

C. B. CALLOW.

INTERLOCK.

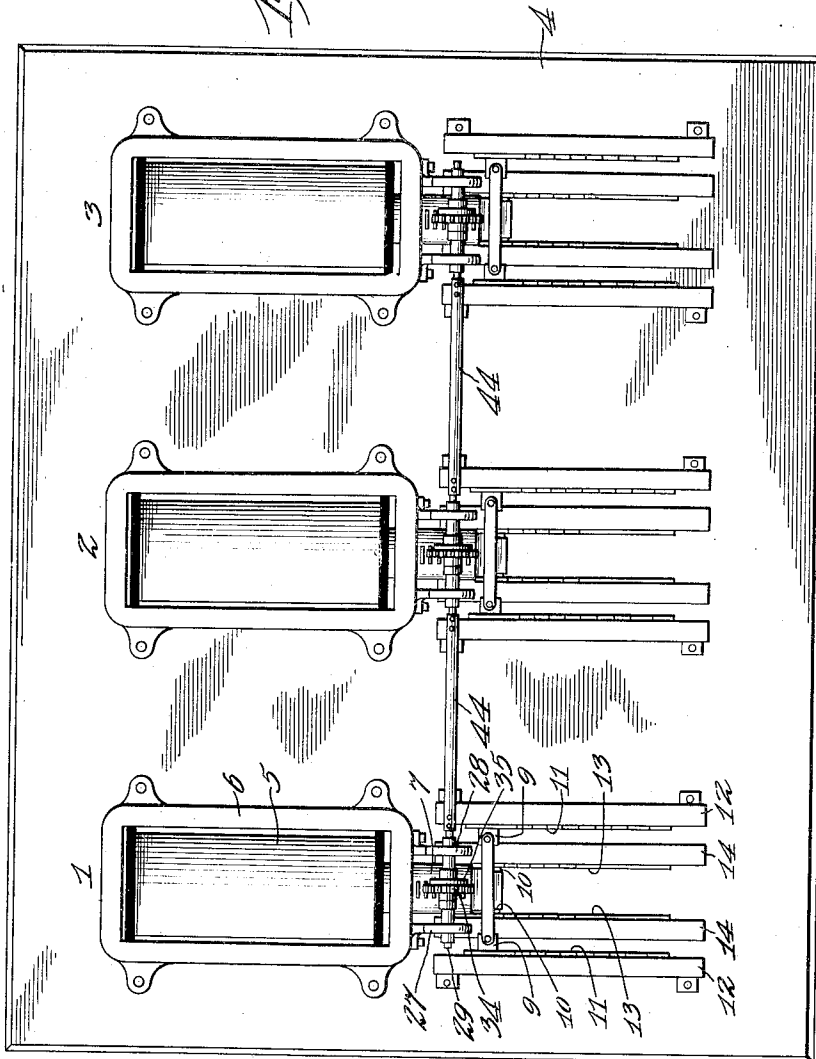
APPLICATION FILED SEPT. 29, 1911.

1,102,318.

Patented July 7, 1914.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

Geo. Haynes.

A. B. Dunbar.

Inventor:

Cecil B. Callow

By Edwin B. Thomas, Jr.,

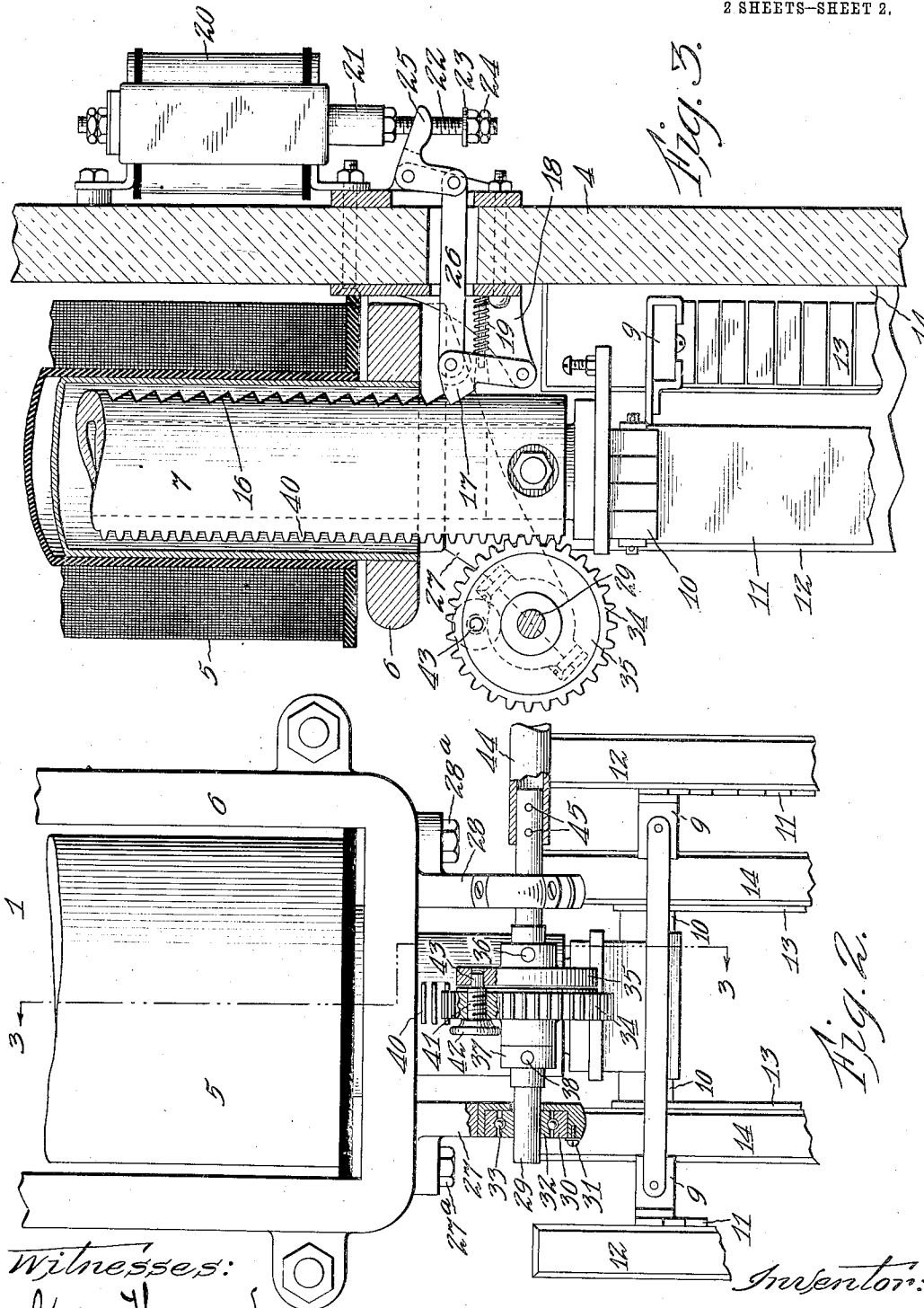
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2 SHEETS—SHEET 2.



Witnesses:
Geo. Haynes.
A. B. Dunbar.

Inventor:
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UNITED STATES PATENT OFFICE.

CECIL B. CALLOW, OF LONDON, ENGLAND, ASSIGNOR TO G. A. EDWARD KOHLER, OF CHICAGO, ILLINOIS.

INTERLOCK.

1,102,318.

Specification of Letters Patent.

Patented July 7, 1914.

Application filed September 29, 1911. Serial No. 651,937.

To all whom it may concern:

Be it known that I, CECIL B. CALLOW, a subject of the King of Great Britain, residing at 51 York Mansions, Prince of Wales Road, Battersea, London, England, have invented new and useful Improvements in Interlocks, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to improvements in interlocks. In practice there are many instances where it is desirable to operate normally independently controlled devices in synchronism and where it is of the utmost importance to maintain the devices in step at all times. For example, it is often desirable to so operate a number of printing presses through which is run a continuous web. Obviously under such conditions the press controllers must be operated in synchronism to maintain the presses at the same relative speeds at all times to prevent undue tension or slack of the web as it passes from one machine to another.

It is one of the objects of my invention to provide a simple means which may be used to effectually insure synchronous operation of normally independent devices.

It is a further object of my invention to provide an interlocking mechanism which may be readily and expeditiously rendered effective and ineffective.

Various other objects and advantages of my invention will be hereinafter clearly and fully set forth.

For the purpose of more fully disclosing the nature and characteristic features of my invention, I shall describe the embodiment thereof illustrated in the accompanying drawings. It should of course be understood that my invention is not limited to the specific embodiment or application thereof illustrated in the accompanying drawings.

Figure 1 is a front elevation of the device. Fig. 2 is an enlarged detail view of part of the device shown in Fig. 1 and Fig. 3 is a sectional view taken on line 3—3 Fig. 2.

The device selected for the purpose of illustration comprises three similar automatic contact devices of a conventional form which are particularly suited for use as master controllers for motor operated printing presses. It may be assumed that these

devices either directly control their respective motors or control the same through suitable intermediary instrumentalities and that the motors drive a separate machine. These controllers are all shown as mounted upon a single panel 4 but of course they might be mounted upon separate panels. For a purpose hereinafter made apparent, it is desirable to have the devices arranged side by side in close proximity to one another. They might however be arranged in various different ways. The three controlling devices are all of the same construction and I shall therefore only describe one of the same and only briefly describe the parts thereof which are old.

The device 1 includes a solenoid winding 5 mounted in a suitable magnet frame 6 secured to the panel 4. This winding is provided with a movable plunger 7, carrying two sets of contact brushes 9—9 and 10—10. The contact brushes 9—9 are adapted to slide over series of contacts 11—11 mounted upon adjacent faces of vertically disposed parallel supporting bases 12—12 suitably secured to the panel 4. The brushes 10—10 are adapted to slide over series of contacts 13—13 mounted on the adjacent faces of vertically disposed parallel bases 14—14. These brushes and their coöperating contacts may control either directly or through suitable intermediary instrumentalities the circuits of the driving motor or motors of one of the machines. The contact brushes are moved upwardly over the contacts upon energization of the solenoid winding. In practice it is desirable to stop and hold the contact brushes in different positions, and for accomplishing this the plunger 7 is provided at its rear with a series of teeth 16 with which engages a pawl 17. The pawl 17 is fulcrumed to a bracket 18 secured to the panel 4 and is normally pressed by a spring 19 into engagement with the toothed portion of the plunger. With this arrangement the ascent of the brushes may be stopped at any time by deenergization of the solenoid winding 5 and the plunger 7 automatically locked against return movement by the pawl 17. For disengaging the pawl from the toothed portion of the plunger to permit its descent, a solenoid 20 is provided upon the rear side of the panel 4. The plunger 21 of this solenoid

is provided with a tail rod 22 carrying a collar 23 retained in place by nuts 24. The collar 23 is adapted to engage and rock a bell crank lever 25 fulcrumed on a suitable support and connected to the pawl 17 by a link 26. The arrangement is such that when the solenoid 20 is energized the bell crank lever is rocked in a direction to withdraw the pawl 17 from engagement with the teeth of the plunger 7, thus leaving the plunger free to descend and move the contact brushes carried thereby downwardly over their respective series of contacts.

I shall now describe the means illustrated for interlocking the several devices to insure synchronous operation thereof.

Continuing the description of the device 1 the magnet frame thereof carries two depending brackets 27 and 28 which may be secured thereto in any suitable manner as by bolts 27^A and 28^A. The brackets are disposed on opposite sides of the plunger 7 and support a transversely extending shaft 29 revolvably mounted therein. In practice the shaft may be supported in any preferred form of bearings. I prefer however to provide the form of bearing shown in Fig. 2. This bearing consists of a ring 30 set into a suitable recess in the bracket 27 and retained in place by a screw 31 threaded into the bracket with its head overlapping said ring. The shaft passes through the bracket and ring 30, the portion thereof within the ring 30 having a similar ring 32 fixed thereto. The rings 30 and 32 are provided with a ball race for the reception of balls 33. This provides a very simple and effective form of anti-friction bearing for the shaft. Shaft 29 carries a pinion 34 and a disk 35 the former being loosely mounted thereon and the latter being fixed thereto as by means of a pin 36. The pinion 34 is confined between the fixed disk member 35 and a collar 37 fixed to the shaft as by means of a pin 38. Pinion 34 meshes with a series of teeth 40 on the front of the plunger 7, said teeth forming a rack extending longitudinally of the plunger. A thumb screw 41 is provided for locking the pinion 34 to the disk member 35 and in consequence to the shaft 29. This screw is provided with a portion threaded through the pinion with a knurled head 42 for turning the same and a pin projection 43 adapted to project into an orifice in the disk member 35. With this arrangement the pinion and disk member may be readily locked and unlocked by merely turning the screw 41 to insert or withdraw the pin projection thereof from the opening in the disk member. When the pinion and disk member are locked together any reciprocation of the solenoid plunger will result in revolving the pinion and shaft 29 whereas with the pinion released from the disk reciprocation of the solenoid plun-

ger will merely cause the pinion to revolve upon the shaft without imparting any movement to the latter.

The other two devices 2 and 3 are provided with similar mechanisms. The shafts of the several devices may be connected in any preferable manner, or they might be made integral if desired. As illustrated the shafts are connected by pipe sections 44 secured thereto by pins 45. This forms a rigid connection between all of the shafts and in effect produces a single continuous shaft for all of the devices. With the arrangement just described, the several controlling devices may be readily interlocked to insure an absolute synchronous operation thereof by merely locking their respective pinions to their corresponding disk members thereby in effect locking all of the pinions to the same shaft. Under these conditions it is obvious that no one of the plungers can be moved without a corresponding movement being imparted to all of the other plungers, since movement of any one of the same would be transmitted through the pinions and shaft to all of the remaining plungers and to precisely the same degree assuming the pinions and racks to be alike. This of course insures absolute synchronous control of the several machines controlled by the different devices. On the other hand when independent control of the machines is desired it is only necessary to turn the screws 41 to unlock the several pinions from their corresponding disk members whereupon as before stated, the pinions are free to revolve upon the shaft without imparting any rotation thereto, thereby entirely eliminating the interlock between the various devices and leaving the same free for independent operation.

What I claim as new and desire to secure by Letters Patent is:—

1. In combination, a plurality of devices having separate power operating means for operating the same independently of one another and mechanical interlocking means therefor, including a revoluble shaft and pinions.

2. The combination with a plurality of devices having separate power operating means and having reciprocating parts, of means occupying a fixed bodily position for mechanically interlocking said reciprocating parts of said devices to insure synchronous operation thereof by their respective operating means.

3. In combination, a plurality of devices having separate power operating means for operating the same independently of one another, a revoluble shaft, a plurality of pinions loosely mounted upon said shaft and each meshing with teeth on one of said devices and means for locking said pinions to said shaft to insure synchronous operation

of said devices by their respective operating means.

4. The combination with a plurality of devices having independent operating means and having reciprocating parts, of interlocking means for said reciprocating parts occupying a fixed bodily position and having means for directly engaging said reciprocating parts to effect positive connection thereof.

5. In combination, a plurality of separately operable reciprocating members, and means for interlocking said members to move in synchronism including rotatable members directly engaging and operated by said reciprocating members and means connecting said rotatable members.

6. In combination, a plurality of reciprocating members, a revoluble shaft, a plurality of pinions loosely mounted on said shaft and meshing with teeth on said reciprocating members and means for locking said pinions to said shaft to insure synchronous operation of said reciprocating members.

7. In combination, a plurality of solenoid operated devices, a plurality of pinions, each meshing with rack teeth on the plunger on one of said solenoid devices and means for operatively connecting said pinions to mechanically interlock said solenoid plungers.

8. In combination, a plurality of solenoids, a revoluble shaft, a plurality of pin-

ions mounted on said shaft, each meshing with rack teeth on the plunger on one of said solenoids and means for rendering said shafts and said pinions effective and ineffective as interlocks between said solenoid plungers.

9. In combination, a plurality of solenoid operated devices, a revoluble shaft, a plurality of pinions loosely mounted upon said shaft, each meshing with a rack on the plunger of one of said solenoids and means for locking said pinions to said shaft to mechanically interlock said plunger.

10. In combination, a plurality of solenoid operated devices, a revoluble shaft, a plurality of pinions loosely mounted upon said shaft and each meshing with a rack on the plunger of one of said solenoids and means for locking said pinions to said shaft to mechanically interlock said plungers, said means including a plurality of members fixed to said shaft each adjacent to one of said pinions and devices for releasably locking each of said pinions to one of said fixed members.

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

CECIL B. CALLOW.

Witnesses:

WILLIAM OLIVER,
A. MONTE CALLOW.