J. WHITE.

SHEET GRIPPER MECHANISM.

APPLICATION FILED DEC. 14, 1911.

1,050,191.

Patented Jan. 14, 1913.

2 SHEETS—SHEET 1.

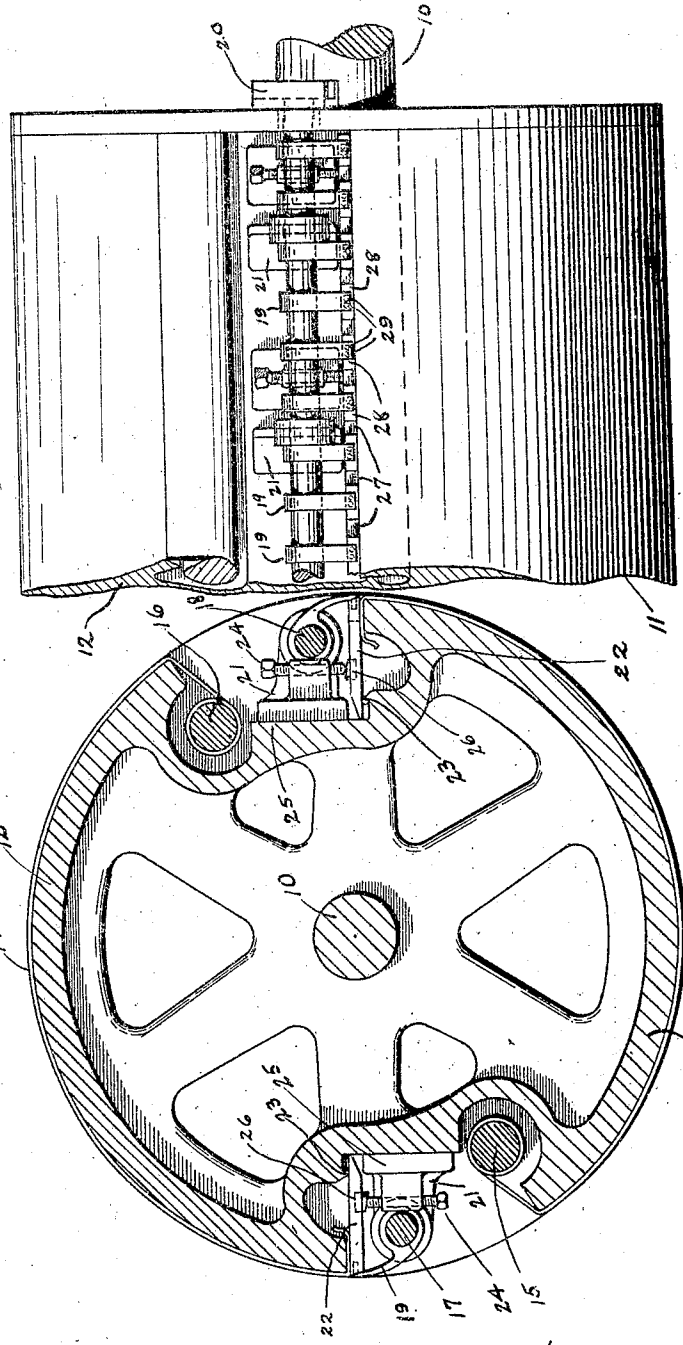

FIG. 2.

FIG. 1.

WITNESSES

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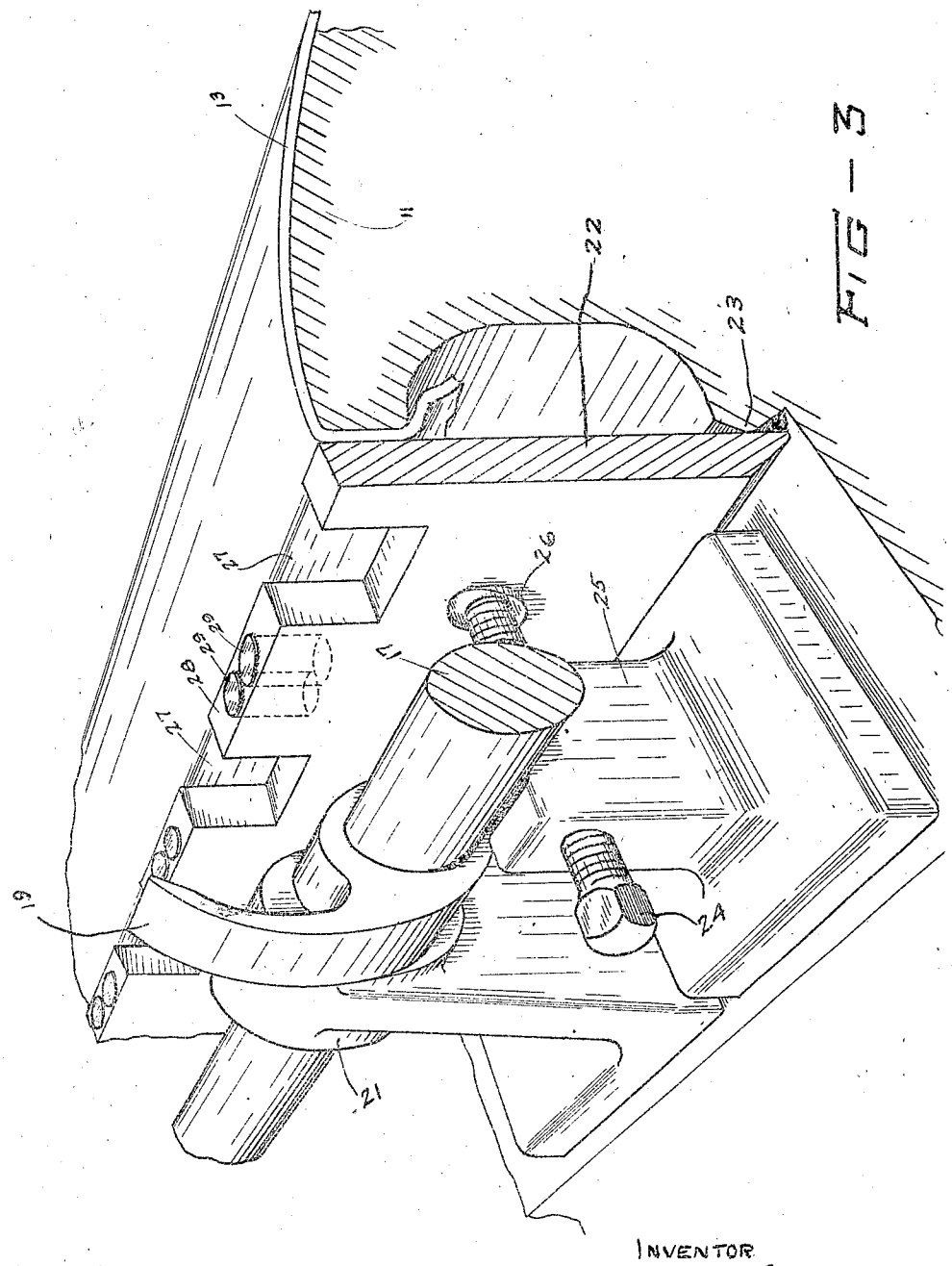

FIG. 2

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SHEET-GRIPPER MECHANISM.

1,050,191. Specification of Letters Patent. Patented Jan. 14, 1913.

Application filed December 14, 1911. Serial No. 665,624.

To all whom it may concern:

Be it known that I, JOSEPH WHITE, a citizen of the United States, residing at Piscataway township, county of Middlesex, State of New Jersey, post-office address Boundbrook, New Jersey, have invented certain new and useful Improvements in Sheet-Gripper Mechanism; and I do declare the following to be a full, true, and exact description of the said invention, such as will enable others skilled in the art to which it appertains to make use of the same.

This invention relates particularly to sheet gripping mechanism on the impression cylinders of printing machines, particularly planographic presses, which use a blanket of yielding material, usually of rubber, on their impression surfaces and which are ordinarily used for multicolor printing, necessitating the passing of the same sheet through the press a number of times to lay on the different colors, which must be in register. In such impression cylinders, to which a sheet is attached temporarily during the printing operation, it is customary to provide an oscillatory shaft mounted on bearings in the ends of the cylinder, and just in front of the impression surface to which the sheet is to be attached, and to place on this shaft a series of fingers so that when the shaft is oscillated, these fingers will be brought in contact with an abutment and hold the front edge of the sheet fed to the cylinder. It has heretofore been usual to use the front portion of the blanket covering the impression surface of the cylinder as this abutment and in many cases, this is fairly satisfactory. However, the succession of blows struck by each finger against this yielding blanket when taking the sheets serves eventually to make depressions therein, and I have found this to be a source of loss of register, unless great care is taken to avoid it and that in some cases, it is practically impossible to avoid it, even with the greatest care. This loss of register arises because sheets fed to such a surface are indented or corrugated along their front edge by being forced into these depressions by the grippers. When such a sheet is again fed to a set of grippers having different relative positions along the front of the impression surfaces, these indentations or corrugations have a tendency to make the gripping point of the sheet in its relation to the cylinder uncertain and so destroy the register of the impression produced by the second printing. If the grippers at the second printing are set to fall exactly in the same places as did the grippers in the first printing, this difficulty is minimized, but this involves considerable time and nicety in the setting of the second set of grippers. Moreover, when the press has an impression-cylinder provided with two or more sets of impression surfaces, each with its own set of grippers, which take successive sheets from the same pile and deliver them to the same pile, the difficulty is greatly increased. In the case of an impression cylinder having two impression surfaces, for instance, the delivery pile, theoretically, should be composed of alternate sheets printed on the alternate surfaces of the impression cylinder. But practically, since sheets are destroyed from time to time and withdrawn from the delivery pile, and since the press itself makes partially idle revolutions at times, this theoretical alternation is not attained. Hence, when the pile is passed through the press a second time, as in multicolor printing, a sheet which was first presented to the grippers of one impression surface may be presented to the same set of grippers or to the other set, as chance determines. If the grippers of the second set are not identical with the first set in arrangement, this results in loss of register for such of the sheets as are presented to a set of grippers other than the one to which they were first presented.

I have provided a mechanism which overcomes all of these objections and enables the production of sheets in register, no matter how many times or to how many different sets of grippers the sheets are presented, and which, when used in a cylinder having a plurality of impression surfaces, enables the production of a pile of printed sheets having the edges flat and smooth, so that the sheets may be fed to the same or other cylinder without loss of register.

As a first step in accomplishing this result, I make the abutments for the movable grippers independent of the impression surface of the cylinder. As one way to accomplish this, I provide a flat bar which may be pressed against the front edge of the impression surface and locked in place. If this bar were composed entirely of metal, there would be a hard and unyielding hold-

ing of the sheet between it and the metallic grippers. The sheet is liable to be torn in such a case by reason of the pull exerted on the front edge of the sheet from the stretching and giving of the rubber blanket of the impression surface when it contacts with the printing surface. This difficulty I overcome by making the grip between the abutment and the gripper a yielding one of substantially the same kind as would be obtained if the gripper impinged directly upon the rubber blanket. By constructing the gripper bar as will be more fully hereinafter described, I am also enabled to prevent the indentation of the front edge of the sheets, as is done when the gripper impinges directly upon the blanket. By such construction, I am also enabled to obtain a more definite grip on the sheet than is obtained between the rubber blanket and the fingers, and at the same time to make this grip sufficiently yielding to prevent the tearing of the sheet by reason of the stretching of the rubber blanket when running over the printing surface.

With these and other objects in view the invention consists of certain novel features of construction and arrangement of parts as will be more fully described and pointed out in the appended claims.

In the drawings, Figure 1 represents a section of an impression cylinder having two sets of gripper mechanism and two impression surfaces. Fig. 2 is a side elevation of a portion of the cylinder shown in Fig. 1. Fig. 3 is an enlarged perspective view of a portion of the impression cylinder showing particularly my novel gripper mechanism.

The corresponding parts are referred to both in the drawings and the following description by similar reference characters.

In the drawings, 10 represents the shaft of the impression cylinder and 11 and 12, two impression surfaces of the particular cylinder which I have shown for purposes of illustration.

13 and 14 are rubber blankets stretched over the impression surfaces 11 and 12, being reeled up on the rods 15 and 16 and clamped at the front edge of the respective impression surfaces, as will be more fully described hereafter.

17 and 18 are gripper shafts of the ordinary type, having grippers 19 thereon, also of the ordinary type. The shafts 17 and 18 are oscillated in the usual manner in the rotation of the cylinder by the usual tumbler heads 20.

21—21 are bearings to support the gripper shaft and it will be understood that the grippers, when in the closed position shown in Figs. 1 and 2, are held in such position by a spring in the usual manner.

22 is an abutment bar, resting on projection 23 on the impression cylinder and also on the front edge of the impression surface. This bar is held in place by screws 24 threaded in brackets 25 attached to the impression cylinder, such screws acting against the bar between the projection 23 and a front edge of the impression surface to clamp the bar against this impression surface and so clamp the rubber blanket thereto.

The bar 22 is provided with plugs of hardened material 26 against which the screws 24 bear, each of these plugs having a sloping face, as shown in the drawings, to prevent the bar from being withdrawn after the screws 24 are tightened up. The bar 22, however, is not attached permanently to the impression cylinder, so that, on loosening up screws 24, the bar is free to be withdrawn from the cylinder to give ready access to the impression surfaces, and thus make the replacement of the rubber blankets easy. Obviously, this sloping face might be made directly on the surface of the bar itself.

Portions of the upper edge of the bar 22 are used as the active area on which the grippers 19 rest to grip the sheet. The bar itself is cut away at the proper place, as shown at 27—27, to admit the passage of grippers on mechanism, such as feed or delivery cylinders, coöperating with the impression cylinder. The remaining portion of the upper edge of the bar, therefore, becomes substantially individual blocks, with any one of which a g pper on the shaft 17 may be made to coöperate. In my preferred form, I form pockets in the upper edge of each one of these blocks and ace therein rubber plugs which extend preferably well below the surface of the block and which may and preferably do extend slightly above the surface of the block. This is shown most clearly by reference to the block 28 in Fig. 3, in which are shown two round plugs 29 inserted in block 28 and extending slightly above its upper surface. It is obvious that these rubber plugs alone will give the same kind of a yielding grip to the sheet as would be had if the gripper contacted directly with the rubber blanket. Since the sheets never tear when they are held directly on the rubber blanket by the grippers, due to the fact that the grip so obtained is sufficiently yielding to permit the paper to move slightly therein in response to the pull of the rubber blanket in stretching during the printing, it is obvious that the sheets will not, and as I have found by experience, they do not tear when held between the rubber plugs 29 and the gripper 19. It will also be seen that while the constant pounding of the gripper 19 on the plugs 29 might eventually compress them in the same way as the grippers compress and indent the rubber blanket, this may be compensated for from time to time by removing the rubber plugs and inserting others, or by removing

the plugs and raising them slightly, as by inserting pieces of paper under them, so as to bring the top surfaces of the plugs back to their original positions. This is clearly a much simpler, cheaper and easier operation than the replacing of the expensive rubber blanket. It will also be seen that, by making the area of the rubber fall inside the contact area of the movable gripper, as I preferably do, the rubber is depressed over its entire surface and cannot form grooves into which the edges of the paper are indented, as is the case when the grippers act directly on the impression blanket.

I have found that the best results are obtained when the plugs of rubber 29 are proportioned so that, when struck by the active gripping surface of the gripper 19, impelled by the usual spring for closing such grippers, the plugs will be compressed sufficiently to permit the top surface thereof to come flush with the surface of the block 28, and by proportioning the area of the plugs 29 to the active area of the gripper 19 so that, when this compression takes place, the gripper 19 grips the sheet not only between itself and the plugs 29, but also between itself and a portion of the surface of the block 28. In other words, to produce the best results, I provide a gripping contact between the gripper and the abutment which is partially yielding and partially unyielding. By this combination I obtain the certainty of registration had between two unyielding surfaces, and at the same time the rubber plugs furnish a relief device to prevent the tearing of the sheet due to the stretching of the rubber blanket when under compression. This same result may be obtained, though not perfectly, by having the surface of the rubber plugs normally just flush with the surface of the block 28.

While I have shown the plugs 29 as round, it is obvious that they may be of any desired shape and in any number to produce the results required. It is desirable, however, that they extend a considerable distance below the surface of the block 28 which then forms a support for the plugs and prevents any excessive sidewise distortion when the pressure of the sheet produced by the printing impression tends to pull the sheet out of the grippers. It is obvious, however, that many of the results may be obtained by merely fastening the rubber on the surface of the block 28.

It will be obvious that I may use any yielding material in place of the rubber which I have shown and described, and it is also obvious that many of the important results of my invention may be had by using a metallic spring or spring-held surface instead of the rubber plugs, since a yielding surface may thereby be obtained. The elastic or yielding surface may also be made a part of the movable, instead of the stationary, grippers.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is as follows:

1. In a printing machine, an impression cylinder, a rubber blanket on the impression surface thereof, grippers mounted in said cylinder and abutments for said grippers independent of the impression surface of said cylinder, the active surface of said abutments being partially hard and unyielding and partially soft and yielding.

2. In a printing machine, an impression cylinder, a rubber blanket on the impression surface thereof, a gripper shaft in said cylinder, grippers on said shaft, a gripper abutment bar in said cylinder, independent of said impression surface, and having elevated blocks on its edge arranged to form abutments for said grippers, the surface of each of said abutments having a portion thereof hard and unyielding and the remainder soft and yielding.

3. In a printing machine, an impression cylinder, a rubber blanket on the impression surface thereof, a gripper mechanism in said cylinder, abutments for the grippers thereof independent of said rubber blanket, the active surface of each of said abutments being partly of metal and partly of rubber.

4. In a printing machine, a cylinder having a sheet carrying surface, a clamp bar arranged to be held removably against the front edge of said sheet carrying surface and clamping means attached to said cylinder and adapted to contact with said bar and press it against the edge of said sheet carrying surface, said bar being provided with inclined surfaces arranged to co-act with said clamping means to prevent the removal of said bar from said cylinder.

5. In a printing machine, an impression cylinder having a projection adjacent the front edge of the impression surface thereof, a sheet gripper abutment bar extending along said front edge and resting on said projection, and clamping means attached to the cylinder and adapted to engage said bar between said front edge and said projection, to hold it against said front edge.

6. In a printing machine, an impression cylinder having a projection adjacent the front edge of the impression surface thereof, a sheet gripper abutment bar extending along said front edge and resting on said projection, and clamping means attached to the cylinder and adapted to engage said bar between said front edge and said projection, to hold it against said front edge, said clamping means and said bar being constructed and arranged to permit the removal of the said bar from the cylinder when the clamping means are released.

7. In a planographic printing machine, an impression cylinder having a plurality of impression surfaces, each of said surfaces having an elastic blanket thereon, a set of sheet taking grippers for each of said surfaces arranged to operate at substantially the same point in the rotation of the cylinder, and abutments for said grippers, independent of said impression surfaces and blankets, said grippers and abutments being constructed and arranged to have a yielding grip on the sheet held therebetween.

8. In a planographic printing machine, an impression cylinder having a plurality of impression surfaces, each of said surfaces having an elastic blanket thereon, a set of sheet taking grippers for each of said surfaces arranged to operate at substantially the same point in the rotation of the cylinder, and abutments for said grippers, independent of said impression surfaces and blankets, each of said abutments being provided with an elastic gripper contact surface.

9. In a planographic printing machine, an impression cylinder having a plurality of impression surfaces, each of said surfaces having an elastic blanket thereon, a set of sheet taking grippers for each of said surfaces, arranged to operate at substantially the same point in the rotation of the cylinder, and abutments for said grippers, independent of said impression surfaces and blankets, each of said abutments being provided with a partially hard and unyielding and a partially soft and yielding gripper contact surface.

JOSEPH WHITE.

Witnesses:
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ALBERT C. WIECHERS.