

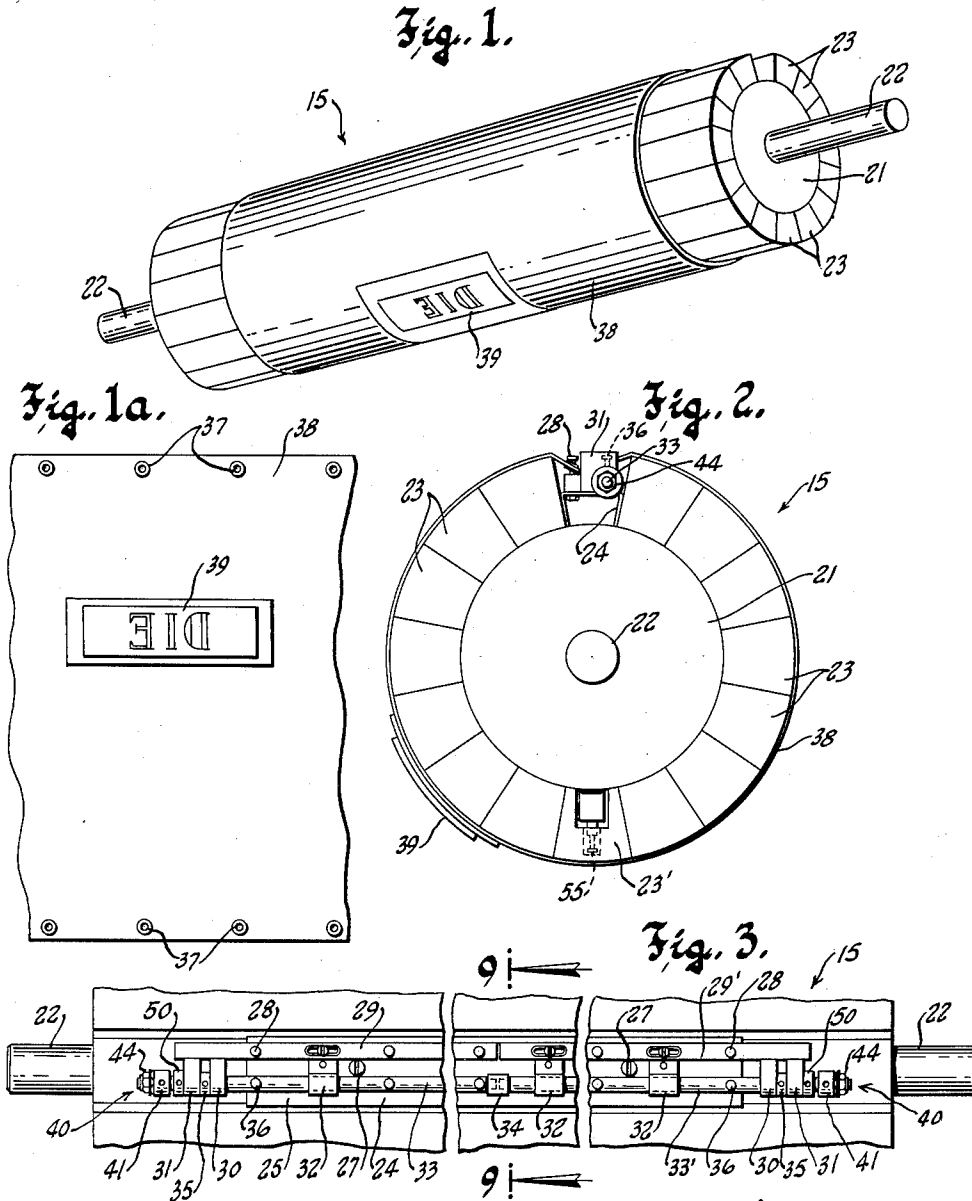
Sept. 10, 1963

H. C. TAYLOR
PRINTING CYLINDER WITH IMPROVED MEANS
FOR SECURING FLEXIBLE DIES THERETO

3,103,169

Filed Jan. 5, 1962

3 Sheets-Sheet 1



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3 Sheets-Sheet 2

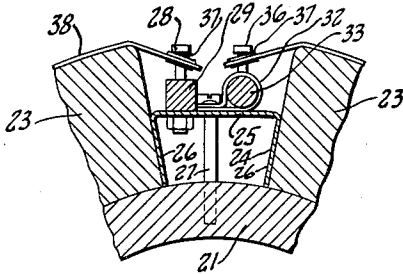


Fig. 4.

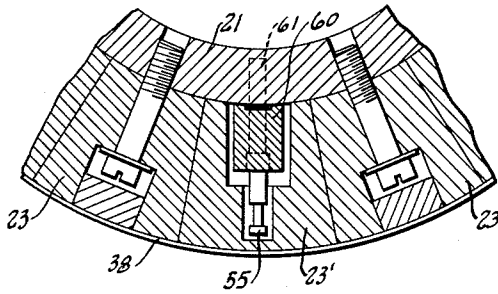


Fig. 5.

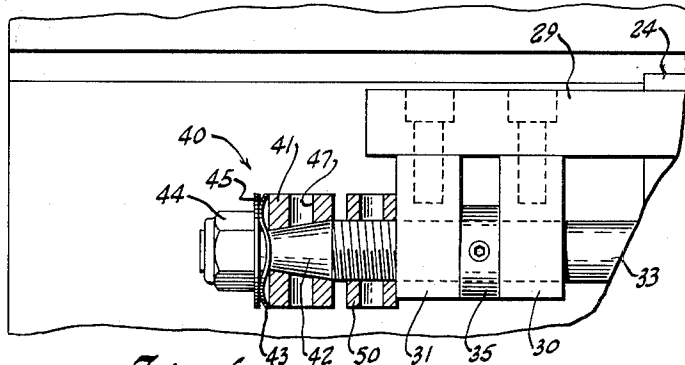


Fig. 6.

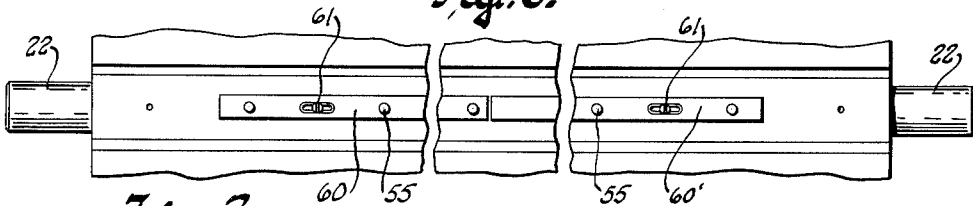


Fig. 7.

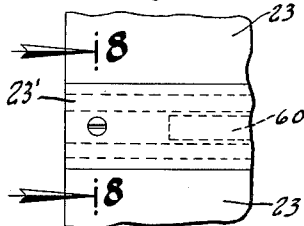


Fig. 8.

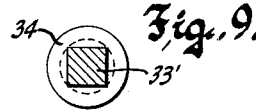


Fig. 9.

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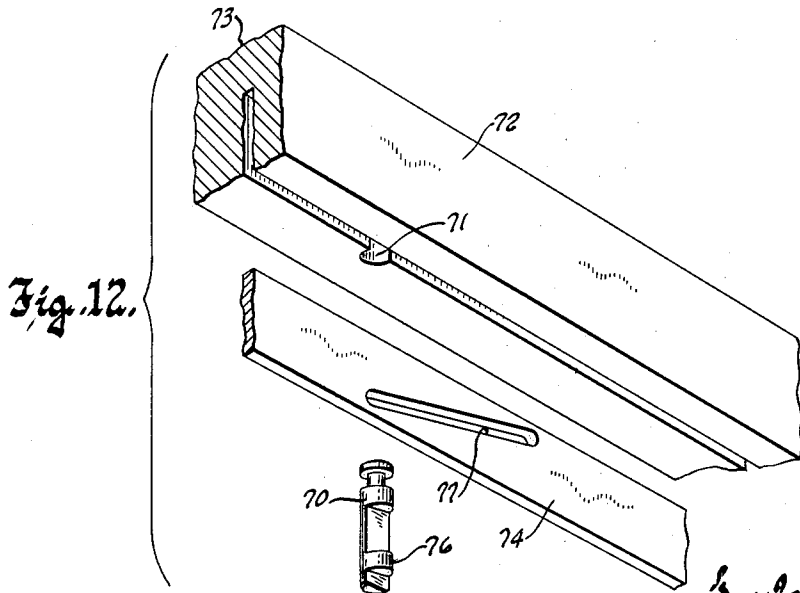
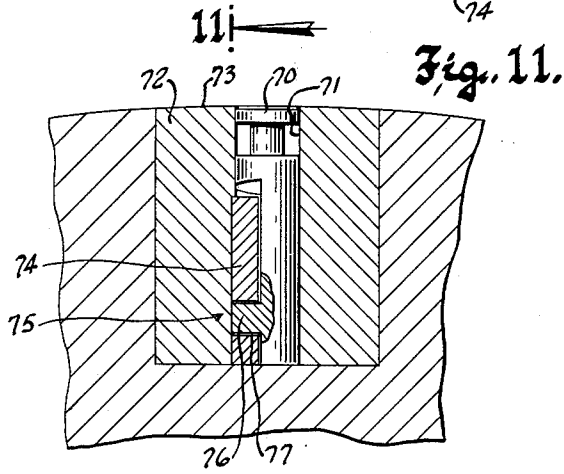
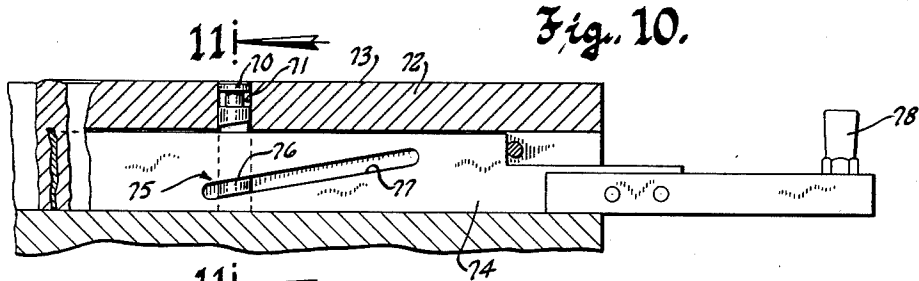
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3 Sheets-Sheet 3



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3,103,169

PRINTING CYLINDER WITH IMPROVED MEANS FOR SECURING FLEXIBLE DIES THERETO

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Filed Jan. 5, 1962, Ser. No. 164,520

6 Claims. (Cl. 101—415.1)

This invention relates broadly to printing presses and refers more particularly to means for removably attaching flexible die mounting sheets to cylinders or rolls of printing presses, as disclosed in application Serial No. 753,970, now abandoned, of which this is a continuation-in-part.

Although not limited thereto, the invention is chiefly concerned with the mounting of flexible dies which are generally made of rubber or like material. The conventional way of mounting such dies has been to staple them to the surfaces of the cylinders or rolls. This required these surfaces be of wood or some similar material into which staples can be driven.

There are many objections to that prior practice. To mention a few, stapling of the dies to the cylinders or rolls and the subsequent removal of the staples when the dies are to be changed is a time-consuming operation; proper placement of the dies on the cylinders to assure good registration in multi-color work is difficult to obtain when each die has to be separately fastened to the cylinder or roll; and as can be readily understood, the surface of the cylinders or rolls had to be renewed quite often because of the inevitable damage thereto resulting from the repeated stapling.

The objections to the past practice of stapling the dies to the cylinders or rolls are eliminated by first securing the individual dies to flexible die mounting sheets—usually by means of a suitable adhesive—and then detachably fastening the die mounting-sheets to the cylinders or rolls by gripping and tightening devices to which the ends of the sheets are attached. This broad general concept is, of course, not new. It is disclosed, for instance, in the Bomberger et al. Patent No. 2,249,938; but heretofore the means employed to attach the die mounting sheets to the cylinders or rolls left much to be desired.

The present invention thus has as its purpose to provide an improved way of attaching die mounting sheets to the cylinders or rolls of a press.

More specifically, it is an object of this invention to provide improved securing means carried by the cylinder or roll and by which flexible die mounting sheets may be quickly and accurately mounted on the cylinder or roll.

Another object of this invention is to provide a manner of securing die mounting sheets to cylinders and rolls by which sheets of different lengths are readily accommodated, and by which a plurality of die mounting sheets each representing a separate "job" may be mounted on a cylinder or roll to enable a number of jobs to be run simultaneously.

The die mounting sheets contemplated by this invention are preferably made of a plastic material known as Mylar. Although this material is essentially non-elastic, to assure utmost accuracy in the placement of the dies on the cylinders or rolls, it is important that the tension applied to the die mounting sheets in attaching them to the cylinders or rolls always be the same. With this in view, the present invention has as another of its objects, to provide means for automatically limiting the amount of tension that can be applied to the die mounting sheets as they are drawn taut about the cylinders or rolls.

To enable the die mounting sheets to be repeatedly attached to and removed from the cylinders or rolls, each end of the sheets has a row of uniformly spaced grommets extending across the full width of the sheets, and the cylinders or rolls have parallel rows of similarly spaced headed pins or pegs extending lengthwise of the cylinders or rolls, onto which the grommets holes in the sheets may be hooked. One row of these pins or pegs is fixed with respect to the cylinder or roll; the other is movable circumferentially with respect thereto. Thus, by adjusting the movable pins or pegs it is possible to draw the sheet taut.

Obviously, the relative positions of the rows of fixed and movable pins or pegs on the cylinder or roll, i.e. the circumferential distance between them must correspond with the length of the sheets to be held thereby. Thus, for sheets of the maximum length that can be accommodated by a given cylinder, the rows of pins or pegs are closely adjacent to one another so that substantially the entire circumference of the cylinder or roll is available to support the sheet.

For shorter sheets, an auxiliary row or rows of stationary pins or pegs is provided and located a circumferential distance from the movable pins or pegs corresponding to the length of the sheets to be attached thereto; but these auxiliary pins or pegs must not interfere with the attachment and proper support of the longer sheets. To meet this requirement the auxiliary stationary pins or pegs may be located in a groove or channel extending across the length of the cylinder or roll and covered by a removable lagging strip, as disclosed in the aforesaid application; but with a view toward making the use of the auxiliary pins or pegs more convenient, it is another object of this invention to mount these pins or pegs in the printing cylinder or roll for endwise projection from an inoperative position wholly below the surface of the cylinder or roll to an exposed operative position enabling a die mounting sheet to be attached thereto; and also to provide a simple mechanism by which all of the pins or pegs may be simultaneously projected and/or retracted.

With the above and other objects in view which will appear as the description proceeds, this invention resides in the novel construction, combination and arrangement of parts substantially as hereinafter described and more particularly defined by the appended claims, it being understood that such changes in the precise embodiment of the hereindisclosed invention may be made as come within the scope of the claims.

The accompanying drawings illustrate two complete examples of the physical embodiments of the invention constructed according to the best modes so far devised for the practical application of the principles thereof, and in which:

FIGURE 1 is a perspective view of a press cylinder shown separated from the press and having a die-mounting sheet with a die bonded thereto and mounted on the cylinder in accordance with this invention;

FIGURE 1A is a fragmentary plan view of the die-mounting sheet removed from the cylinder;

FIGURE 2 is an end view of the cylinder shown in FIGURE 1;

FIGURE 3 is a top plan view of the cylinder shown in FIGURE 2;

FIGURE 4 is an enlarged detail view showing diametrically opposite segments of the cylinder in cross section;

FIGURE 5 is an enlarged detail view, partially in plan and partially in section, showing a portion of the structure illustrated in FIGURE 3;

FIGURE 6 is a fragmentary bottom view of a portion of the cylinder shown in FIGURE 2, but with one of the

wood lagging segments removed to expose the row of auxiliary stationary pins or pegs; which, when not used, are covered by the removed lagging segment;

FIGURE 7 is a fragmentary plan view of one end portion of the structure shown in FIGURE 6, but illustrating the lagging segment in place;

FIGURE 8 is a detail cross sectional view taken on the plane of the line 8—8 in FIGURE 7;

FIGURE 9 is a detail cross sectional view taken on the plane of the line 9—9 in FIGURE 3;

FIGURE 10 is a view in longitudinal section through a portion of the cylinder, to illustrate a modified form of auxiliary stationary pin unit which is distinguished by the fact that all of the pins in the row thereof are simultaneously movable to and from an exposed position;

FIGURE 11 is a cross sectional view through FIGURE 10 on the plane of the line 11—11, and

FIGURE 12 is an exploded perspective view of the essential elements of the structure shown in FIGURES 10 and 11.

Referring now particularly to the accompanying drawings, the numeral 15 designates generally a printing press cylinder having a metal core 21 with coaxial journals 22 projecting from its opposite ends, and lagging strips or segments 23 covering the core. These strips or segments are usually made of wood and are bolted or otherwise removably secured to the core 21, as best shown in the lower portion of FIGURE 4.

At one point in the circumference of the cylinder, a lagging segment is removed and in its place an elongated base member 24 is secured to the core 21. Although the cross sectional shape of the base member may take any suitable form, it is convenient to give it an inverted U-shaped formation so that it has a flat web 25 flanked by flanges 26. As particularly shown in the upper portion of FIGURE 4, the width of the web 25 is such that it spans the distance between the opposing faces of the adjacent wooden lagging segments at a distance well below the surface of the cylinder, and to assure utmost rigidity, the flanges 26 converge to have surface-to-surface engagement with the faces of the adjacent lagging segments. The base member is held in place by a plurality of bolts 27 which extend through holes in the web 25 and are threaded in the cylinder core 21.

Mounted on the base member in fixed relation thereto, and hence with respect to the cylinder, is a row of stationary attaching pins or pegs 28. These pins are fixed to two bars 29—29' which are bolted to the web 24 in end-to-end relationship, as clearly shown in FIGURE 3. The holes in the bars 29—29' through which their anchoring bolts pass are elongated so that for purposes to be described, the bars and all structure carried thereby may be adjusted lengthwise of the cylinder.

Preferably, the bars 29—29' project beyond the opposite ends of the base, and on their projecting portions they have spaced end bearings 30 and 31 mounted thereon. These end bearings are coaxial with intermediate bearings 32 mounted on the base, and together the bearings 30, 31 and 32 freely rotatably mount two rock shafts 33 and 33' in end-to-end relationship. The adjacent end portions of the two rock shafts are square or otherwise non-circular in cross-section and are slidably fitted into the opposite ends of a tubular coupling 34 by which the rock shafts are connected to turn in unison. Obviously, of course, the bore of the coupling 34 corresponds in shape to that of the end portions of the rock shafts; and as will also be apparent, to keep the rock shafts coupled they must be held against endwise separation. For this purpose, a collar 35 is releasably secured to each rock shaft between its end bearings 30 and 31. Set screws may be used to secure the collars 35 to the shafts.

The aligned rock shafts have pins or pegs 36 fixed thereto, and spaced lengthwise thereof in a straight row directly opposite the stationary pins or pegs 28 and, like

the latter, their outer ends are reduced in diameter and have heads at their extremities.

The headed ends of the pins or pegs 28 and 36, in effect, form hooks to which grommeted eyelets or holes 37 in the opposite ends of a die mounting sheet 38 may be attached. With the opposite ends of a die mounting sheet thus attached to the pins 28 and 36, turning the rock shafts 33 counterclockwise, as viewed in FIGURES 2 and 4, draws the sheet 38 tightly about the cylinder. In the embodiment of the invention illustrated, the pins or pegs are of a length such that their outer headed extremities lie directly beneath the surface of the cylinder. However, it should be understood that to preclude interference with the operation of the press, it is only necessary that the pins do not protrude beyond the printing surface of the die or dies on the cylinder.

In accordance with this invention each die mounting sheet 38 has one or more dies 39 bonded thereto by a suitable adhesive or other fastening means, and since the position of the sheet on the cylinder is accurately determined by the fixed pins 28, it follows that if the dies 39 are accurately placed on the sheets they will be in proper position with respect to the cylinder when the mounting sheet is attached thereto.

The die mounting sheets 38 are preferably made of a plastic material known as Mylar, and although this material is essentially non-elastic and normally will not stretch, it is desirable that the degree of tension applied to the sheet in securing the same to the cylinder always be the same. This affords utmost assurance that the die or dies carried by the sheet will be properly positioned on the cylinder no matter how often the sheet is removed and replaced.

To assure proper tensioning of the sheet, the means employed to impart torque to the rock shafts incorporates a torque limiting friction clutch device, indicated generally by the numeral 40 and since it is contemplated that the rock shafts at times will be disconnected from one another and used separately, there is a torque limiting device 40 on the outer end of each rock shaft. This device comprises a collar 41 having a tapered bore which fits upon a tapered end portion 42 on the rock shaft and a spring washer 43 interposed between the collar 41 and a nut and washer 44—45. Friction holds the collar to the tapered end 42 of the shaft with a grip determined by the adjustment of the nut 44; and to enable torque to be applied to the shaft by means of the collar, the collar has radial holes 47 for the reception of a spanner wrench (not shown). Obviously, the degree of tension applied to the spring washer by the tightening of the nut determines the maximum torque that can be imparted to the rock shaft by rotation of the collar.

When the rock shafts have been turned to draw the sheet 38 taut and tightly wrapped about the cylinder, they may be locked in place by tightening nuts 50 threaded on the outer ends of the rock shafts. These nuts bear against the adjacent endmost bearings 31 so that the bearings 31 may be gripped between the collars 30 and the clamping nuts 50, and of course as a result the shafts are secured against rotation. If the two rock shafts are connected together by the coupling 34, they turn in unison as explained, and only one of them need be secured against rotation by tightening its respective clamping nut 50.

Whenever the die mounting sheet is of a width requiring more than half the length of the cylinder, the two rock shafts will be coupled together to, in effect, constitute one continuous shaft, but as will sometimes happen, the job to be printed may not require a die mounting sheet so wide that more than half the length of the cylinder is required to mount the same. In this case, the cylinder can have two die mounting sheets attached thereto, side-by-side. To enable this to be done, the two rock shafts are simply disconnected from one another by effecting endwise separation thereof. This may

be done by loosening the set screw holding one of the collars 35 to its respective rock shaft, and sliding the shaft towards the adjacent end of the cylinder, far enough to allow the coupling 34 to be removed. After the shafts are disconnected, the one moved may be returned to its initial position and there secured to bring its pins 36 in line with the opposite stationary pins 28.

It is also possible to disconnect the rock shafts by loosening the bolts holding one or both of the bars 29—29' to the cylinder, and moving the bars farther apart. This latter way of disconnecting the rock shafts has the advantage of maintaining the correct relationship between the fixed pins 28 and the movable pins 36.

Ordinarily, the mounting sheet will completely encircle the cylinder or roll so that its opposite ends are attached to the stationary pins 28 and the movable pins 36. However, the character of the work to be printed sometimes is such that it is expedient to use mounting sheets which are shorter and extend only partway around the cylinder—for instance, half-way therearound. To accommodate such shorter die-mounting sheets, the cylinder is equipped with one or more rows of auxiliary stationary mounting pins 55. In the embodiment of the invention show, there is but one such row of auxiliary stationary pins, located diametrically opposite the attaching and tightening mechanism already described.

To mount this auxiliary row of stationary pins, a segment 23' is removed to expose the surface of the cylinder core 21. To this exposed surface of the core, two endwise aligned mounting bars 60 and 60' are secured for independent endwise adjustment by means of bolts 61, which pass through elongated holes in the bars and are threaded in the core of the cylinder. The headed pins 55 are secured to these bars and project outwardly therefrom, but their headed extremities lie below the surface of the cylinder. The endwise adjustability of the bars 60 and 60' enables the pins 55 to be at all times located circumferentially opposite the movable pins 36.

When the auxiliary stationary pins are not needed, they are covered by the segment 23' which, as clearly shown in the bottom portion of FIGURE 4, has its inner face cut out to accommodate the pins and their mounting bars, the segment 23' being removably held in place by screws or bolts threaded into the core of the cylinder.

While the manner of mounting the auxiliary stationary pins, just described is functionally satisfactory, it has the disadvantage of having to remove the segment 23' when it is desired to use them.

An improved manner of mounting the auxiliary stationary pins is shown in FIGURES 10, 11 and 12. In this case, the pins identified by the numeral 70, are axially slidably seated in holes 71 in a mounting bar 72 for axial movement between retracted positions at which the extremities of their headed ends are flush with the surface of the bar, to projected or active positions at which their headed ends project beyond the top face of the bar. Thus by having the bar 72 mounted in the cylinder with its outer face 73 flush with the surface of the cylinder, the cylinder surface is substantially unbroken when the pins are in their retracted positions, while at the same time all of the pins may be quickly projected to make them available for the attachment of a die mounting sheet thereto.

To effect simultaneous projection and retraction of all of the pins 70, a bar-like actuator 74 is mounted in the bar 72 and constrained to endwise movement with respect to the bar 72. A cam connection 75 between each of the pins and the actuator translates endwise motion of the actuator into axial projection or retraction of the pins. The cam connection between the actuator 74 and the pins comprises a cam follower 76 on each pin seated in an elongated slot 77 in the actuator 74 adjacent to the pin. The slots 77 are all inclined with respect to the direction of sliding motion of the actuator, and paral-

lel to one another. The cam followers 76 are formed by slabbing off the sides of the pins, as shown.

A handle 78 on one or the other of the ends of the actuator 74 provides means for manually sliding the same back and forth.

Obviously, the auxiliary bar unit of FIGURES 10, 11 and 12, may be duplicated at opposite ends of a cylinder; also these units may be located anywhere about the circumference of the cylinder to afford maximum flexibility in adapting the cylinder to different size die mounting sheets.

From the foregoing description, taken in connection with the accompanying drawings, it will be apparent to those skilled in this art that this invention provides a very effective and relatively simple manner of quickly detachably securing a die mounting sheet to a press cylinder or roll, and that it has the advantage of assuring absolutely accurate placement of the dies carried by sheets, on the cylinder or roll no matter how often a job may be re-run.

What is claimed as my invention is:

1. Means for detachably securing a die-mounting sheet to a cylinder of a printing press comprising:

(1) an elongated base adapted to be fitted to the cylinder, the base having a top face;

(2) a plurality of stationary sheet engaging elements fixed to the base,

(a) said elements being arranged in a row extending lengthwise of the base and projecting from the top face thereof;

(3) coaxial bearings fixed to the base at the top face thereof with the common axis of the bearings parallel to said row of elements;

(4) a rock shaft journaled in said bearings;

(5) a plurality of movable sheet engaging elements fixed to the rock shaft and arranged in a row extending lengthwise thereof so as to be movable toward and from said stationary elements as the rock shaft is turned;

(6) a collar on the rock shaft;

(7) means providing a frictional torque transmitting connection between the collar and the rock shaft through which a predetermined amount of torque may be applied to the rock shaft by means of the collar; and

(8) clamping means reacting between a part on the base and the rock shaft to secure the rock shaft in an adjusted position of rotation.

2. The structure of claim 1, wherein element 7 comprises:

(1) a tapered portion on the rock shaft fitting in a correspondingly tapered bore in the collar;

(2) a nut threaded on the rock shaft adjacent to the side of the collar to which the small diameter end of its bore opens; and

(3) a spring reacting between said face of the collar and the nut, so that by tightening or loosening the nut the amount of torque that can be imparted to the rock shaft from the collar may be increased or decreased.

3. Means for detachably securing a die-mounting sheet to a cylinder of a printing press comprising:

(1) a row of stationary sheet engaging elements fixed with respect to and extending lengthwise of the cylinder;

(2) coaxial bearings mounted on the cylinder beneath the surface thereof with the common axis of the bearings parallel to said row of sheet engaging elements and the axis of the cylinder;

(3) a rock shaft journaled in said bearings;

(4) a plurality of movable sheet engaging elements fixed to the rock shaft to be movable towards and from said stationary sheet engaging elements as the rock shaft is turned

(a) so that a die-mounting sheet on the cylinder and having its opposite ends connected to the

- stationary and movable sheet engaging elements may be drawn taut by turning the rock shaft;
- (5) a collar on the rock shaft;
 - (6) means providing a frictional torque transmitting connection between the collar and the rock shaft through which a predetermined amount of torque may be applied to the rock shaft by means of the collar; and
 - (7) clamping means reacting between a part fixed with respect to the cylinder and the rock shaft to secure the rock shaft in a desired position of rotation.
4. The structure of claim 3, wherein element 6 comprises:
- (1) a tapered portion on the rock shaft fitting in a correspondingly tapered bore in the collar;
 - (2) a nut threaded on the rock shaft adjacent to the side of the collar to which the small diameter end of its bore opens; and
 - (3) a spring reacting between said face of the collar and the nut, so that by tightening or loosening the nut the amount of torque that can be imparted to the rock shaft from the collar may be increased or decreased.
5. Means for detachably securing a plurality of die-mounting sheets side-by-side to a cylinder of a printing press comprising:
- (1) coaxial bearings mounted on the cylinder beneath the surface thereof, with the common axis of the bearings parallel to the axis of the cylinder;
 - (2) a plurality of end-to-end rock shafts journaled in said bearings;
 - (3) releasable coupling means at the adjacent ends of said rock shafts for coupling the rock shafts for rotation in unison or independently of one another depending upon whether or not said coupling means is engaged or disengaged;
 - (4) movable sheet engaging elements on each rock shaft adapted to engage an adjacent end of a die-mounting sheet and to draw the sheet about the cylinder upon rotation of the rock shaft carrying said sheet engaging elements;
 - (5) stationary sheet engaging elements carried by the cylinder and adapted to have the opposite ends of said die-mounted sheets attached thereto, so that the stationary sheet engaging elements and the movable elements on the rock shafts cooperate to draw the die-mounting sheets taut about the cylinder as the rock shafts are turned, and
 - (6) manually operable means on each of the rock shafts by which torque may be applied to each individual rock shaft; and
 - (7) means to releasably lock each individual rock shaft against turning.
6. Means for detachably securing die mounting sheets of different lengths to a cylinder of a printing press comprising:
- A. a rock shaft rotatably mounted in the cylinder beneath the surface thereof;
 - B. movable sheet-engaging elements carried by the

- rock shaft and accessible from the surface of the cylinder;
- C. relatively stationary sheet-engaging elements carried by the cylinder,
 - (1) said relatively stationary sheet-engaging elements being arranged in a plurality of rows which are parallel to the rock shaft and are spaced different distances therefrom
 - (2) so that die mounting sheets of different lengths having one end thereof attached to the movable sheet-engaging elements on the rock shaft and the other end thereof attached to relatively stationary sheet-engaging elements of a selected one of said rows of stationary sheet-engaging elements, may be drawn taut about the cylinder upon turning of the rock shaft;
 - D. manually operable means for applying torque to the rock shaft;
 - E. means for locking the rock shaft in any position to which it is turned;
 - F. means mounting one of said rows of relatively stationary sheet-engaging elements on the cylinder for movement from a retracted inoperative position wholly beneath the surface of the cylinder where the elements of said one row do not interfere with a die mounting sheet attached to other relatively stationary sheet-engaging elements, to an operative position projecting above the surface of the cylinder; and
 - G. means for simultaneously moving all of the relatively stationary sheet-engaging elements in said one row thereof from one position to the other, comprising
 - (1) an elongated actuator endwise slidably mounted on the cylinder and extending alongside said one row of relatively stationary sheet-engaging elements, and
 - (2) means on said actuator and the adjacent elements providing cam connections through which endwise movement in one direction projects all of said elements to their operative positions, while endwise movement of the actuator in the opposite direction retracts all of said elements to their inoperative positions.

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