

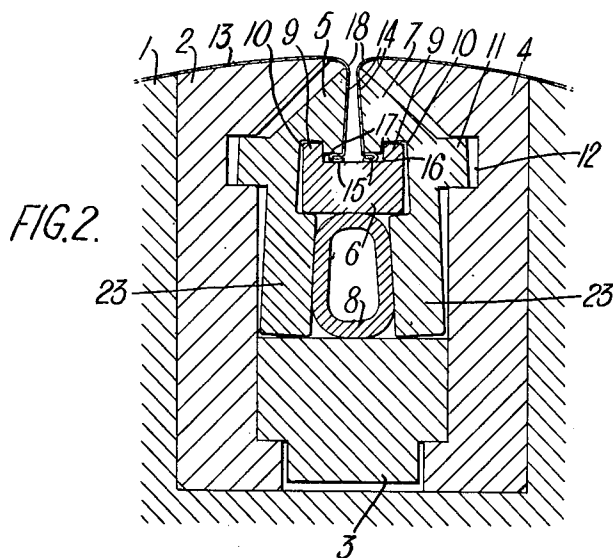
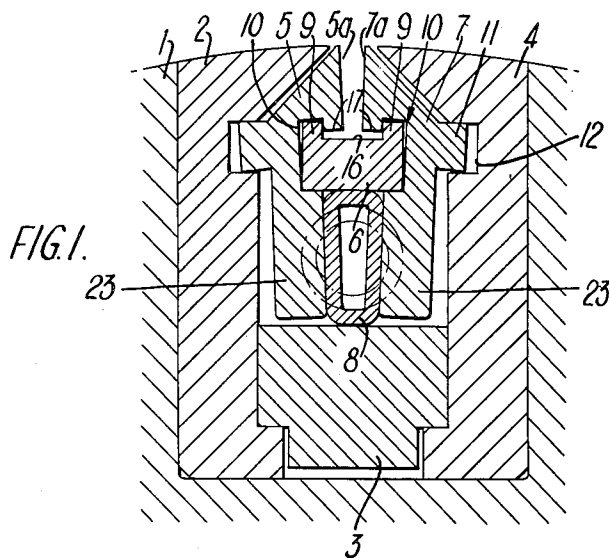
Oct. 16, 1962

N. H. V. NORLIN
MECHANISM FOR CLAMPING PLATES TO THE CYLINDERS
OF PRINTING MACHINES

3,058,417

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4 Sheets-Sheet 1



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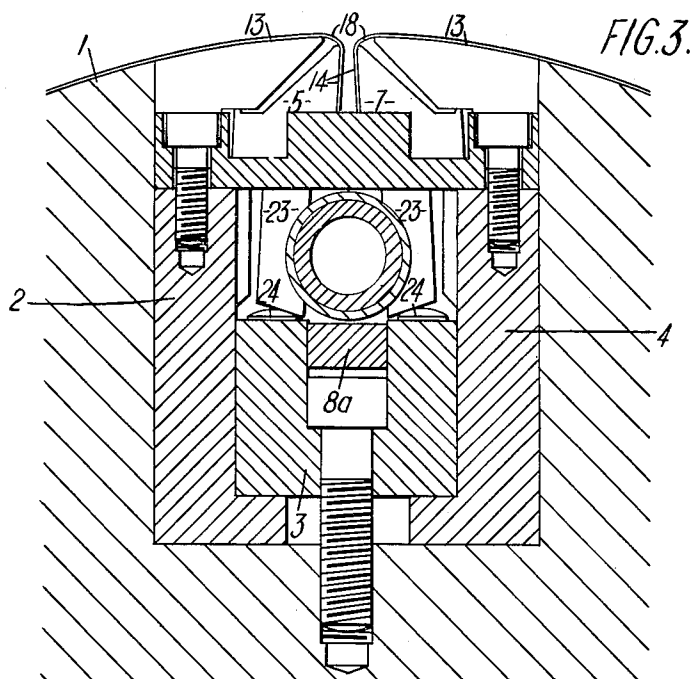


FIG. 3.

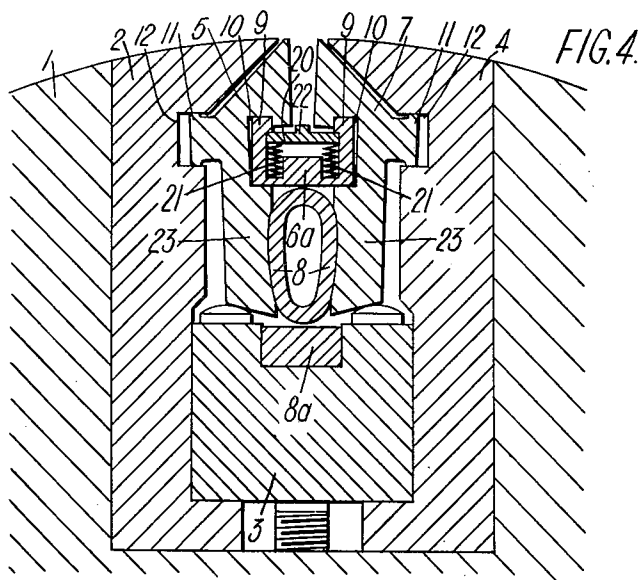


FIG. 4.

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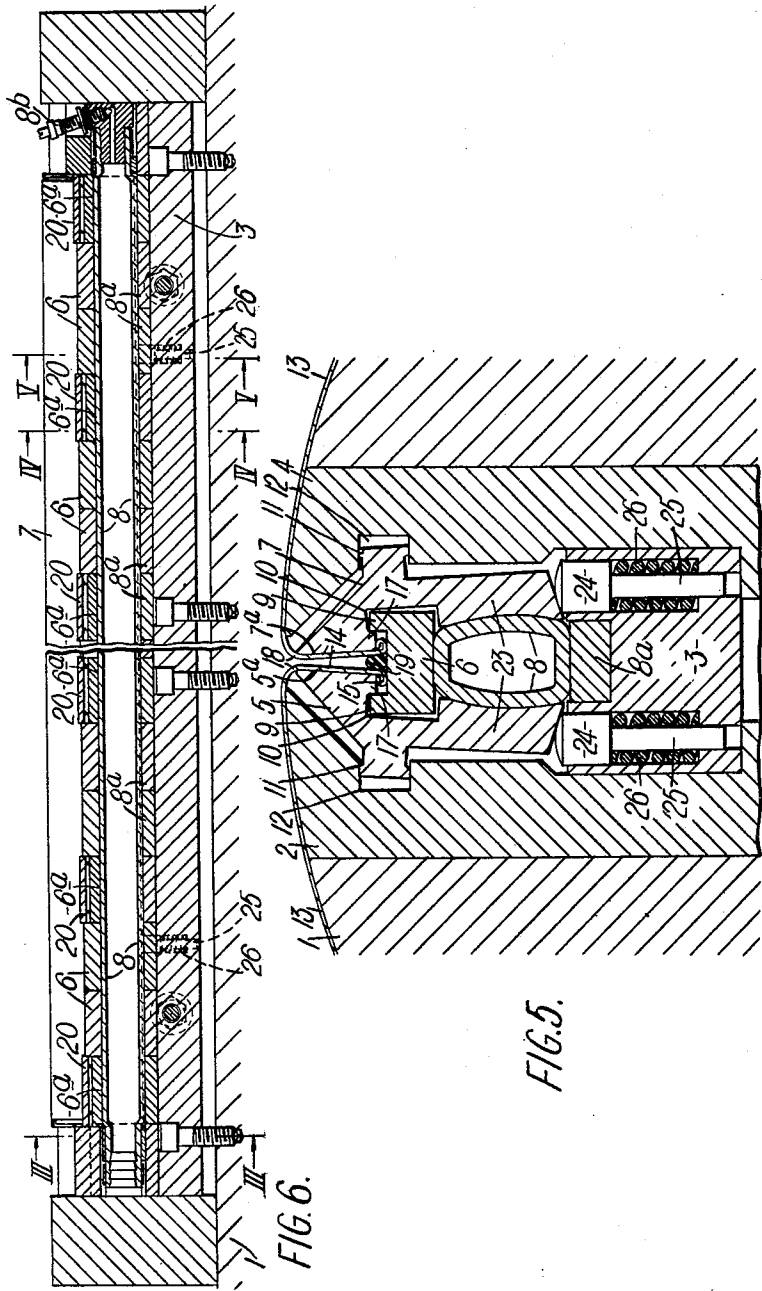


FIG. 5.

FIG. 6.

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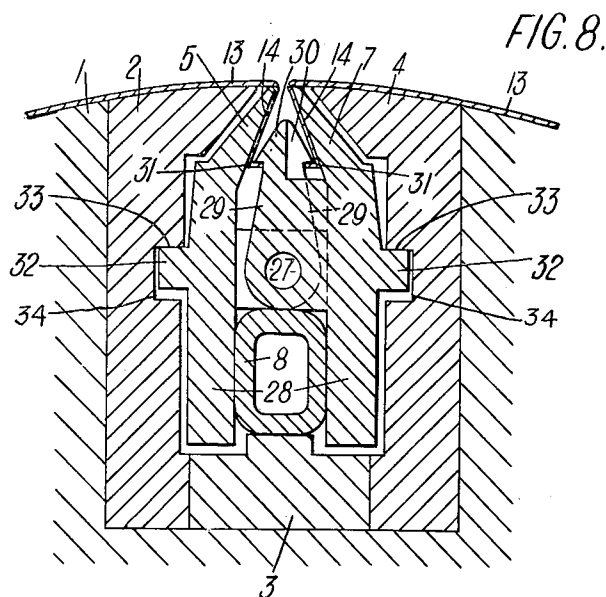
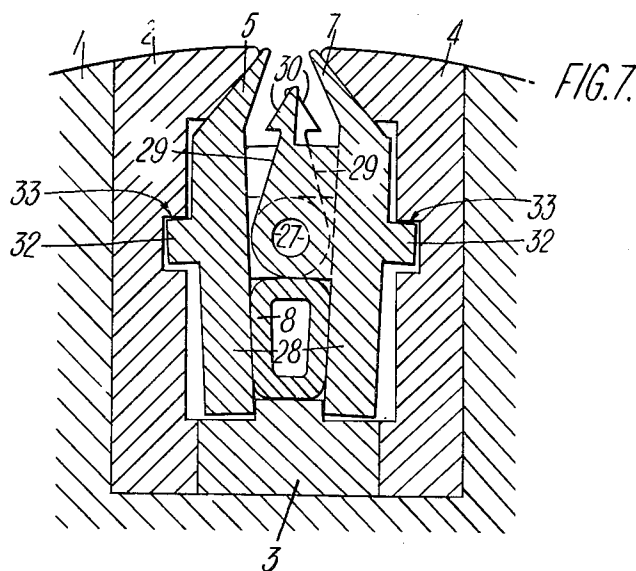
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MECHANISM FOR CLAMPING PLATES TO THE CYLINDERS OF PRINTING MACHINES

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Claims priority, application Great Britain May 22, 1959 9 Claims. (Cl. 101—415.1)

This invention relates to mechanism for clamping or securing printing plates of the flexible type to the cylinders of printing machines and especially printing machines making use of the planographic printing principle.

In such mechanism, the printing plates, which usually are of a relatively thin flexible metal, are provided at one or both of their ends with an inwardly extending flange which may be formed by turning in the end of the plate or by separate pieces secured to the plate: the flange or flanges enter a longitudinal slot or groove formed in the periphery of the cylinder: in this slot is located one or other form of mechanism by which the flanges can be moved relatively towards one another so as to strain the plate about the periphery of the cylinder.

The object of the present invention is to provide an improved operating mechanism.

Broadly stated, the present invention consists in utilising fluid under pressure as the means for operating the improved plate straining mechanism.

In general, it would be preferable to locate in the slot in the cylinder a flexible bag which can be inflated by connection to a fluid pressure supply, the bag having a non-return valve which retains the fluid pressure after the supply is disconnected from the supply to allow the cylinder to rotate. The bag could extend the whole length of the cylinder and have a single fluid-pressure connection or it could be sectionalised with independent non-return valves to enable the plate to be manipulated for register as is common in the normal mechanical plate clamping arrangement.

The plate-engaging mechanism may comprise a number of parts which co-operate to grip or clamp the turned-in end part or parts of the plate and to move the clamped ends towards one another to effect the straining action. The parts which effect the straining action are preferably so formed as to have a pivoting action such that the junction between the flanges and the printing surface of the plate are moved towards one another to reduce the gap in the effective printing surface of the plate.

The invention is illustrated by the accompanying drawings, in which FIGURES 1 and 2 illustrate one construction, FIGURES 3-6 illustrate a modified construction and FIGURES 7 and 8 show a further modification. FIGURES 1 and 2 are transverse cross-sections showing the parts in alternative positions: FIGURES 3 and 4 are sections taken on the line III—III and IV—IV FIGURE 6, FIGURE 5 is a section on the line V—V FIGURE 6 and FIGURE 6 is a longitudinal section taken through the slot in a printing cylinder: FIGURE 7 and 8 are transverse cross-sections showing parts in alternative positions.

In the drawings the mechanism is arranged to operate on the two ends of the printing plate, this being the usual arrangement: it will be understood, however, that as is sometimes the case, one end of the plate can be anchored to the cylinder, the clamping mechanism of this invention being applied only to the other end.

Referring firstly to the construction shown in FIGURES 1 and 2, the printing cylinder of a planographic off-set printing machine is indicated at 1, the cylinder having a longitudinal groove in which are secured bars 2, 3, 4 defining a longitudinal slot between them. In the slot are disposed plate engaging parts in the form of clamping

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components 5, 6, 7 which are disposed about a reinforced rubber bag 8 extending the length of the slot and having at one end an inflation and connection 8^b incorporating a non-return valve (not shown).

The component 6 is formed with side flanges 9 which enter recesses 10 formed in the components 5 and 7: these components 5 and 7 are formed with lateral flanges 11 which enter recesses 12 in the fixed parts 2 and 4.

The interfitting of the flanges 9 into the recesses 10 and of the flanges 11 into the recesses 12 is such that the components 5 and 7 can rock virtually about the flanges 11 which can be appropriately shaped for that purpose: these flanges are disposed radially beyond the point of application of pressure by the bag 8 to the components 5, 7.

In FIGURE 1, the clamping mechanism is shown in the position its parts occupy to receive a printing plate which is shown at 13 in FIGURE 2, the plate being bent down to form flanges 14 which enter the longitudinal gap between the opposed faces 5^a, 7^a of the components 5, 7: in the particular case shown, the lower ends of the flanges 14 are bent out to form tongues 15 which are doubled over and these tongues are passed into the gaps provided between the recess 16 formed in the component 6 by the flanges 9 and the projecting flanges 17 formed on the components 5, 7 by the recesses 10.

With this arrangement, therefore, the inflation of the bag 8 cause it to expand radially outwards and laterally: the outward expansion urges the component 6 towards the components 5 and 7 to grip the tongues 15 firmly between them: the reaction set up by the gripping pressure now causes the further expansion of the bag to take place laterally and so applies increasing pressure against the lower end of the components 5, 7: these in turn are caused to rock more or less tangentially of the cylinder from the position shown in FIGURE 1 to the position shown in FIGURE 2 and in this movement the pressure faces 5^a, 7^a of the components 5, 7 press against the flanges 14 of the plate and pull them slightly downwardly and towards one another so that the junctions 18 of the plate are caused to approach one another very closely, as is shown in FIGURE 2. The plate is thus strained about the cylinder 1 and at the same time the gap in the printing area of the plate is reduced to a very small value so minimizing the loss of effective printing area.

While any gas or liquid under pressure could be used, it would be most convenient to use pressure air which is usually available in printing offices.

The components 5, 7 can be biased to return to their original setting when the bag is deflated by means of return springs housed in the components 5, 7 and in the bars 2, 4.

In order to promote the rocking action of the components 5, 7 which action results in drawing the junctions of the plate ends towards one another, a strip of rubber or resilient plastic material can be introduced between the flanges 14 at the inner ends.

Reference is now made to the construction shown in FIGURES 3-6, in which figures the parts corresponding to those indicated in FIGURES 1 and 2 are given corresponding reference numerals.

As will be clear from FIGURE 6, the component 6 can be formed by sections which together provide the required length of the component, the sections being assembled in line along the length of the inflatable bag 8. In FIGURE 5 is also shown the disposition of a strip of rubber 19 between the flanges 14 of the plate 13.

However, in the construction shown in FIGURES 3-6, the modifications consist firstly in forming certain at least of the sections 6 in two parts which are spring biased to move apart. These sections are indicated at 6^a in

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FIGURE 6 and are best shown in FIGURE 4, in which the second part of the component is indicated at 20: this part 20 is moved out to clamp the tongue 15 on the plate 13 through springs 21 which enable the part 20 to accommodate itself to the tongue 15 and exert a resilient clamping pressure on it. In addition, this part 20 is formed with a rib 22 which, when the section 6 is moved out, enters between the flanges 14 to promote the rocking action of the sections 5 and 7, causing the gap between the junctions 18 of the plate to be reduced or even closed.

Secondly, the components 5 and 7 which are formed with downwardly extending parts or flanges 23, upon which the inflatable bag operates, are as shown best in FIGURE 5 acted on by the shaped heads 24 of plungers 25 which are urged radially outwards by springs 26: the ends of the flanges 23 conjointly with the shaping of the heads 24 exert a camming action which, when the bag 8 is expanded, promotes the desired rocking action of the bars 5 and 7 and, in addition, causes the outer ends of the bars to move outwardly slightly to exert a resilient pressure at the junctions 14 of the plate so improving the action of closing the gap: the springs 26 also promote the return of the bars 5 and 7 to their original position when the bag 8 is deflated. In connection with the latter feature of the invention it will be noted that when the bag 8 is deflated, the flanges 23 are free to move inwardly. Upward pressure of the heads 24 tends to cam inwardly the lower ends of the flanges 23, thus assisting in returning the bars 5 and 7 to normal position. As is shown the bag 8 can re-act against blocks 8^a which are assembled in a groove in the bar 3.

Reference is now made to the construction shown in FIGURES 7 and 8 which shows a simplified construction which renders unnecessary the parts 6 shown in FIGURES 1 and 2 and FIGURES 1-6 for clamping the flanges 15.

In this construction, the components 5 and 7, which can be in sections assembled end to end to provide the required length, are pivotally connected to one another by pivots 27 disposed between their upper plate engaging ends and downward extensions 28 between which the inflatable bag 8 is disposed. In addition, each of the components 5, 7 is formed with an upwardly extending extension 29 which is formed with a beak 30 to engage below a flange 31 which is turned at the inner end of each flange 14: the components 5, 7 are formed with side extensions 32 which engage below abutments 33 formed by recesses 34 in the bars 2 and 3.

With this construction, when the bag 8 is deflated, the parts assume the plate-receiving position shown in FIGURE 7, the components being, if desired, biased to this position as by springs: the ends 14 of the plate 13 having been placed in position with the flanges 31 below the beaks 30, the bag 8 is inflated with the result that the components 5 and 7 rock to assume the position shown in FIGURE 8; in moving to this position, the components 5 and 7 have a compound rocking action which causes the beaks 30 to pass over the flanges 31 and the upper ends of the components 5, 7 to trap the flanges 14 and 31 as well as to pull the plate 13 around the cylinder 1.

I claim:

1. A printing cylinder having a longitudinal slot to receive flanges at the ends of a flexible printing plate, plate-engaging components disposed in the slot to receive the flanges between them, means mounting the said plate-engaging components for rocking movement at a zone between their radially inner and outer ends, the said outer ends being formed to engage the outer faces of the flanges, an inflatable component disposed between the inner ends of the plate-engaging components, and an inflation valve to inflate the inflatable component thereby to move the inner ends of the plate-engaging components apart and their outer faces towards one another to clamp the flanges and to tension the plate about the periphery of the cylinder.

2. A printing cylinder having a longitudinal slot to

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receive flanges at the ends of a flexible printing plate, plate-engaging components disposed in the slot to receive the flanges between them, means to clamp the flanges to the said plate-engaging components; means mounting the said plate-engaging components for rocking movement at a zone between their radially inner and outer ends, the said outer ends being formed to engage the outer faces of the flanges, an inflatable component disposed between the inner ends of the plate-engaging components, and an inflation valve to inflate the inflatable component thereby to move the inner ends of the plate-engaging components apart and their outer ends towards one another to clamp the flanges and to tension the plate about the periphery of the cylinder.

3. A printing cylinder having a longitudinal slot to receive flanges at the ends of a flexible printing plate, plate-engaging components disposed in the slot to receive the flanges between them, a flange-clamping component disposed in the slot between the plate-engaging components and radially movable in said slot, means mounting the said plate engaging components for rocking movement at a zone between their radially inner and outer ends, the said outer ends being formed to engage the outer faces of the flanges, and an inflatable component disposed between the inner ends of the plate-engaging components and radially inwardly of the flange clamping component, and an inflation valve to inflate the inflatable component thereby to move the flange clamping component outwardly and the inner ends of the plate-engaging components apart and their outer faces towards one another to clamp the flanges and to tension the plate about the periphery of the cylinder.

4. A printing cylinder having a longitudinal slot to receive flanges at the ends of a flexible printing plate, plate-tensioning components within the slot which are pivotally connected and each of which is formed with a first part providing an anchorage for the flange at one end of the plate and a second part providing a clamping surface for clamping the flange at the other end of the plate against the first part of the other component, means mounting the two components for rocking movement at a point between their ends, the two components having inward extensions, an inflatable component disposed between the extensions and an inflation valve to inflate the inflatable component whereby the components are rocked to clamp the two ends of the plate and to tension the plate about the cylinder.

5. A printing cylinder having in its periphery a longitudinal slot receiving the ends of a flexible printing plate, tensioning components in said slot movable in said slot to engage said plate ends and to tension the plate about the cylinder, means in said slot to clamp the ends of the plate to the tensioning components, and inflatable means to operate the clamping means and said tensioning components in succession first to clamp the ends of the plate and then to tension the clamped ends.

6. A printing cylinder having in its periphery a longitudinal slot receiving the ends of a flexible printing plate, tensioning components in said slot movable in said slot to engage the plate ends and to tension the plate about the cylinder, means in said slot mounting the tensioning components for bodily and angular movement toward one another at their outer ends, means to clamp the plate ends to the tensioning components, and inflatable means to operate the clamping means and effect said movement of said tensioning components in succession whereby the plate ends are clamped and then tensioned.

7. A printing cylinder as claimed in claim 6 wherein said clamping means comprises components movable radially outwardly in the slot and cooperating with said tensioning components to clamp the plate ends thereto, said inflatable means being arranged to operate conjointly on said clamping components and on said tensioning components.

8. A printing cylinder as claimed in claim 6 wherein

said clamping means comprises pivotal components having plate clamping surfaces cooperating with said tensioning components and having a surface engaging said inflatable means.

9. A printing cylinder having in its periphery a longitudinal slot receiving the ends of a flexible printing plate, tensioning components in said slot movable in said slot to engage the plate ends and to tension the plate about the cylinder, a succession of components in said slot to clamp the ends of the plate about the tensioning components, and an inflatable bag extending longitudinally in the slot and disposed to operate when inflated on said clamping components and said tensioning components to clamp the

plate ends to the tensioning components and to tension the plate.

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