W. GRASS.

PRINTING PRESS.

APPLICATION FILED JAN. 17, 1917. RENEWED APR. 15, 1920.

1,358,843. **Patented Nov. 16, 1920.**

3 SHEETS—SHEET 1.

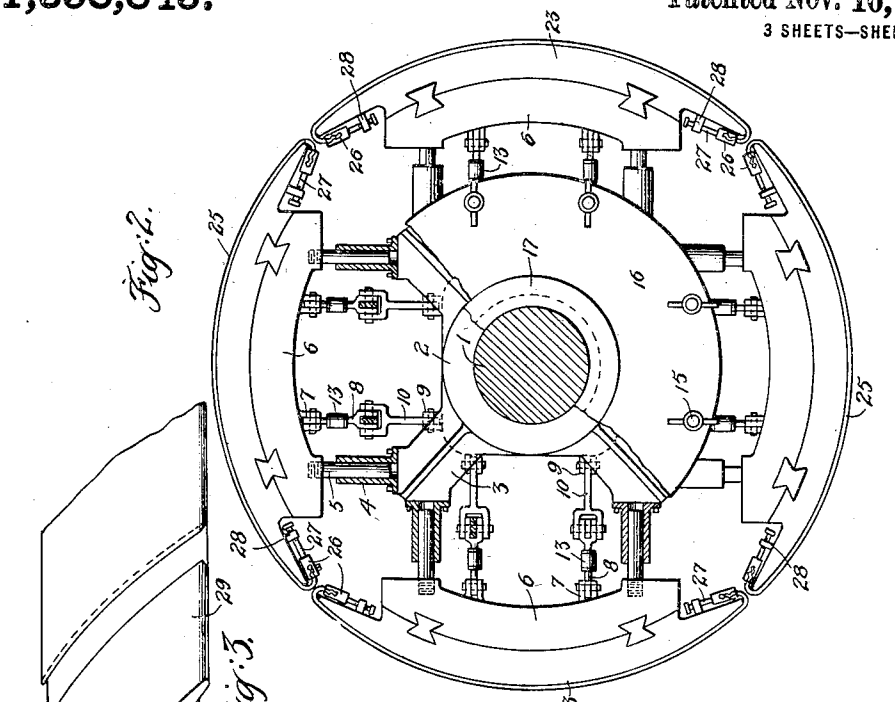


Fig. 2.

Fig. 3.

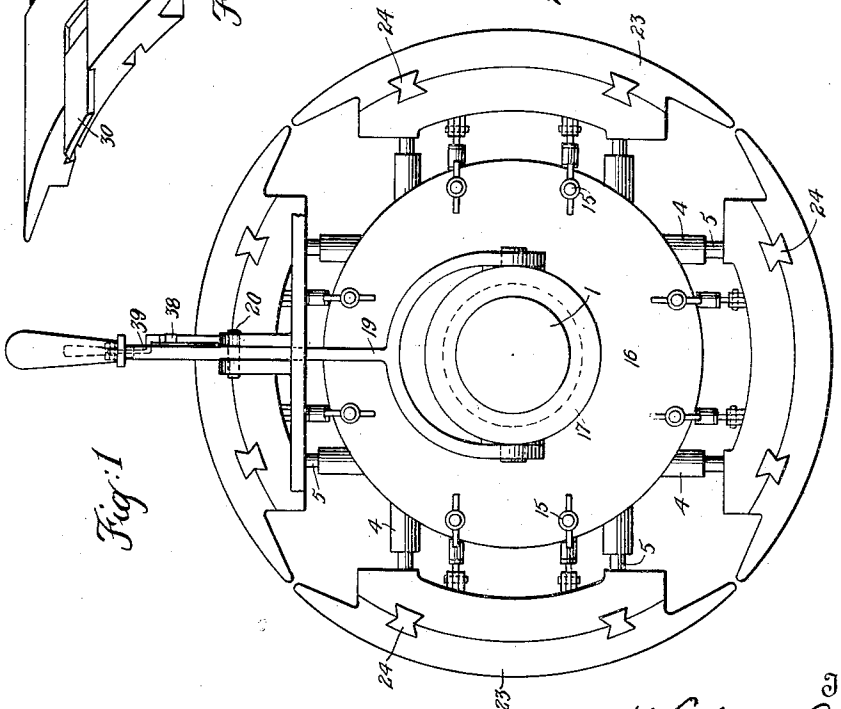


Fig. 1.

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By his Attorney

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3 SHEETS—SHEET 2.

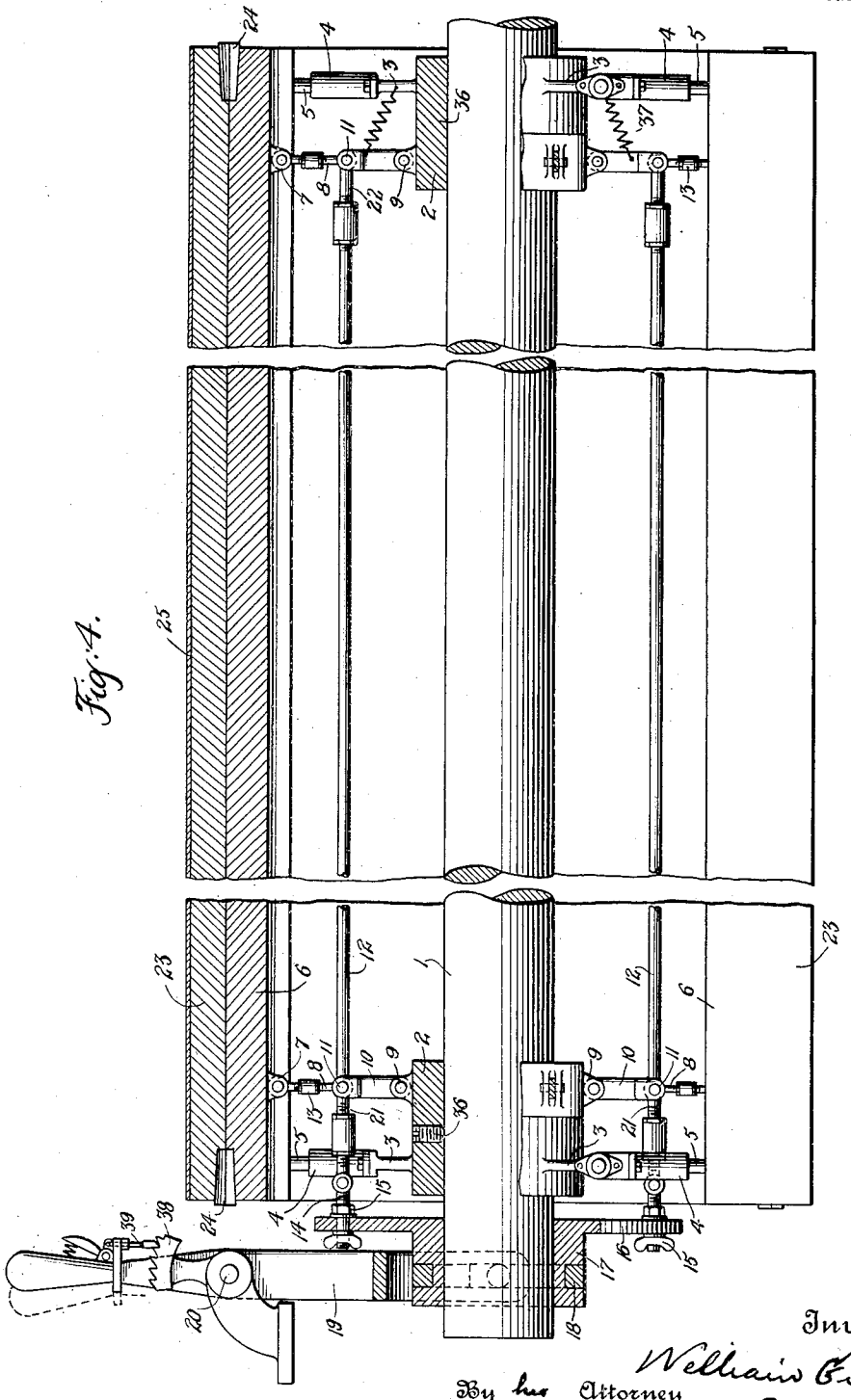


Fig. 4.

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3 SHEETS—SHEET 3.

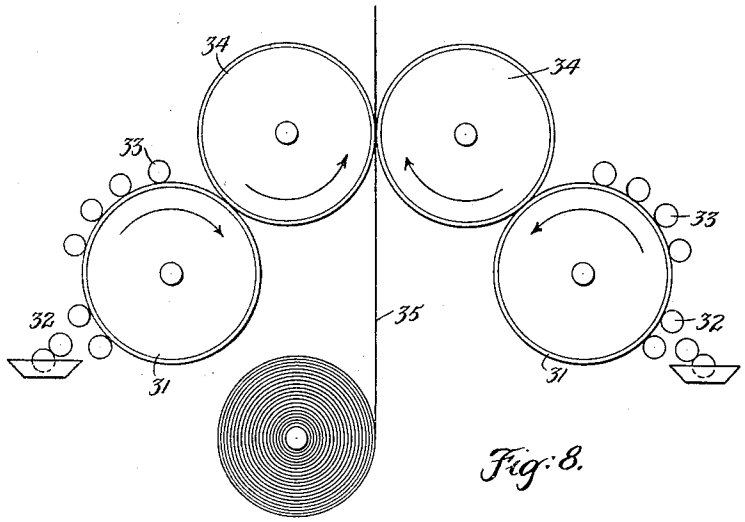


Fig. 8.

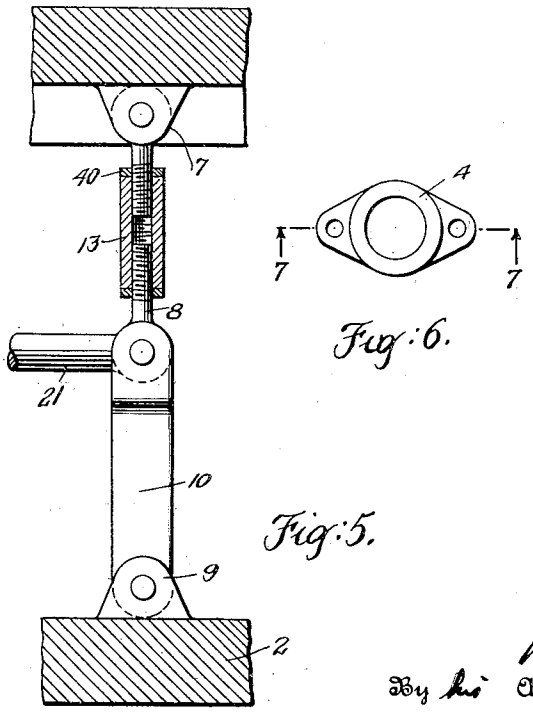


Fig. 5.

Fig. 6.

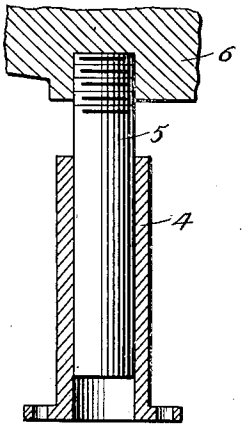


Fig. 7.

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By his Attorney

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UNITED STATES PATENT OFFICE.

WILLIAM GRASS, OF WEEHAWKEN, NEW JERSEY.

PRINTING-PRESS.

1,358,843. Specification of Letters Patent. Patented Nov. 16, 1920.

Application filed January 17, 1917, Serial No. 142,918. Renewed April 15, 1920. Serial No. 374,202.

To all whom it may concern:

Be it known that I, WILLIAM GRASS, formerly a subject of the German Empire, but having taken out first naturalization papers in the United States, residing at Weehawken, county of Hudson, State of New Jersey, have invented certain new and useful Improvements in Printing-Presses, of which the following is a specification.

My invention relates to printing presses in general and more specifically comprises an improved form of printing and transfer cylinders particularly useful in offset printing. In offset presses as now constructed much difficulty is encountered in maintaining the printing and transfer cylinders each of exactly the same diameter and circumference. If this is not done the contact surfaces wear rapidly and also rub one over the other so as to destroy the clearness of the printing. My invention overcomes this difficulty, especially when used in connection with the type of etched zinc printing plates described in U. S. Patent No. 1,155,352, issued to Jacob Grass. The best form of apparatus embodying my invention at present known to me is illustrated in the accompanying three sheets of drawings in which:

Figure 1 is an end view of a printing or transfer cylinder constructed in accordance with my invention.

Fig. 2 is a similar view partly in cross section and with parts removed of a cylinder which may be used either as a printing or as a transfer cylinder.

Fig. 3 is a detail view in perspective showing a portion of the curved surface of a modified form of printing cylinder.

Fig. 4 is a longitudinal axial section of the cylinder shown in Fig. 2, parts being broken away.

Fig. 5 is a detail side view and partial section of one of the adjustable toggle link systems shown in Figs. 1, 2 and 4, parts being broken away.

Fig. 6 is a detail plan view of the guide socket 4, and Fig. 7 an axial section on line 7—7 of Fig. 6 on an enlarged scale of one of the telescoping guides shown in Fig. 2.

Fig. 8 is a diagram of a form of offset printing press in which my invention may be employed.

Throughout the drawings like reference characters indicate like parts. 1, is a shaft on which is mounted sleeves 2, 2, carrying spider arms 3, 3. On these are mounted guide sockets, 4, 4, in which slide telescopic guide plungers 5, 5, projecting from base segments 6, 6, which together with outer segments 23, 23, form a paneled cylinder, each panel or surface section of which is adjustable radially of the cylinder within limits, through action of the slip joints 4, 5.

The position of each segment is controlled by a system of toggle links connected to lugs 7, on base segment 6, and lug 9, on sleeve 2, and composed of links 8 and 10, pivoted together and to rod 12, at 11. One link as 8, is made adjustable as by the right and left screw coupling 13, which may be locked by jam nut 40 (see Fig. 5). A similarly adjustable link 21, is pivoted to the end of rod 12, and to adjustable stud 14, held by nuts 15, 15, to disk 16, mounted and sliding on shaft 1. Disk 16, has a hub 17, circumferentially grooved at 18, to received forked shifting lever 19, pivoted at 20, to the main frame of the printing press (not shown). Each rod 12, has another length adjustment at 22, consisting of another right and left screw coupling or union. 38, is a toothed sector and 39, a coöperating latch for locking lever 19, in different positions, 37, 37, are springs normally tending to trip the toggle systems.

Preferably each base segment 6, as before described, carries an outer segment 23, held on by locking wedges 24, 24. The outer segments extend through such arcs that when drawn inward slightly their ends will abut to form a complete cylinder, and when in their outermost positions only narrow spaces will be left open between adjacent segments. These outer segments 23, may be made solid of zinc or other material on which may be etched photographically impression surfaces by the process described in U. S. Patent No. 1,155,352. This is indicated more clearly in Fig. 3 where panels 29, 29, are shown designed to be so treated. There may also be removable panels dovetailed into a main panel as indicated at 30. On the other hand the curved outer surfaces of segments 23, may be left smooth and plates or sheets 25, 25, of zinc or other material on which printing surfaces have been formed by any process may be stretched over segments 23, 23, and clamped by holding jaws 26, 26, mounted on threaded pins 27, 27, held in internally threaded lugs 28, 28, on the under sides of segments 23.

In Fig. 8 is shown the outline of an offset press in which 31, 31 represent impression

or printing cylinders of one of the constructions shown in Figs. 1, 2 and 3, while 32, 32, indicate dampening rolls and 33, 33, inking rolls therefor. 34, 34, represent transfer cylinders usually faced with rubber. Preferably these transfer cylinders are also constructed according to my invention as above described.

In operation shaft 1, revolves during operation of the printing press and as sleeves 2, 2, are clamped to the shaft, as by set screw 36 (see Fig. 4) the cylinder also revolves. When shifting lever 19, is in position shown in full lines in Fig. 4, all toggle connections 8—10 are extended and the panels or segments of the cylinder are in their outermost, or operative printing position, whether it be a printing or transfer cylinder. This position can be adjusted by means of adjustable toggle sections 13. The proper adjustment to bring all the toggle links into straight line positions can be secured by means of the adjustments 21 and 22 on toggle rods 12, and by adjustment of stud 14, by means of nuts 15, 15. When it is desired to trip any cylinder its shifting lever 19, is swung into the position shown in dotted lines in Fig. 4, thereby shifting disk 16, and all toggle rods 12, to the right, thus partly collapsing the toggle link systems 8—10, and slightly withdrawing all the segments of the cylinder surface radially toward the center. If for any reason one or more panels or segments of the cylinder surfaces are to be put out of operation for a definite period of time, the toggle link systems carrying the same are shortened by means of the adjustable sections 13, 13. If the cylinder is used as a printing or impression cylinder and solid outer segments are used such as shown in Fig. 3, the same are given their proper printing surfaces by the process described in prior Patent No. 1,155,352, or any other suitable method and these can be quickly placed in position and held to the inner or base segments 6, 6, by means of locking wedges 24. If the cylinder is used as a transfer cylinder then the outer segments 23, will usually be faced with rubber. If printing surfaces are produced on sheets of zinc or other material such as indicated in Fig. 2, these can be stretched over the outer segments 23, and held in position by the clamps as there shown.

When my invention is employed in an offset printing press such as indicated in Fig. 8, it will be obviously possible to adjust the diameters of all cylinders 31 and 34 with the utmost nicety to a uniform figure so that perfect contact without relative rubbing will be secured between all surfaces. In such press the printing or impression cylinders 31, 31, receive ink for the ink retaining portions of their surfaces from the usual dampening rollers 32, 32, and water for the ink repelling portions of their surfaces from the inking rolls 33 33. The ink is then transferred by contact to the transfer cylinders 34, 34, and by them applied to the web of paper 35, which is to be printed. My invention also provides a most simple and easily operated trip for the cylinders which is much preferable to the complicated apparatus heretofore employed for swinging such cylinders bodily out of operative position.

By my invention practically the complete surface of the cylinder is capable of use, and at the same time it may be conveniently cut up into sections as for different pages of the book or paper. By making each panel of the cylinder surface equal in circumferential dimension to the length or width of a page or some multiple of such page length or width, the very narrow opening between adjacent panels will come at the margins of such pages and no cylinder surface whatever will be wasted. Another advantage resides in the ease and rapidity with which particular plates can be removed and replaced by means of the locking wedges 24, without disturbing any of the other delicate adjustments made to secure proper position for the printing surface.

I wish it understood that various changes can be made in the details of construction shown and described without departing from the substance of my invention so long as the general principles of operation and coaction of parts herein set forth are preserved.

Having described my invention, I claim:

1. A cylinder for use in printing presses the curved impression surface of which is composed wholly of a plurality of segments mounted on guides and movable radially of the cylinder, and means for holding the segments in different positions of radial adjustment, comprising a shaft on which all the segments are mounted, a system of adjustable toggle joint connections between the shaft and each segment and means for operating said toggle joint connections simultaneously.

2. A cylinder for use in printing presses the curved impression surface of which is composed wholly of a plurality of segments mounted on guides and movable radially of the cylinder, and means for holding the segments in different positions of radial adjustment, comprising a shaft on which all the segments are mounted, a system of toggle joint connections between the shaft and each segment and adjustable means for operating said toggle joint connections simultaneously.

3. In an offset printing press the combination, with a transfer cylinder the curved surface of which is composed wholly of more than two segments mounted in guides and movable radially of the cylinder and

means for holding the segments in different positions of radial adjustment, of a coöperating printing cylinder the impression surface of which is also composed wholly of more than two segments mounted in guides and movable radially of the cylinder, and means for holding the segments in different positions of radial adjustment.

4. A cylinder for use in printing presses comprising in combination, a shaft, a plurality of base segments mounted on said shaft, and adjustable radially thereof, a corresponding number of outer segments detachably mounted one on each of the base segments and having their outer surfaces curved to form a nearly continuous cylindrical surface, and a series of flexible sheets of metal detachably mounted on said outer segments having their outer faces etched to form impression surfaces, whereby when the proper radial adjustment of one set of said combined elements has been secured, the outer segments and impression sheets carried thereby may be easily removed, new impression sheets substituted and the outer segments and new sheets rapidly replaced in position on the base segments without disturbing the radial adjustment of the cylinder as a whole.

WILLIAM GRASS.