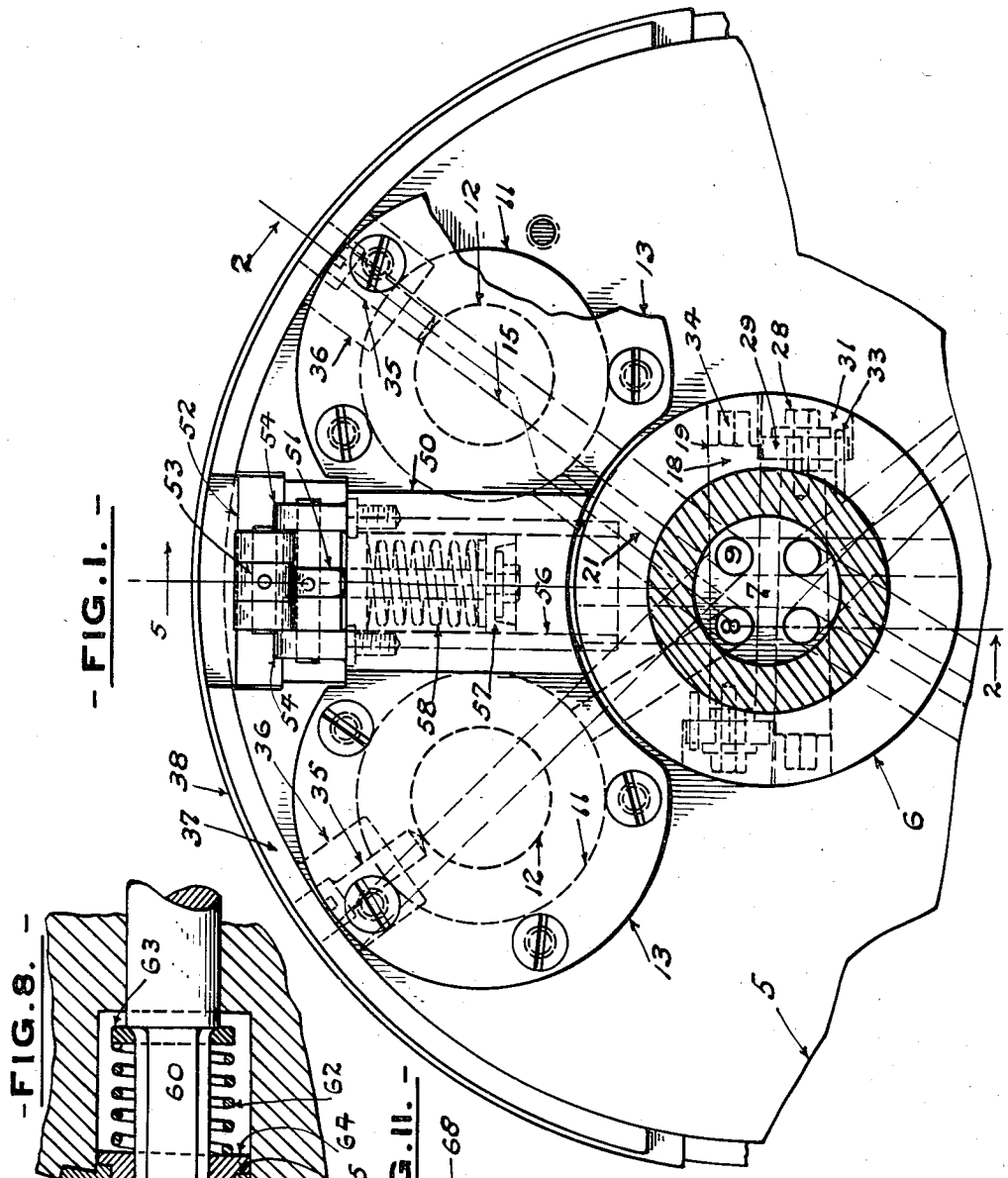
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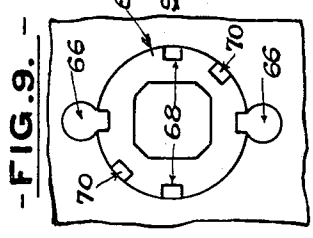
PRINTING PLATE CLAMPING MECHANISM

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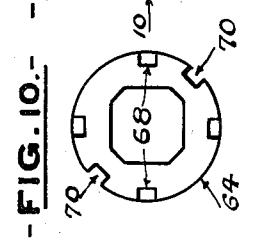
-FIG. 1.-

-FIG. 8.-



-FIG. 9.-

-FIG. 11.-



-FIG. 10.-

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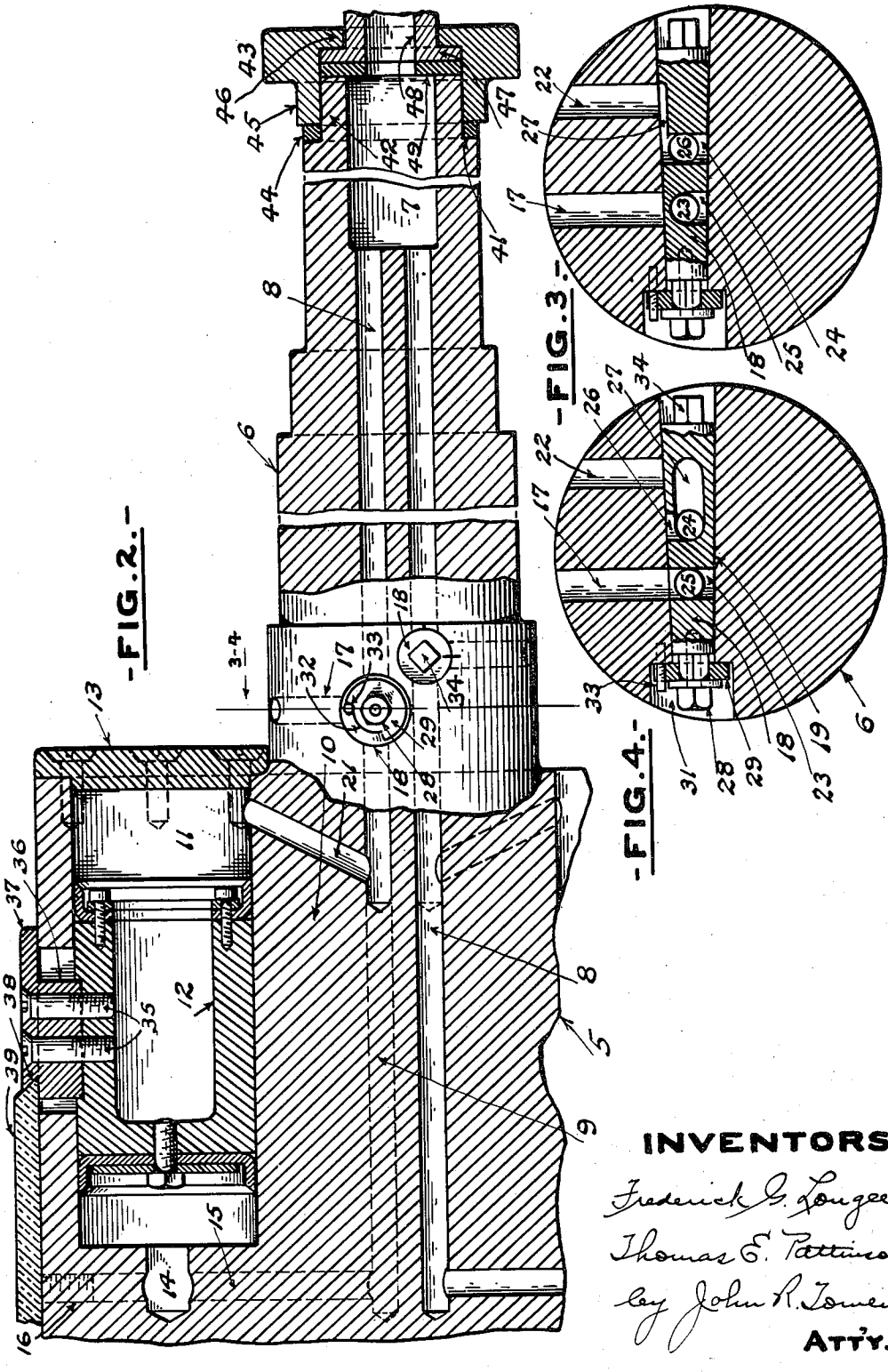
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PRINTING PLATE CLAMPING MECHANISM

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-FIG.2.-

-FIG.3.-

-FIG.4.-

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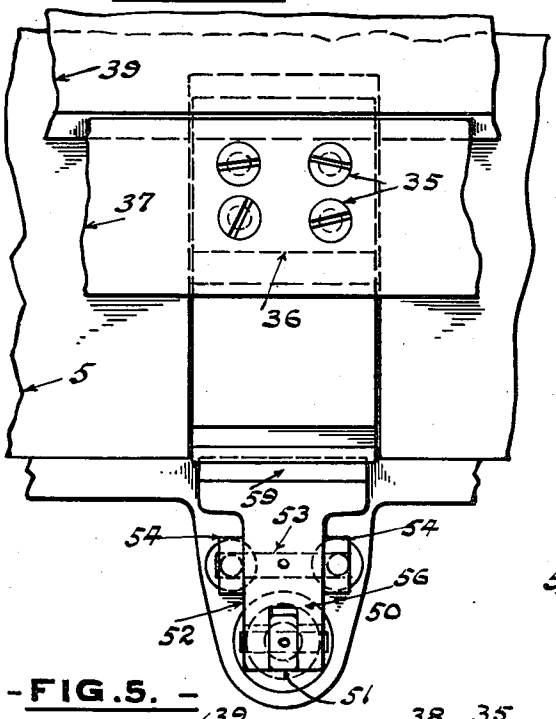
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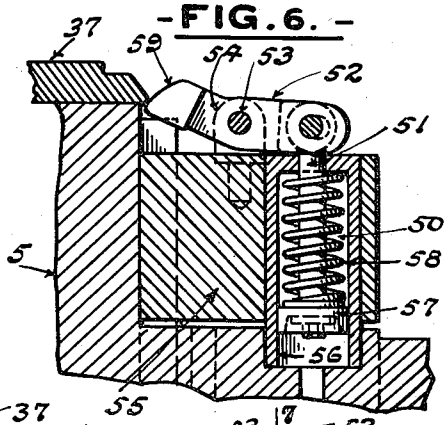
PRINTING PLATE CLAMPING MECHANISM

Filed July 14, 1932 3 Sheets-Sheet 3

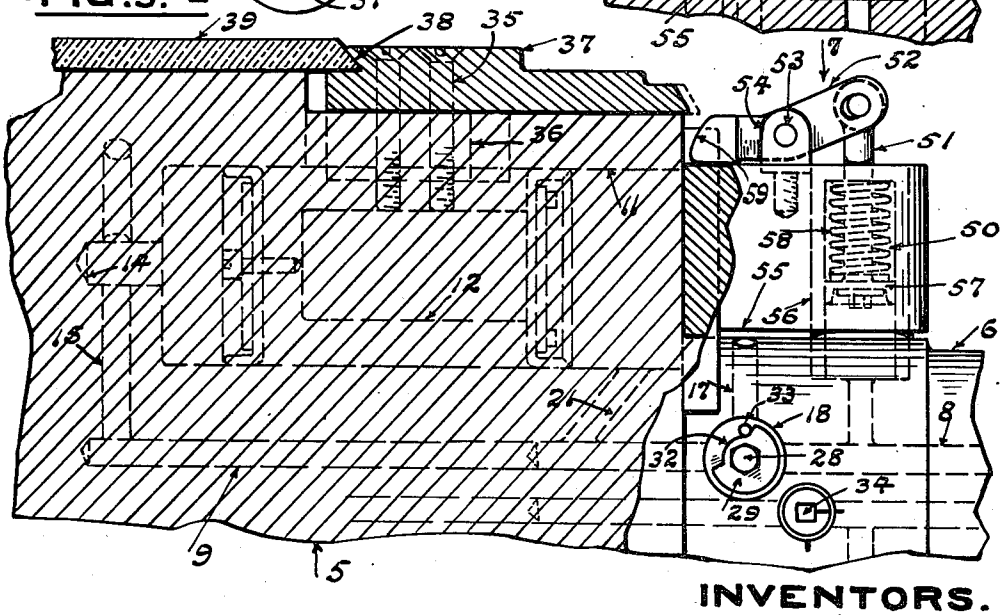
-FIG.7.-



-FIG.6.-



-FIG.5.-



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PRINTING PLATE CLAMPING MECHANISM

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Application July 14, 1932, Serial No. 622,446
In Great Britain July 25, 1931

15 Claims. (Cl. 101—378)

This invention in general relates to improved means for clamping printing plates, and more particularly stereotype plates, and to means for clamping such plates by fluid pressure.

The principal object of the invention is to provide a simplified arrangement whereby a substantial saving in time and labor will be effected in the clamping and unclamping of printing plates.

Another object is to provide a device insuring that the printing plates will be securely clamped despite wear and unevenness in same, which may develop during a "run" of a printing machine.

A further and special object is to provide a novel device for clamping printing plates by pneumatically operated means which will operate to apply a clamping pressure to the plates, instantly available when required, by the operation of a valve.

It is also an object of the invention to provide a pneumatic plate lockup of generally improved construction, whereby the device will be simple, durable and inexpensive in construction, as well as convenient, practical, serviceable and efficient in its use.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts, and in the details of construction hereinafter described and claimed, it being understood that various changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

The preferred embodiment of the invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a fragmentary end elevational view of a printing cylinder to which an embodiment of the invention has been operatively attached;

Figure 2 is a fragmentary longitudinal sectional view taken on line 2—2 of Figure 1, showing the "on" or plate "lockup" position.

Figure 3 is a transverse sectional view taken on line 3—3 of Figure 2, looking in the direction of the arrow and illustrating one of the valve locks employed for admitting air to, and exhausting same from a printing cylinder, showing the port to the front of the air cylinder. This being the "on" or plate "lock-up" position.

Figure 4 is a view similar to Figure 3, but showing the parts reversed; i. e., the rear port open and the front port exhausting; this view illustrating the plate release position;

Figure 5 is a fragmentary longitudinal sectional view showing a spring controlled member which operates to prevent the printing plate from becoming loosened in case of failure of the fluid supply.

Figure 6 is a fragmentary sectional detail view of the spring controlled means shown in elevation in Figure 5;

Figure 7 is a fragmentary top plan view of details shown in Figure 5;

Figure 8 is a fragmentary sectional detail view, partly in elevation, of the means employed for retaining the valves in their operative and inoperative positions.

Figure 9 is an end elevational view looking in the direction of the arrow 9 of Figure 8;

Figure 10 is an elevational view of the spring retaining plate shown in Figures 8 and 9; and

Figure 11 is a sectional view taken on the line 11 of Figure 10.

In the preferred embodiment of the invention as applied to a printing cylinder 5 shown fragmentarily, which is "two plates around" and "four plates along" and which is provided with the usual fixed central abutment, and intermediate floating clips (not shown), the said printing cylinder 5 has its shaft 6 recessed at each end to provide a pocket 7 with which communicate inlet passageways 8, 9 provided by rifle-boring the shaft 6, the said passageways being extended into the body portion 10 of the cylinder 5.

The body portion 10 of the cylinder 5 is provided at each end with four chambers or cylinders 11 each adapted to receive a piston 12, the outermost end of each of said cylinders 11 being sealed with a cover plate 13 secured thereto, in any suitable manner. As each of the piston and cylinder assemblies are practically identical, a description of one will serve for the others. Each of the piston-receiving chambers or cylinders 11, at one end communicates with a small pocket 14 leading into a passageway 15 normally closed at one end by a plug 16 threaded therein, and at its other end opening into the passageway 9 leading directly into the chamber or pocket 7 with which the compressed air supply is connected, as hereinafter described. The passageway 9 also is adapted to communicate with an exhaust channel 22 by means of a tapering valve or plug 18 which is arranged in a correspondingly tapered hole or channel 19 formed in the shaft 6. The passageway 8 similarly communicates with the front end of the piston-receiving chamber 11 through an obliquely-positioned passageway 21.

The passageway 8, similarly to the passageway 9, may be connected with an exhausting channel 17 formed in the shaft 6 by means of the same plug 18.

The tapered plug or valve 18 is formed with two ducts 23, 24 arranged transversely through the body portion of the plug, and extending through same in directions differing by approximately 90°. Each of the ducts 23, 24 has communicating transversely therewith an auxiliary duct 25, 26 respectively, which extend and are arranged at right angles to the principal ducts 23, 24 and which do not like the latter extend transversely from one side to the other of the valve or plug 18.

Each of the tapered plugs 18 in addition is formed with a comparatively shallow gutter 27 on its outer periphery which communicates at one end with the passageway 24, and at its other end, when the plug 18 is turned to the position shown in Figure 4, with the exhaust channel 22.

It will now be seen when the plug 18 is turned to the position shown in Figure 3, the passageway 8 is aligned with duct 25 of the said plug, permitting the flow of fluid under pressure to the front end of the chamber 11 via the oblique passageway 21, at the same time, the rear of the chamber 11 is exhausted through 14, passageways 15, 9; duct 26, gutter 27 and exhaust channel 22.

When the plug 18 is turned to the position shown in Figure 4, the gutter 27 is sealed or closed by the adjacent portion of the shaft, while the duct 24 is aligned with passageway 9 to admit compressed fluid into the rear of the piston receiving chamber 11 via the passageway 15, while the front of the same chamber is exhausted through the passageway 21, 8, auxiliary duct 25 and duct 23; escaping thence out of channel 17, the piston reciprocating as the plug 18 is turned. With a view to absorbing shock as the piston 14 responds to fluid pressure, the exhaust ports in the plug or valve 18 may be formed smaller than the inlet passageways so as to provide a slightly delayed or retarded escape of the compressed fluid.

In order to limit the angular movement of the plugs or valve bodies 18, a screw bolt 28 is threaded into one end of the plug 18, the head of the said bolt 28 being engaged against a plate or disc 29 which is thereby pressed against the floor or innermost portion of a recess 31 formed in the shaft 6, the recess 31 communicating with the channel 19 receiving the plug 18. The plate 29 is formed with a square hole which fits over a similarly formed extension of the plug 18; and cut away or notched as at 32 to receive the stem of a pin 33 which is fastened in the shaft of the cylinder 6.

By turning the screw bolt 28, the disc 29 may be clamped with variable pressure against the floor of the recess 31 so that the valve plug 18 may properly seat in the tapering passageway 19 provided in the shaft 6 of the cylinder 5. Any other suitable means instead of the bolt 28 and disc 29 may be employed for adjustably maintaining the plug 18 in its tapered hole 19.

At its other end, the plug 18 is formed with a square shank 34 which is adapted to receive a suitable wrench or key for turning the said plug 18. By inspection of Figures 2, 3 and 4, it will now be seen that the plugs 18 may be turned in order to open or close one channel 8 and simultaneously close or open the other channel 9 and vice versa in order to actuate the pistons 12 connected therewith to each of which latter are fastened by screws 35, a block 36 having an integrally formed clip or a plate clamp 37 provided with a beveled edge 38 adapted to engage a correspondingly beveled edge on a stereotype plate 39.

The shaft 6 of the cylinder 5 is shouldered as at 41 and has a reduced end 42 on which a coupling assembly 43 connecting a compressed air supply (not shown) to the shaft 6 is mounted. The assembly 43 includes a gasket 44 held between the shoulder 41 and an annular member or cap 45 having an inwardly directed flange 46 which is engaged against an outwardly directed flange 47 on a pipe 48, a gasket 49 being arranged between the last mentioned flange 47 and the extremity of the reduced shaft end 42. The purpose of the coupling assembly 43 is to maintain an operative air tight connection between the cylinder shaft 6 and the air supply so that the compressed air may properly perform its functions while the cylinder is rotating. Any suitable air tight coupling may be employed instead of the assembly 43 illustrated.

As best shown in Figures 6 and 7 means are provided to prevent a stereotype plate 39 from flying off the cylinder 5 in case of a breakdown or failure in the air supply. The said means comprises a small spring-loaded plunger 50 the stem 51 of which is connected to a latch or dog 52 rockingly mounted or fulcrumed on a pin 53 secured to a lug 54 fastened to a block or member 55 recessed to accommodate a small casing 56 in which the plunger assembly 50 is reciprocatingly confined. Between a piston or head 57 secured on the stem 51 of the plunger 50 and the top of the casing 56, a spring 58 is confined, which operates only when the air supply fails, as will appear hereinafter. During operation the plunger 50 is normally pressed upwardly by the fluid pressure and maintained in the position shown in Figure 5; i. e., in a position to keep a cam-shaped or beveled head 59 forming a part of the latch or dog 52 out of engagement with the plate clamp 37. Should the fluid pressure fail accidentally or diminish to a value insufficient to maintain the plate clamps in operative engagement with the printing plate, or be otherwise cut off from the cylinder 5, the spring 58 will thrust downwardly the plunger thereby rocking the latch 52, abovementioned, on its pin 53. As the latch 52 rocks, the cam-shaped or beveled head 59 of the dog 52 will engage the extremity of the plate clamp 37, as best shown in Figure 6, thereby preventing same from releasing its engagement with the stereotype plate 39.

In Figures 8, 9 and 10, means for locking the plug valve in either of its two operating positions to clamp or release a plate, is shown. The said plug valve is squared and reduced at one end 60, the other end being provided with the bolt 28, disc 29 and pin 33 as shown in Figures 3 and 4 to limit the swing of the plug to the normal opening and closing positions. The squared end 60 carries a spring 62 which is confined between a washer 63 on the said reduced end and a ring 64 which has a square hole, and which slides back on the end 60 when an operating wrench is applied to turn the valve. The margin 65 of the ring seats against a pair of tabs 66 preferably welded to the shaft 6. Opposed pairs of notches 68 on its outer edge are arranged 90° apart and it is slotted at 70. When the tabs 66 are seated in either of the pair of notches 68, the plug is locked in operative position for clamping or releasing a plate. To remove the plug for inspection or adjustment, the washer 29 is first removed after which the plug

valve is turned further until the slots 10 are aligned with the tabs 66, whereupon the ring 64 may be slipped out and the spring 62, washer 63 and the plug withdrawn. The spring 62, it will be understood, maintains a pressure against the ring 64 which serves to retain the latter yieldingly against the tabs 66, and permits a socket wrench to be applied to the exterior squared end 60 of the plug valve when the ring 64 is thrust inwardly by the said wrench.

The construction and manner of operation of the device has been in a large measure indicated from the foregoing details, but will be more fully understood from the following brief description: Assuming a stereotype plate 39 has been secured to the periphery of the printing cylinder 5, and further assuming that the pocket 7 of shaft 6 of the said printing cylinder has been connected to a source of air or fluid under pressure, it will be observed the said fluid will be conducted through the pairs of passageways 8 and 9 to their respective chambers, the angular position of the rotary plug valves 18 determining to which side of the chambers 11 the fluid will be conducted. When it is desired to engage or clamp the stereotype plate 39 with the printing cylinder 5, the plug 18 will be turned so that the port or duct 23 therein will be aligned with the passageways 8 with which communicates passageway 21 leading to the front of the cylinder, the auxiliary duct 25 being closed on the outer side of the plug by the adjacent surface of the cylinder 5, thereby permitting fluid under pressure from a source (not shown) to enter at the front and consequently thrusting to the left (see Figure 2) the piston 12 carrying the stereotype plate engaging member or plate clamp 37 against the stereotype plate 39.

Simultaneously, the rear of the chamber 11 will be exhausted in the manner indicated above, via 14, passageways 15, 9; duct 24 and gutter 27 of the plug 18 to exhaust channel 22 in the cylinder 5. When it is desired to release the stereotype plate 39 the valve will be turned in an opposite direction which will change the alignment of passageways, channels and ducts to the position shown in Figure 4, thus introducing compressed air into the back of the chamber 11 while permitting the escape of air from the front of the chamber, and consequently pushing the piston to the right as viewed in Figure 2. The movement of the piston to the right as viewed in Figure 2 will serve to disengage the stereotype plate.

It may be pointed out that by the present device a considerable saving in time and labor may be effected, since it avoids the necessity of clamping the stereotype or printing plates by conventional means involving manually adjustable screws and equivalent means.

It will of course be understood that hydraulic means may be substituted optionally for pneumatic means, as indicated by the general use of the term "fluid-operated" throughout the specification and claims. Likewise the device, as is obvious, may be employed for the operative engagement and disengagement of other types of printing plates such as electrotype plates to printing machines.

It will also be understood that when hydraulic means are employed, a suitable guard and/or conducting means will be employed to take care of the exhaust liquid from the device.

What we claim is:

1. In a device of the character described, a printing cylinder, fluid-operated means secured to said cylinder for engaging and disengaging a printing plate when desired, and a second means for preventing disengagement of a printing plate when the fluid operated means becomes ineffective to retain the printing plate on the cylinder, said second means being normally controlled by fluid.

2. In a device of the character described having a printing cylinder, fluid-operated means secured to said cylinder for fastening a printing plate operatively to the printing cylinder, and other means secured to the cylinder for retaining said printing plate to the cylinder; said last-mentioned means being operative only when said fluid-operated means becomes accidentally inoperative.

3. In a device of the character described, a printing cylinder, a plurality of chambers secured to said cylinder, each of said chambers receiving a piston reciprocatingly mounted therein, fluid-conducting means secured to the cylinder for admitting and exhausting fluid to actuate said pistons for engaging and disengaging printing plates securable on said printing cylinder, and latch means normally maintained inoperative by the fluid for preventing the disengagement of the printing plates from the cylinder when said fluid becomes ineffective to actuate the pistons.

4. In a device of the kind described, a printing cylinder adapted to receive a printing plate, fluid-operated means for engaging and disengaging said printing plate to fasten the printing plate to the cylinder and release same when desired, and means normally maintained inoperative by fluid pressure when the fluid-operated means are operative, but made effective when the said fluid-operated means become accidentally inoperative, to retain the printing plate on the cylinder.

5. A device of the kind described comprising a cylinder, adapted to have printing plates fastened thereto, said cylinder having a plurality of chambers, each of said chambers having a piston reciprocatingly mounted therein and adapted to be moved by fluid pressure, fluid-conducting means optionally connectable with each of the chambers, rotary valve means for operatively connecting and disconnecting said fluid-conducting means with and from said chambers, and other means operated by diminished fluid pressure, for preventing the said printing plates from being accidentally detached in case of failure of the fluid pressure.

6. In a device of the kind described, in combination, a printing cylinder having a plurality of chambers formed therein, each of said chambers communicating with passageways arranged in and extending through said cylinder, a piston reciprocatingly mounted in each of the said chambers, a plurality of rotary valves secured in the cylinder and normally serving to admit and exhaust fluid under pressure into and out of said chambers, a printing plate-engaging member secured to each of said pistons, and means including a spring-biased ring connected to one end of the valve for maintaining said valve in open and closed positions.

7. In a mechanism of the kind indicated, a printing cylinder provided with a plurality of chambers having a plurality of passageways communicating with said chambers and manually operable valve means for admitting fluid to and exhausting same from the chambers to actuate a piston in each of said chambers for clampingly engaging and disengaging a printing plate operatively on the periphery of said cylinder, said valve means being spring-pressed at one end and

having movement limiting means connected to its other end.

8. In a device of the kind described, the combination of means operated by fluid under pressure for fastening a printing plate operatively to a printing cylinder and releasing same when desired, and other means normally made inoperative by said fluid but automatically moved and made operative to fasten said plate to the cylinder when the fluid pressure becomes diminished.

9. In combination, a cylinder adapted to receive a printing plate, a plate clamp adapted to secure the plate on the cylinder, a bore in the cylinder, a piston fitted to slide in the bore and operably connected to the clamp, a valve, ducts opening into the bore and connecting with the valve, and other ducts connecting the valve with a fluid pressure supply; said valve being operable to admit the fluid pressure to the bore, on one side of the piston to engage the clamp with the plate, and a locking device biased to prevent movement of the clamp to disengage the plate and held in inoperative position by the fluid pressure.

10. In combination, a cylinder adapted to receive a printing plate, a plate clamp adapted to secure the plate on the cylinder, a bore in the cylinder, a piston fitted to slide in the bore and operably connected to the clamp, a reversing valve, exhaust ports for the valve, ducts opening into the bore at opposite sides of the piston and connecting with the valve, and other ducts connecting the valve with a fluid pressure supply; said reversing valve being operable to admit the fluid pressure to one side of the piston to engage the clamp with the plate and to the other side of the piston to disengage the clamp, and a locking device biased to prevent movement of the clamp to disengage the plate, and held in inoperative position by the fluid pressure.

11. In a mechanism of the character described, a cylinder having a shaft, a chamber formed in said cylinder, a piston reciprocatingly mounted in the chamber, longitudinally extending passageways in the shaft communicating with said chamber, a channel arranged in said shaft transversely to said passageways, valve means arranged in said channel and a plurality of exhaust channels arranged in said shaft transversely to said passageways, said valve means intersecting all of said passageways and channels.

12. In combination, a cylinder adapted to receive a printing plate and having a shaft, a plate clamp adapted to secure a plate on the cylinder, a bore in the cylinder, a piston operably connected to the clamp and fitted to slide in the bore when impelled by fluid pressure, longitudinally extending passageways in the shaft communicating with the bore, a channel arranged in the shaft transversely to the passageways, and a valve mechanism rotatable in the channel to control the fluid pressure.

13. In combination, a cylinder adapted to receive a printing plate and having a shaft, a plate clamp adapted to secure a plate on the cylinder, a bore in the cylinder, a piston operably connected to the clamp and fitted to slide in the bore when impelled by fluid pressure, longitudinally extending passageways in the shaft communicating with the bore, an exhaust duct in the shaft, a channel arranged in the shaft transversely to the passageways, and a valve mechanism rotatable in the channel and communicating with said passageways and with the exhaust duct.

14. In a device of the character described in combination, a printing cylinder adapted to receive a printing plate and having a shaft, a bore in the cylinder, a piston slidably arranged in the bore, longitudinally extending passageways formed in the shaft and communicating with the bore, a channel arranged in the shaft transversely to the passageways, valve means mounted in the channel, and other means arranged within the cylinder and mounted on the valve means for selectively retaining the said valve means in operative and inoperative positions.

15. In a device of the character described in combination, a printing cylinder adapted to receive a printing plate and having a shaft, a bore in the cylinder, a piston slidably arranged in the bore, longitudinally extending passageways formed in the shaft and communicating with the bore, a channel arranged in the shaft transversely to the passageways, a valve mounted in the channel, and other means including a spring detachably secured to the valve for selectively retaining same in operative and inoperative positions and for permitting the removal of the valve from the cylinder when desired.

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