July 14, 1953 A. DRESSEL ET AL 2,645,177

STEREOTYPE PLATE CLAMP

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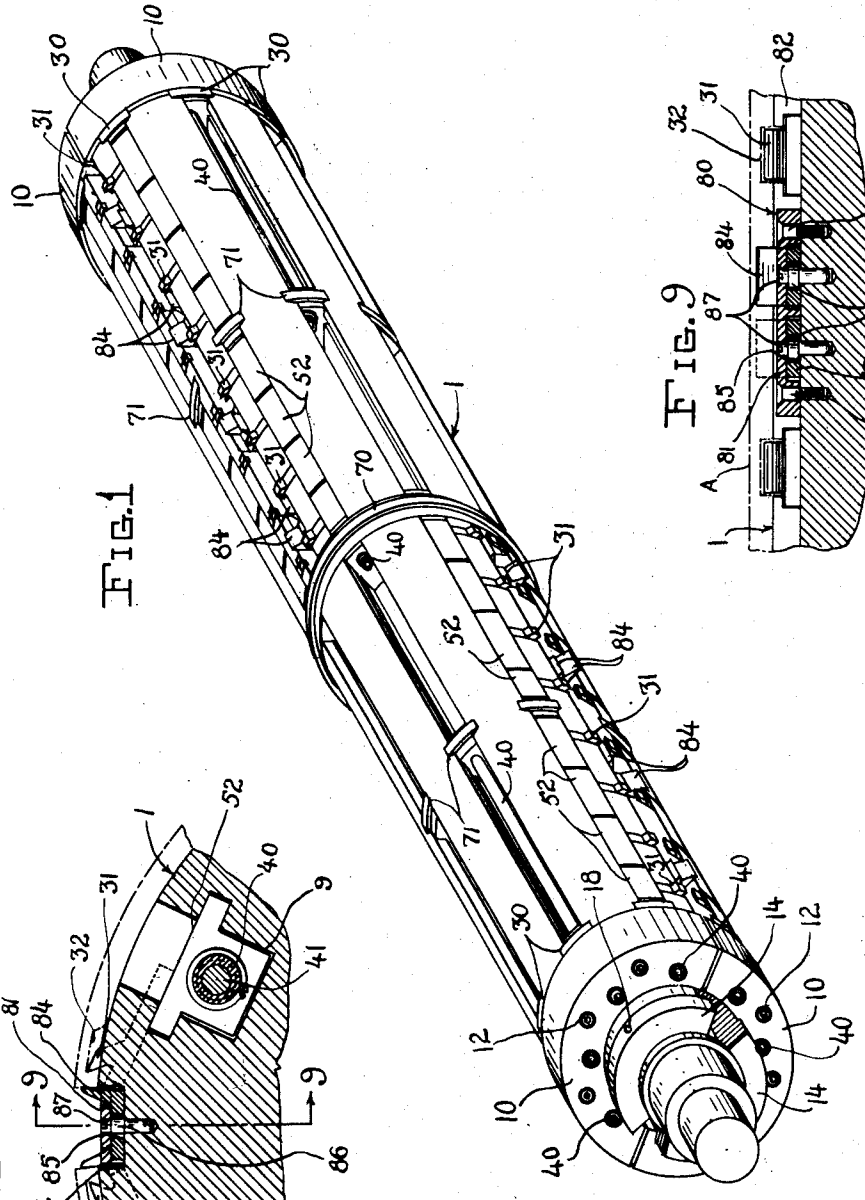


FIG. 1

FIG. 9

FIG. 8

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STEREOTYPE PLATE CLAMP

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FIG. 2

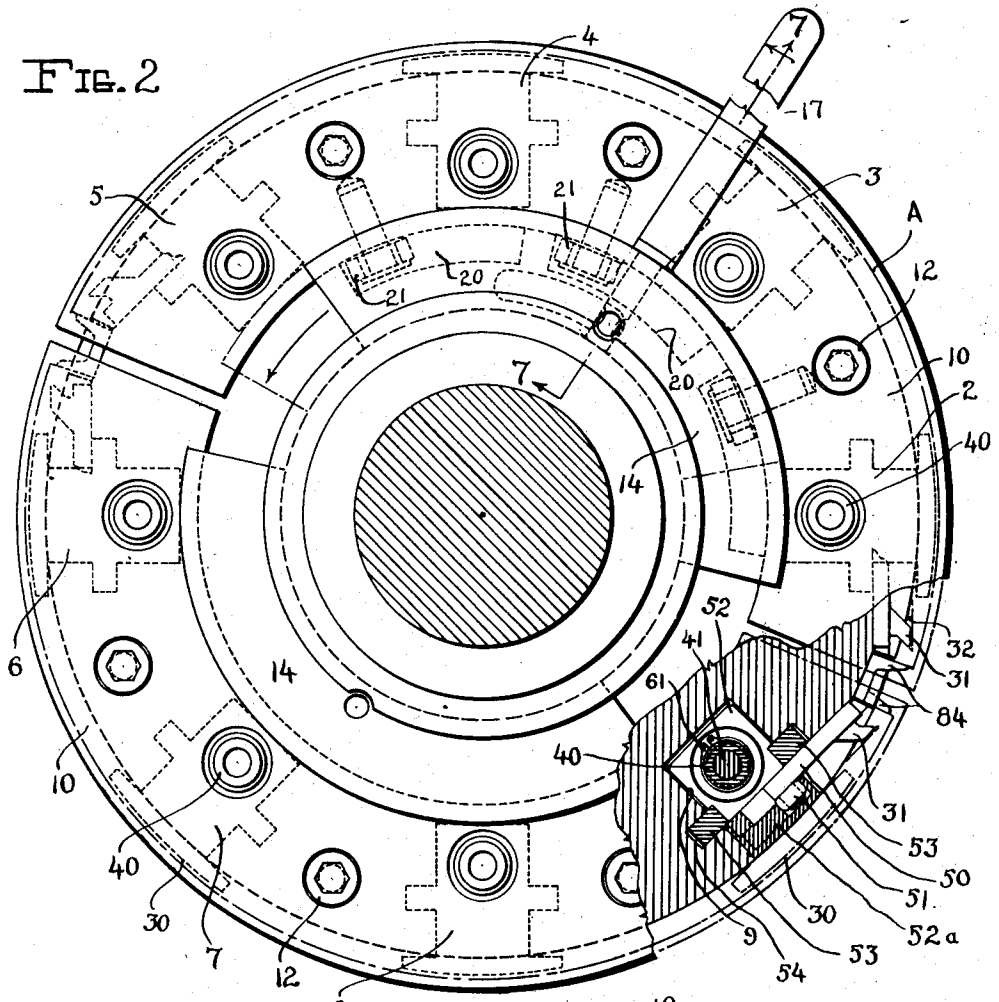
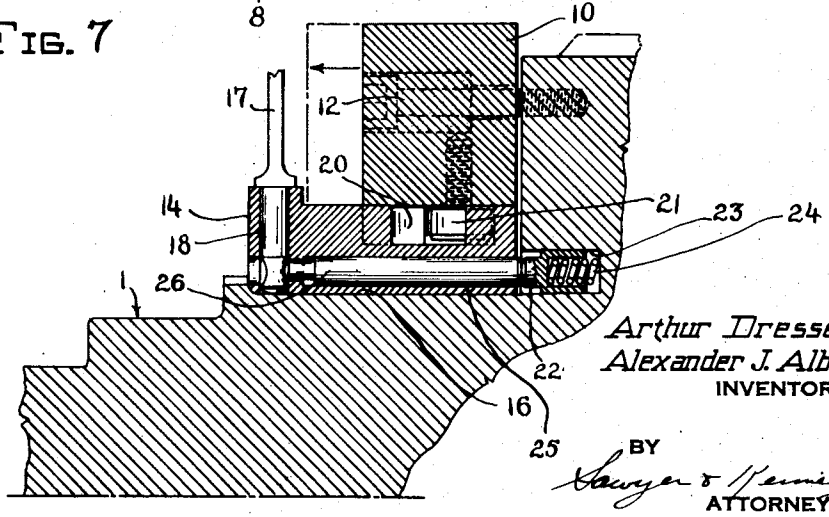


FIG. 7



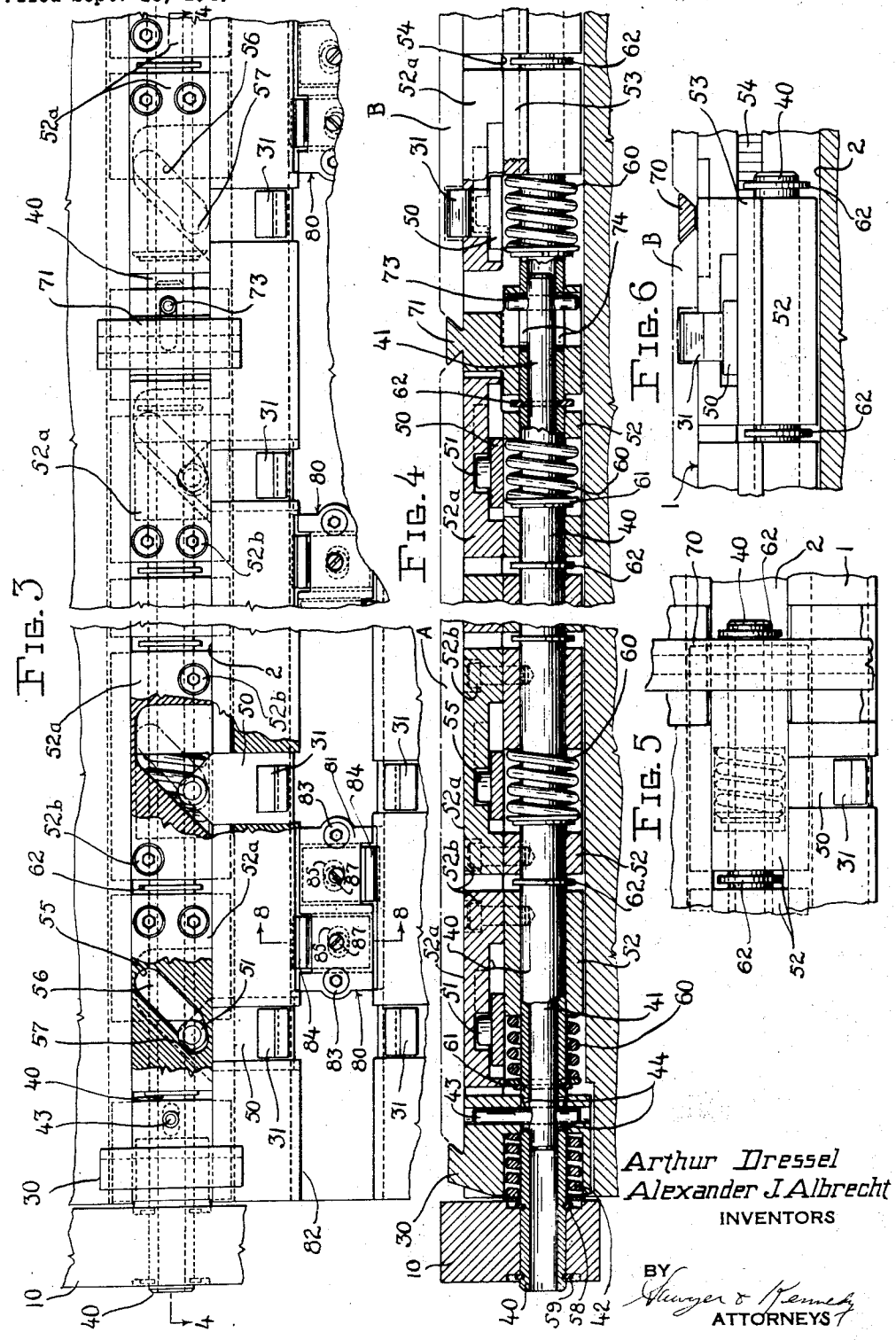
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STEREOTYPE PLATE CLAMP

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2,645,177

STEREOTYPE PLATE CLAMP

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Application September 18, 1946, Serial No. 697,658

3 Claims. (Cl. 101—378)

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This invention relates to improvements in printing machines and more particularly to plate clamps for holding stereotype plates upon the cylinders of printing presses.

The general object of the invention is to provide a plate clamp and lock-up mechanism therefor which is simple and rapid in operation and which holds the plate securely to the cylinder with a minimum of vibration or danger of the plate coming loose during operation.

With this general object and still other objects which will appear in the following description in mind, the invention consists in the combinations and arrangements of parts and details of construction which will now first be fully described in connection with the accompanying drawing and will then be more particularly pointed out in the appended claims.

In the drawing:

Figure 1 is an isometric view of a printing cylinder embodying the invention in a preferred form of embodiment;

Figure 2 is an end elevation of the cylinder of Figure 1 with parts broken away;

Figure 3 is a developed view of a portion of the cylinder;

Figure 4 is a radial longitudinal section taken on the line 4—4 of Figure 3;

Figure 5 is a detail plan view of the clamping structure adjacent the middle of the cylinder;

Figure 6 is a side elevation, with cylinder parts in section, of the clamping structure of Figure 5;

Figure 7 is a detail section taken on the line 7—7 of Figure 2;

Figure 8 is a detail cross section taken on the line 8—8 of Figure 3; and

Figure 9 is a detail radial section taken on the line 9—9 of Figure 8.

The present invention is an improvement on the disclosure of Horton Patent No. 1,985,628, in which patent the plates are clamped by means of curved edge clamping elements and also by intermediate clamping elements spaced along the cylinder and which engage lugs provided for that purpose on the under side of the plate. According to the present invention, the plate is held down upon the plate cylinder by curved edge clamping elements and also by intermediate clamping elements spaced apart longitudinally of the cylinder, and which engage in recesses formed in the plates, this arrangement of plate clamp engaging elements being, in some cases, more convenient.

A plate cylinder constructed according to the invention comprises a cylinder body (Figure 1)

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designated generally by the numeral 1, and in which is formed a number of channels 2, 3, 4, 5, 6, 7, 8 and 9 (Figure 2), spaced around the cylinder. The clamping structure associated with these channels at one end thereof serves to hold four plates on the cylinder, covering half the surface thereof, and the structure is duplicated at the other end of the cylinder for holding another four plates, but is there displaced circumferentially through a convenient angle, such as 90°, as indicated in the embodiment illustrated, for the purpose of displacing the gaps between plates at one end of the cylinder circumferentially with respect to those at the other, so that they may be in registry with similarly displaced impression cylinder gaps, in accordance with prior and known practice. The clamping elements are operated by structure similar to that shown in the Horton patent above mentioned, and in Ball Patent No. 2,066,192, a pair of semi-circular segments 10 being provided for operating the clamps associated with the plates. These segments 10 are axially movable and are guided by bolts 12 fastened in the cylinder body and by means of shafts 40 associated with the clamping structure, as more fully described below. With each of the segments 10 is associated an operating member 14, circumferentially movable in an annular groove 16 formed in the cylinder body (Fig. 7) and moved by means of a wrench 17 which may be inserted in a bore 18 within the member 14. Each of the members 14 has a number of cam slots 20 cooperating with rollers 21 carried upon the corresponding segment 10 so that by moving an operating member 14 circumferentially, in the direction of the arrow of Figure 2, the lock-up segment 10 may be pulled outwardly, in the direction of the arrow of Figure 7, to a position indicated in Figure 7 by broken lines, for the purpose of unlocking the plates. Rotating the operating member 14 in the opposite direction will force the segment 10 inwardly, into the solid line position, Figure 7, for locking up the plates. The operating member 14 is held in the locked position by means of a spring-pressed plunger 22 carried in a bore 23 in the cylinder body and urged outwardly by spring 24. This plunger is positioned to enter a bore 25 in the member 14 when the latter is in locked position, thus preventing circumferential movement thereof. The bore 25 carries a slidable plunger 26 engageable with the end of the wrench 17, as shown in Figure 7, and which releases the member 14 upon insertion of the wrench. As will be apparent from Figure 7, when the

wrench is withdrawn, spring 24 is permitted to push the plunger 22 into the bore 25, thus locking the member 14 circumferentially and, by means of the cam slots and rollers 20, 21 locking the segments 10 axially in the clamping position.

As shown in Figure 2, the channels 2 and 5 carry curved edge clamping members and also clamping elements for engaging in recesses in the under sides of the plates at points spaced longitudinally on the cylinder, but as herein shown, the channels 3 and 4 carry only locking elements for engaging curved edges of the plates. Where desired, clamping elements engaging the under side of the plates and located inwardly of the curved edges may also be provided in these channels, but such elements will ordinarily not be required. This mechanism locks up one pair of semi-cylindrical plates.

Associated with the channels 6 to 9, inclusive, is mechanism for clamping a second pair of plates. Such mechanism is identical with that provided in the channels 2 to 5 inclusive, which will now be described in detail.

The clamping structure within the channel 2 is shown in detail in Figures 3 to 6 inclusive, and comprises a curved outer end clamp 30 and circumferential clamping elements 31 spaced longitudinally on the cylinder and adapted to engage within recesses 32 formed on the under side of the plates. The clamping elements are operated by means of shaft structure associated with the lock-up segment 10 and comprising a hollow shaft 40 fastened therein and an inner shaft 41 carried in the hollow shaft 40 and permitted a sliding movement therein as hereinafter described. The curved end clamp element 30 is spring-pressed by a spring 42 seated therein, about the shaft 40 and abutting against a washer or collar 58, which together with a similar washer or collar 59 fit into grooves in the hollow shaft 40 and secure the segment 10 in position, as shown. The curved end clamp 30 is retracted upon retraction (to the left) of segment 10, by engagement of a collar or washer 61 secured to the shaft 40. A pin 43 is carried in a bore in the clamp 30 and passes through the inner shaft 41, as shown. The pin 43 is accommodated by slots 44 in the hollow shaft 40, so that when the segment 10 and shaft 40 are forced inwardly into the locking position, the clamp 30 is moved under the influence of the spring 42, but when the segment 10 is moved outwardly the collar 61 will engage and retract the clamp 30 with a slight lost motion.

The hollow shaft 40 also carries a plurality of clamp operating mechanisms, which may be of substantially identical construction, as shown, and one of which is associated with each of the clamps 31. Each of the clamps 31 is movable chord-wise of the cylinder as indicated in Figures 2 and 8, having a clamp base 50 slidable within a chord-wise channel formed in the cylinder body. The clamps are operated by cam means, which may be slidable, rotatable or formed as screw elements. In the preferred form, each clamp base 50 carries a roller 51 which is operated by a cam block 52 movable longitudinally in one of the channels 2, 5, 6 or 9, of the cylinder. These cam blocks are provided with ribs 53 which are fitted to slide within grooves 54 extending outwardly from the sides of the channel. A cap 52*a* is secured to each cam block 52 by screws 52*b*, and is formed with a cam slot 55 to cooperate with a roller 51. The major part of the cam slot 55, designated by the numeral 56, has its walls at a relatively high pitch, about 45° in the figures and operates for quickly retracting and protracting the clamp 31. An end 57 of the cam slot 55 has its walls at a low angle to the direction of movement of cam block 52 and operates to apply the clamping pressure, after the clamp has been brought into approximately clamping position. The pitch of this portion of the cam slot may be selected as convenient, provided, however, that it is sufficiently low as to lock the roller 51 positively against any backward movement and, in consequence, the cam block can not be moved by reaction pressure from the clamp. Each of the cam blocks 52 receives a spring 60 which abuts against a washer or collar 61 carried by the hollow shaft 40, the pressure of this spring serving, in the locked position, to force the associated clamp 31 firmly into locking position with the printing plate. The use of a differential device, such as a separate spring for each clamping element 31, provides against any slight difference that may exist in the recesses on the under side of the plate and insures that all the clamping elements will be tightly locked up. By utilizing springs of proper dimensions a substantially constant pressure for all clamping elements may be obtained. Additional collars or washers 62 each serve to engage the inner end of the cam blocks 52, with a lost motion upon retraction of the lock-up segment 10, for unlocking the printing plate.

As before indicated, a typical cylinder will be provided with eight plates, four plates at each end being locked up against a central clamp 70 (Figure 1), which may be rigidly fixed in position. One pair of plates, A and B, are indicated in Figure 4, locked up against the central member 70 by means of the outer curved end clamp 30 acting through plate A and through an intermediate clamping member 71, and thus through the plate B, to press the assembly of the two plates against and under the member 70.

The intermediate clamping member 71 is carried freely on the hollow shaft 40 and is retracted by means of the pin 73 carried by the inner shaft 44. The pin 73 is accommodated by relatively long slots 74 in the hollow shaft 40, and has a relatively large lost motion in the member 71 so that a considerable movement of this shaft will be necessary to retract the member 71 and unlock the inner plate B. In this way provision is made for unlocking first the plate A near the end of the cylinder and then unlocking the plate B near the middle thereof somewhat later.

In the channels 3, 4, 7 and 8, with which no clamping mechanism for engaging the under side of the plate is shown associated, the clamping members 31 and associated structure may be omitted. The shafts 40 and 41 are preferably terminated short of the center of the cylinder so as to avoid interference with similar clamping structure located in the other ends of these four channels for the other set of four plates, as indicated in Figure 1.

Stops are provided for the straight edges of the plates, and may be provided for all such edges, where desired, so as to make full provision for reversible operation. A preferred stop mechanism takes the form as best shown in Figures 3, 8 and 9, of a number of adjustable stop assemblies 80, each of which comprises a bearing and cover plate 81 held in a recess 82 in the cylinder by means of screws 83, and forming channels for

movement of oppositely facing stops **84**. Each of these stops **84** has a slot **85** receiving an eccentric **86** carried on a pin **87**. By rotating a pin **87**, the associated stop **84** will accordingly be moved circumferentially of the cylinder for accurately positioning the straight edge of the associated plate.

The clamping structure of the invention is intended primarily for use in printing presses runing at very high speeds. At such speeds the plates are subject to very high centrifugal force and at regular intervals are also subjected to high pressure from the impression cylinder. If the plate is not securely held against the plate cylinder, it will tend to move slightly toward and away therefrom, under the periodically alternating action of centrifugal force and impression pressure. Where a resilient element, such as a spring or similar device, is utilized for holding the plate down intermediate its curved edges, a condition is created in which the plate may be permitted to move or bend slightly away from the plate cylinder and then immediately be pressed downward against the plate cylinder by its engagement with the impression cylinder, thus creating a succession of opposite movements tending to loosen the plate. By holding the clamping elements **31**, as hereinbefore mentioned, in a non-yielding manner, complete rigidity may, however, be obtained, since the roller **51** cannot give or yield backwardly, the pitch of the cam slot portion **57** being insufficient to permit the roller to force its associated member **52** to yield. Since the plate is held down securely and rigidly and there is no elasticity or give in the clamp members intermediate its length, vibration is eliminated. The firm holding down of the plate near its straight edges, without permitting any yield of the clamping devices, also eliminates substantially all force tending to cause the plate to "grow" under the rolling action of the impression cylinder and permits it to be pressed firmly against the stops **84** in an accurately determined position.

What is claimed is:

1. A stereotype plate cylinder, and in combination, adjustable stops for abutting a straight edge of a stereotype plate for positioning it circumferentially of the cylinder, resilient means for clamping a curved end of the plate, means spaced longitudinally across the cylinder and comprising a plurality of clamping members mounted for movement chordwise into the cylinder and protractible for positively clamping the said straight edge of the plate against said stops, and means for operating all said clamping means simultaneously to lock and unlock said plate.

2. In a stereotype plate cylinder, and in combination, a curved end clamp, a plurality of clamps for engaging in recesses in the underside of the plate and spaced longitudinally across the cylinder, a lockup member, spring means operated by said lockup member for urging said curved end clamp into engagement with the plate, rigid means connected to said lockup member for retracting the clamps, a lost motion connection between said rigid means and said curved end clamp, a cam means for urging each of the said plurality of clamps into engagement with the plate, differential operating means connecting said cam means to said rigid means, and lost motion connections between said rigid means and the said cam means for retracting the said plurality of clamps.

3. In a stereotype plate cylinder, and in combination, a curved end clamp, a plurality of clamps for engaging in recesses in the underside of the plate and spaced longitudinally across the cylinder, a lockup member, spring means operated by said lockup member for urging said curved end clamp into engagement with the plate, rigid means connected to said lockup member for retracting the clamps, a lost motion connection between said rigid means and said curved end clamp, a cam means for urging each of the said plurality of clamps into engagement with the plate and having a pitch such that it has no give under reaction of the clamp, a spring between each said cam means and said rigid means for operating said cam means to urge its clamp into engagement with the plate, and lost motion connections between said rigid means and the said cam means for retracting the said plurality of clamps.

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