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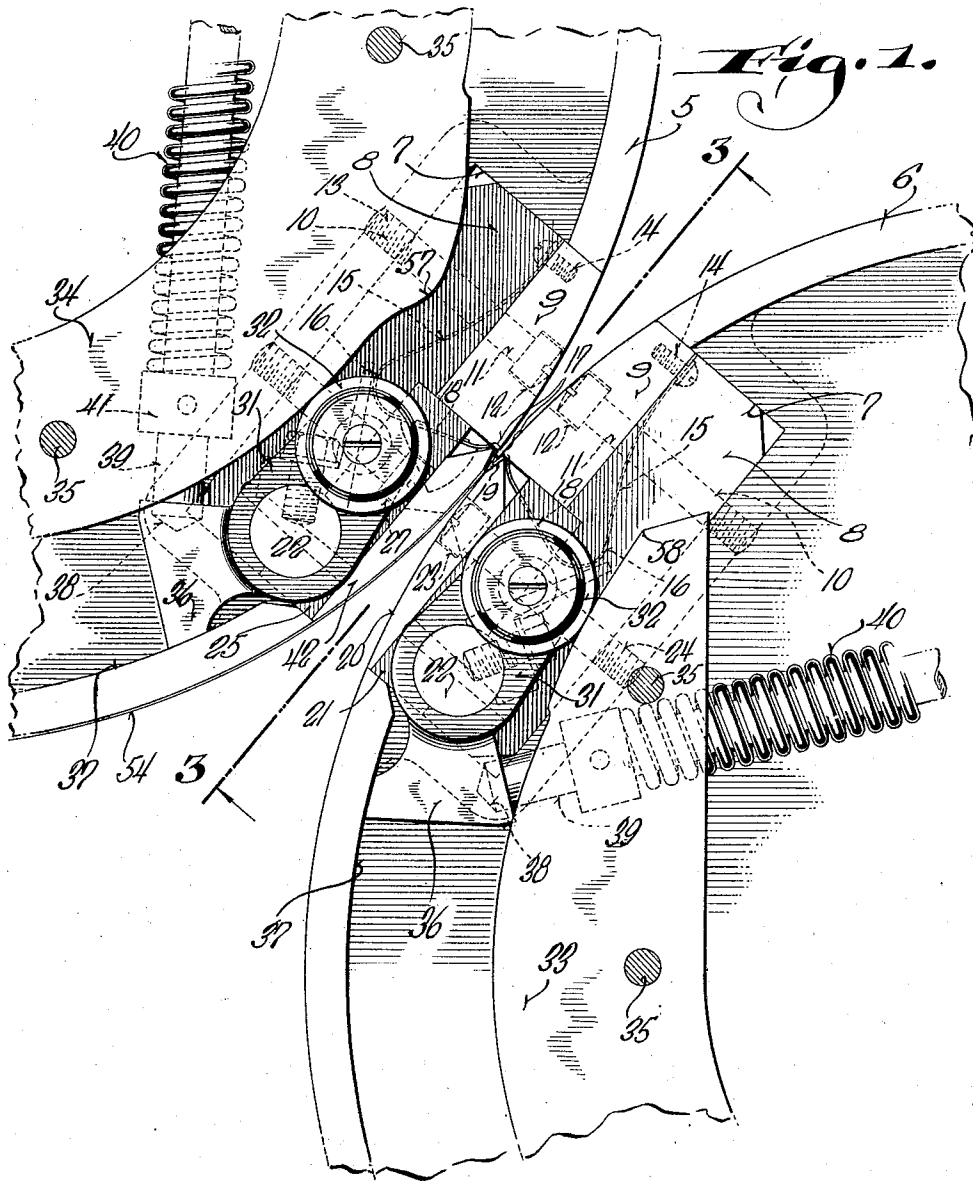
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SHEET TRANSFER MECHANISM

Filed June 13, 1928

2 Sheets-Sheet 1



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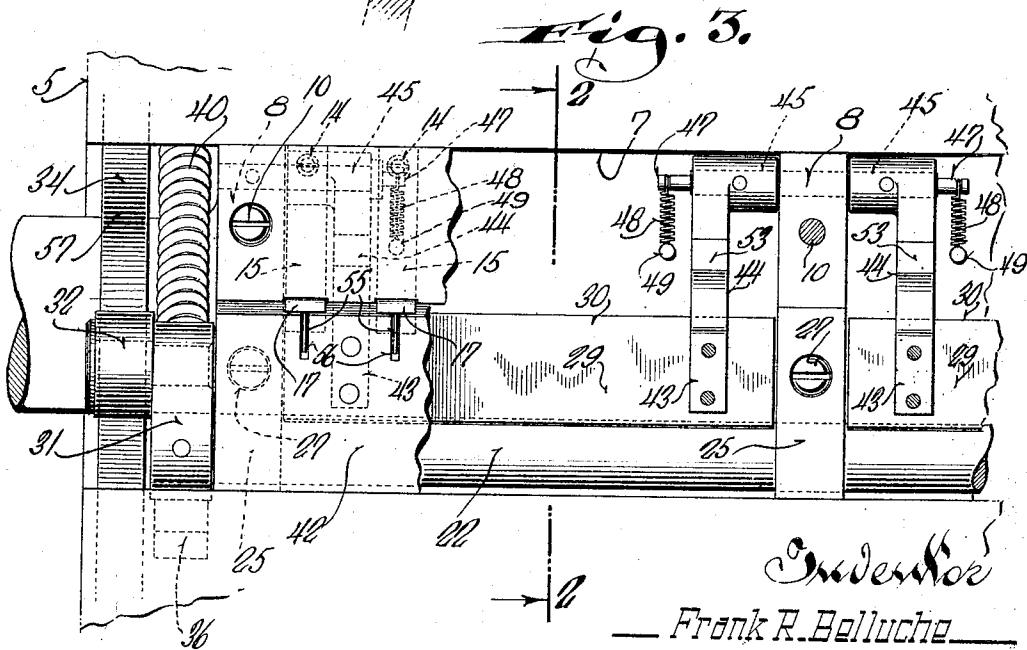
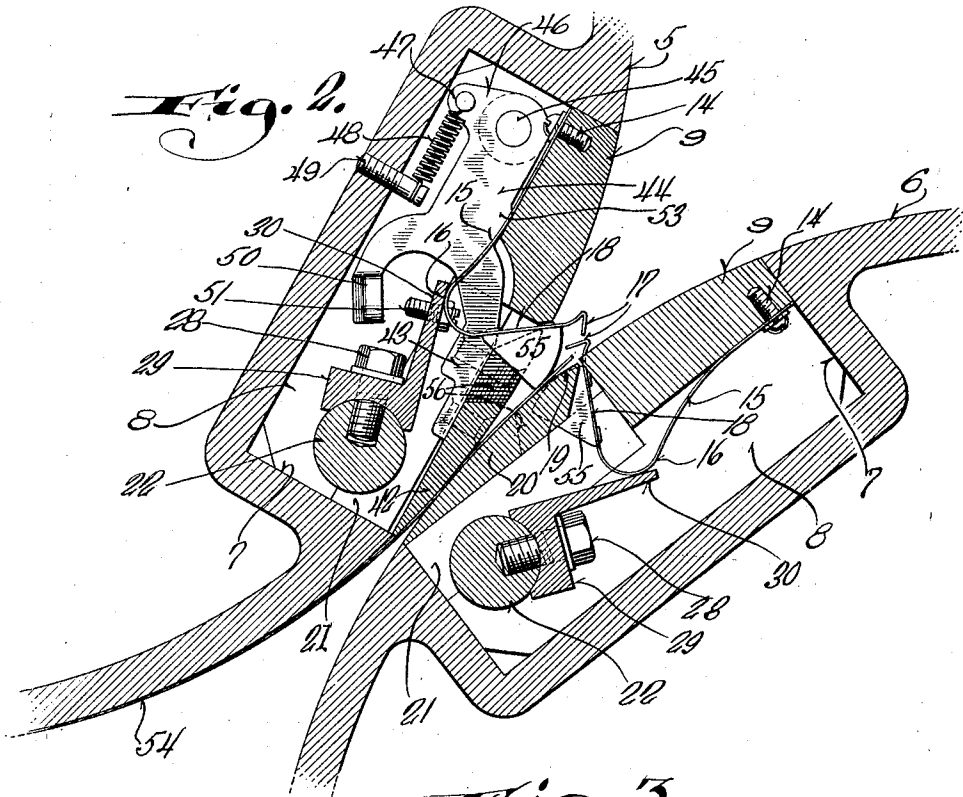
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2 Sheets-Sheet 2



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SHEET TRANSFER MECHANISM

Application filed June 13, 1928. Serial No. 285,033.

This invention relates particularly to means for transferring paper sheets and the like from one cylinder to another and has as its primary object to provide a transfer mechanism in which the surface of the cylinders is substantially unbroken, having substantially no gap therein.

Another object of this invention resides in the provision of a transfer means of the character described especially adapted for use with bronzing machines where cleaning rolls rotating on the sheet tend to pull the same from the grippers as soon as they are opened to transfer the sheet to the receiving cylinder.

Another object of this invention resides in the provision of a transfer mechanism of the character described in which the grippers are formed of flexible spring material and form their own tensioning means and are independent of each other thereby obviating the usual tedious adjustment of the grippers.

A further object of this invention resides in the provision of a transfer mechanism of the character described in which means are provided for clamping the sheet against the receiving cylinder when the grippers of the first cylinder are opened during the transfer and until the grippers of the receiving cylinder engage the sheet.

And a still further object of this invention resides in the provision of a transfer mechanism of the character described in which the manufacturing cost is reduced considerably without in any way impairing the efficiency of the structure.

With the above and other objects in view which will appear as the description proceeds, my 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.

In the accompanying drawings, I have illustrated one complete example of the physical embodiment of my invention constructed according to the best mode I have so far de-

vised for the practical application of the principles thereof, and in which:

Figure 1 is an end view of a portion of two cylinders illustrating my improved transfer mechanism applied thereto;

Figure 2 is a cross sectional view taken transversely through the cylinders on the plane of the line 2—2 of Figure 3 and illustrating the transfer mechanism in the act of transferring a sheet from the first cylinder to the receiving cylinder; and

Figure 3 is an elevational view of the gripper mechanism of the first cylinder taken on the plane of the line 3—3 of Figure 1.

Referring now more particularly to the accompanying drawings, in which like numerals designate like parts throughout the several views, 5 designates a work cylinder which, in the case of a bronzing machine, is termed a bronzing cylinder and 6 a receiving cylinder, or, as in the case of a bronzing machine, a delivery cylinder and while my invention is not restricted to use with bronzing machines, it is particularly adapted therefor, in that means are provided for holding the sheet during the act of transferring from one cylinder to the other against the tendency of the cleaning rolls of such a machine to pull the sheet away from its grippers. Each cylinder 5 and 6 is provided with a longitudinal groove or channel 7 to receive the gripper mechanisms of which bearing blocks 8 form a part, the blocks being positioned within the channels 7 at each end of the cylinders and at medial spaced points along the length thereof.

Positioned outwardly of, and filling the space between the outer surface of the bearing blocks and the periphery of each cylinder, is a gripper carrying plate 9 which extends across the length of each cylinder. The plate 9 is secured in place by cap screws 10 which pass through apertures 11 in the gripper plates with their heads positioned in counterbores 12 and through apertures in the bearing blocks 8 to be threaded, as at 13, in the bottom of the channels 7, thus securing the bearing blocks, at one point, and the gripper carrying plates to the cylinders.

The outer face of each gripper plate is

curved to form a continuation of the curvature of the surface of its cylinder and secured to the underside thereof by screws or other means 14 is a plurality of grippers 15 formed of flexible spring steel or other suitable metal. The grippers are fastened to the plates at one end and are flexed inwardly toward the center of the cylinders and then bent upwardly, as at 16, to terminate in hooks or paper engaging fingers 17 which are directed at substantially right angles to the straight portions 18 of the grippers which extend between the bends 16 and the fingers 17.

The grippers of the cylinder 6 have their paper engaging fingers 17 cooperating with the tapered face or edge 19 of a gap cover 20 which, like the gripper plates 8, extends throughout the length of its cylinder and has its under surface engaging bearing caps 21 which cooperate with the bearing members 8 to rotatably mount a shaft 22, for the purpose later described. Cap screws passing through counter-bored apertures 23 in the gap cover and through aligned apertures in the bearing cap and bearing block, are threaded in apertures 24 in the bottom of the channel 7 of the cylinder 6 to secure the gap cover, the bearing caps and the adjacent ends of the bearing blocks in position. The outer surface of the gap cover 20 is curved, or arcuate to conform to the curvature of the cylinder 6 to form a continuation thereof. The edge 19, with which the fingers 17 of the grippers cooperate, is spaced but a slight distance from the edge of the gripper carrying plate 9, the width of the gap being sufficient to permit the relatively thin grippers to move therethrough.

The bearing blocks 8 of the cylinder 5 are also provided with bearing caps 25 to rotatably mount a shaft 22, the caps 25 being secured in place by cap screws having their heads positioned in counter-bores 27 in the cap members and pass through openings in the adjacent portions of the blocks and are likewise threaded in apertures 13 in the bottom of the channel 7.

The shafts 22 extend across the length of their cylinders and have secured thereto by cap screws 28, gripper actuating members 29 provided with gripper engaging flanges 30 which are normally positioned to engage the bend 16 in the grippers and, upon rotation of the shafts, move the grippers outwardly against their own resiliency to open the same.

The gripper actuating members 29 are of a length to extend from one bearing block 8 to the other and thus engage all of the grippers of each respective cylinder. The shafts 22 each have one end extended outwardly of their adjacent endmost bearing blocks 8 to mount an arm 31 which rotatably carries gripper rollers 32 at its outer end adapted to track on the cams 33 and 34, the cam 33 cooperating

with the roller carried by the shaft 22 of the cylinder 6 and the cam 34 cooperating with the roller carried by the shaft 22 of the cylinder 5. The cams 33 and 34 are stationary and are suitably secured to the adjacent frame of the machine, not shown, by suitable means 35.

Extended from each arm 31 is a tail piece 36 which engages the inner surface of an annular extension 37 formed on the adjacent end of each cylinder and has an aperture or recess 38 in which the adjacent end of a spring urged rod 39 is positioned, the other end of the rod 39 being slidable in a guide, not shown, carried by the cylinder. A spring 40 confined between the guide, not shown, and a collar 41 secured to the end of the rod 39 adjacent the tail piece 36 yieldably urges the arms and their respective shafts 22 upon which the gripper actuating members 29 are secured towards a position disengaged from the grippers and with the tail piece 36 engaging the annular flange 37 of its respective cylinder.

In the cylinder 5 the space outwardly of the bearing caps 21 which in the cylinder 6 is closed by the gap cover 20 has a transfer plate 42 movably positioned therein. The transfer plate 42 is similar in construction to the gap cover 20 extending across the length of the cylinder, and is riveted or otherwise secured to arms 43 of several levers 44 pivoted, as at 45, to the bearing members 8, the medial bearing members having levers 44 at each side thereof. Each lever 44 has an extension or lug 46 carrying a stud 47 to receive one end of a contractile spring 48 the other end of which is connected with a stud 49 threaded in the bottom wall of the opening 7 to at all times yieldably urge the arms 43 and with them the transfer plate beyond the periphery of the cylinder.

As, during operation, the cylinders travel at an appreciable speed, the transfer plate 42 will be affected by centrifugal force which tends to project the plate beyond the periphery of the cylinder and thus assists the springs 48.

However, during all positions of rotation of the cylinder, except that at which the sheet transfer takes place, the transfer plate 42 is held against actuation due to centrifugal force and the springs 48, by stops 50 carried by the lever 44 which cooperate with an adjustable screw 51 on the flange 30 to hold the plate 42 in its retracted position with the outer surface thereof forming a continuation of the cylinder 5.

When the cylinders are in the positions at which their respective cam following rollers 32 ride on the low parts of their cams or off of the cams entirely, their springs 40 are free to rotate the shafts 22 and retract the gripper actuating members 29 permitting the grippers to close with their fingers 17 engaging

the edge 19 of the gap cover 20 and the edge 52 of the transfer plate 42. With the movement of the gripper actuating members; the adjustable screws 51 carried by the members positioned within the cylinder 5 about the stops 50 of the levers 44 to fully retract the transfer plate. The screw 51 being adjustable, it will be apparent that the levers 44 will be moved inwardly a proper distance.

10 The lever 44 is further provided with a stop 53 which abuts the adjacent inner surface of the gripper carrying plate to limit the outward movement of the transfer plate, however, the stop 53 is so positioned as to permit the spring 48 to extend the transfer plate a sufficient degree and permit the same to clamp the sheet 54 between it and the gap cover 20 when the cylinders assume the position illustrated in Figure 2. At this time, the sheet is being transferred from the cylinder 5 to the receiving cylinder 6.

20 The grippers 15 are each provided with a "shoo-fly" 55 suitably secured to the portions 18 of the grippers and operably movable with the grippers in slots 56 in the gap cover 20 and the transfer plate 42 to be extended outwardly of the periphery of the cylinders when the grippers are actuated toward open position, as shown in Figure 2.

30 The high spot 57 of the cam 34 and the high spot 58 of the cam 33 are so positioned with respect to each other that at the time the cylinders assume their positions illustrated in Figure 2, the roller of the cylinder 6 has just left the high spot 58 and the roller of the cylinder 5 is directly on the high spot 57. Furthermore it will be seen that as the cam 33 drops abruptly beyond its high spot 58, the grippers of the cylinder 6 quickly close whereas the grippers of the cylinder 5 remain open until the sheet 54 is securely held by the grippers of the cylinder 6. It will also be seen that as the grippers of the cylinder 5 are open to a greater extent than the grippers of the cylinder 6, the "shoo-flies" carried by the grippers of the cylinder 5 extend beyond the periphery thereof and direct the edge of the sheet into the path of the fingers 17 of the grippers carried by the receiving cylinder 6.

40 The grippers being formed of resilient spring steel or other like metal, in themselves provide the necessary tension for maintaining the same in contact with their cooperating edges to securely grip the edge of the sheet and inasmuch as each gripper is independent of the other, it will be seen that if for any reason an obstruction prevents the full closing of any single gripper it will not in any way effect the positive functioning of the remaining grippers and as the members 29, when in their retracted position, move away from the bends 16 and the grippers they will be free to exert the maximum of pressure on the sheet.

From the foregoing description, taken in connection with the accompanying drawings, it will be readily apparent to those skilled in the art to which an invention of the character described appertains, that I provide a transfer mechanism for cylinders of printing presses, bronzing machines, and the like, in which the cylinders are substantially closed with but a narrow gap through which the grippers operate, and one in which the grippers are independent of each other requiring no adjustment and in which a sheet is held clamped against the receiving cylinder during the actual transferring thereof from one cylinder to the other.

What I claim as my invention is:

1. In combination with a pair of cylinders having grippers adapted to clamp a sheet thereto whereby the sheet is movable therewith, means for transferring the sheet from one cylinder to the other including means for projecting the sheet toward the receiving cylinder, and means independent of said projecting means for holding the sheet against the receiving cylinder during the transferring of the sheet.

2. In combination with two cylinders, spring grippers carried by each cylinder and adapted to clamp a sheet thereto for movement with the cylinders, means for transferring the sheet from the grippers of one cylinder to the grippers of the other including means for projecting the sheet toward the receiving cylinder, and means independent of said projecting means for holding the sheet against the receiving cylinder during the transferring.

3. In combination with a pair of cylinders the surface of which is substantially unbroken having but a relatively narrow slot therein, spring grippers carried by each cylinder and cooperating with an edge of each slot to clamp a sheet therebetween, the thickness of the grippers being substantially equal to the width of the slot, means for transferring the sheet from one cylinder to the other including means for projecting the sheet toward the receiving cylinder, and means independent of said projecting means for holding the sheet against the receiving cylinder during the transferring.

4. In combination with a pair of cylinders, grippers for holding a sheet for movement with the cylinders, means for opening the grippers to transfer the sheet from one cylinder to the other, means at spaced intervals for projecting the sheet from one cylinder toward the other, and a member carried by and extending throughout the length of one cylinder and movable to clamp the sheet against the other cylinder when the grippers are opened to transfer the sheet.

5. In combination with a pair of cylinders, grippers carried by the cylinders and operable to grip a sheet for movement therewith,

means for transferring the sheet from the grippers of one cylinder to the grippers of the other including means for opening the grippers, means for yieldably urging the opening means to inactive position, a member carried by one cylinder for clamping the sheet against the surface of the other during transferring, and means whereby said member is retracted upon retraction of the gripper opening means.

6. In combination with a pair of cylinders grippers carried thereby for engaging a sheet to be carried first by one cylinder and then by the other, means for transferring the sheet from the grippers of one cylinder to the grippers of the other, and means partially actuated by centrifugal force for holding the sheet against the surface of one cylinder during the transferring thereof.

7. In combination with a pair of cylinders, grippers carried thereby for engaging a sheet to be carried first by one cylinder and then by the other, means for transferring the sheet from one cylinder to the other, a member for holding the sheet against one cylinder during the transferring, arms carrying said member pivotally mounted to the other cylinder, and means for moving the member towards the first-mentioned cylinder to hold the sheet thereagainst.

8. In a cylinder having a longitudinal channel in its surface, a plate member closing a portion of the channel and forming a continuation of the curved surface of the cylinder, a second plate member movably mounted closing the remainder of the longitudinal channel normally forming a continuation of the curved surface of the cylinder and slightly spaced from the first plate member to provide a relatively narrow slot in the surface of the cylinder, grippers connected with the first plate member and extended through the slot to cooperate with the adjacent edge of the second plate member to grip a sheet for movement with the cylinder, means for opening the grippers, and means for moving the second plate member outwardly of the periphery of the cylinder when the grippers are opened.

9. In a cylinder having a longitudinal channel in its surface, a plate member closing a portion of the channel and forming a continuation of the curved surface of the cylinder, a second plate member forming a continuation of the curved surface of the cylinder and spaced from the first plate member to form a relatively narrow slot extending throughout the length of the cylinder, spring grippers carried by the first plate member and projected through the slot to cooperate with the adjacent edge of the second plate member to grip a sheet for movement with the cylinder, means movably mounting the second plate member, means at all times tending to extend the second plate member beyond

the periphery of the cylinder, means for opening the grippers, and means whereby the means for opening the grippers controls the means at all times urging the second plate member beyond the periphery of the cylinder whereby the second plate member is projected beyond the periphery of the cylinder whenever the grippers are opened.

10. In combination with a cylinder having a longitudinal channel in its surface, plate means secured over the channel to substantially close the same and form a continuation of the curved cylinder surface, said plate means having an opening, a gripper having its major portion disposed within the cylinder channel and having a part projected through the opening to cooperate with one edge thereof, and means within the longitudinal cylinder channel for actuating the gripper.

11. In combination with a cylinder having a longitudinal channel in its surface, complementary plate members secured over the channel to substantially close the same and form continuations of the curved cylinder surface, said plate members being spaced from each other to provide a narrow slot communicating with the longitudinal channel, grippers mounted within the channel and projected through said narrow slot to cooperate with one edge thereof, and means within the longitudinal cylinder channel for actuating the grippers.

In testimony whereof I have hereunto affixed my signature.

FRANK R. BELLUCHE.