c*. The main motor shaft *a* gears positively, without the intervention of a clutch, through the countershaft *l* which is suitably carried in brackets which are not shown. Such shaft *l* may advantageously be geared with the main motor shaft *a* by means of the bevel pinions *l'* and *l<sup>2</sup>* and may communicate motion from the worm *l<sup>3</sup>* mounted upon it with a worm wheel *l<sup>4</sup>* which is loosely mounted upon the slow motion shaft *c*, and is provided with a number of pawls *l<sup>5</sup>* on its face engaging with a boss *l<sup>6</sup>* fixed to the slow motion shaft *c* so that in the forward direction of movement of the worm wheel, motion is communicated to the slow motion shaft *c*, but should the slow motion shaft *c* be moved at a greater velocity, this is permitted by the slipping of the pawls *l<sup>5</sup>* over the recesses or teeth provided upon the fixed boss *l<sup>6</sup>*. Motion is

communicated from the countershaft  $j$  through the shaft  $m^{12}$  to a complementary countershaft and similar gear upon the other side of the machine or at the other side of the press.

The clutch operating gear consists of the hand control lever  $g$  pivoted upon the spindle  $g'$  and carrying upon same spindle  $g'$  a toothed segment  $g^2$  which gears with a rack  $g^3$  mounted upon a rod  $g^4$  at the extremity of which a piston  $h$  is connected, which works within a cylinder  $h'$ , whereby on air being admitted to one side or the other of the piston  $h$  the rack  $g^3$  and therefore the segment  $g^2$  and the hand control lever  $g$  are moved in one direction or the other as required to increase or decrease the speed of the machine, or to stop the press, the admission and exhaust of air to and from the cylinder being conveniently effected by any suitable air valve such as the three way valve  $h^2$  which is connected to the air supply pipe  $h^3$  and which is in turn connected to a receiver  $h^4$ , within which air may be maintained at a constant pressure by means of an air pump  $h^5$  operated from an eccentric  $h^6$  upon the main motor shaft  $a$ . The air pressure may be under the control of a stop valve such as  $h^7$ , and may be led through pipes such as  $h^8$  from an independent source, or to the controlling mechanism of the second part of the press.

The boss  $d^2$  of the clutch  $d$  is moved by the bell crank lever  $n$  which is connected to a link  $n'$ , which is in turn connected to one arm of the bell crank lever  $n^2$ , on the extremity of which weights  $n^3$  depend, so that on the bell crank lever  $n^2$  being tripped by the movement of the operating lever  $g$  from the position indicated  $x$ , the weight  $n^3$  would serve to retract the boss  $d^2$  of the clutch  $d$  and thus disengage the freely mounted part  $d'$  and the pinion  $k$ .

On the movement of the operating lever  $g$  from the position indicated  $x$ , the bell crank lever  $n^2$  will be tripped and will pass under the pawl  $n^4$ . In this position the slow motion shaft  $c$  will be moving at its full speed, and in this position also the clutch  $b$  will be slowly put into engagement, so that when the hand lever  $g$  reaches the position indicated  $y$ , the clutch  $b$  will be fully engaged so that the shaft  $i$  will rotate at the same speed as the main motor shaft  $a$ . This operation is effected by means of a cam piece  $o$  mounted upon the spindle  $g'$  of the hand control lever  $g$ , which is provided with a tail piece  $o'$ . A groove is formed in the cam piece  $o$  within which a pin provided upon the bell crank lever  $o^2$  slides, and a link  $o^3$  connects to the operating lever  $o^4$  of the clutch  $b$ . After the operating hand lever  $h$  has reached the position indicated  $y$ , the pin will reach the segmental or dead part of the tail piece  $o'$  of the

cam, and no further movement will be given to the clutch operating the lever  $o^4$ , which will thus be held or locked in that position.

A connecting rod  $e$  may be connected to the lower extremity of the hand control lever  $g$ , by which corresponding movements may be given to a second set of controlling apparatus provided upon the second part of the press or upon the second press, so that each press may be controlled together on the operation of one or other of the operating mechanisms.

In order to increase the speed of the machine after it has attained its normal speed a series of contacts  $p$  are provided with which engage a contact brush  $p'$  provided upon the operating hand lever  $g$ , so that after the operating hand lever  $g$  passes the position indicated at  $y$ , and reaches that indicated at  $z$  circuits may be closed by resistances and by which the motor fields may be weakened and the speed of the machine thereby accelerated.

Referring now to Fig. 2 in which the movement of the operating lever is shown as being controlled by means of electric solenoids,  $m$  is the main motor,  $m'$  the motor field,  $q$   $q'$  are the mains,  $r$  is the controller and  $r'$  indicates the magnetic blow out therefor. The contacts of the controller are numbered 1 to 10, of which 10 represents the normal full speed point.  $S$  is the field resistance box, and the shunt control contacts  $p$  are numbered 11 to 16 in sequence with the starter and controller  $r$ .

It will be understood that when the operating lever is moved to the position in which the machine is caused to run at its normal speed, the resistances indicated by numbers 1 to 10 will be included in the circuit. Upon further movement of the lever the resistances indicated by numbers 11 to 16 may be switched in.

What I claim as my invention and desire to secure by Letters Patent is.—

1. In combination an electric motor, a slow speed positive clutch and a high speed frictional clutch interposed between said electric motor and the driven shaft, a hand controlling lever, means for operating said clutches successively by said hand controlling lever, electrical controlling devices rendered operative by the movement of said hand controlling lever beyond its clutching position and means whereby the said further movement of the hand controlling lever locks the high speed clutch in its operative position.

2. In combination, an electric motor a slow speed positive clutch and a high speed frictional clutch interposed between the said electric motor and the driven shaft, a hand controlling lever, means for operating said clutches successively by said hand controlling lever a series of resistances in the field of

said electric motor switch connections where-  
by on the movement of said hand controlling  
lever beyond its clutching position said re-  
sistances are increased and means whereby  
5 the said further movement of the hand con-  
trolling lever locks the high speed clutch into  
its operative position.

In testimony whereof I have signed my  
name to this specification in the presence of  
two subscribing witnesses.

GEO. W. MASCORD.

Witnesses:

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