June 13, 1944. A. J. CARPENTER, JR 2,351,012

INK FOUNTAIN DRIVE

Filed Oct. 8, 1942 3 Sheets-Sheet 1

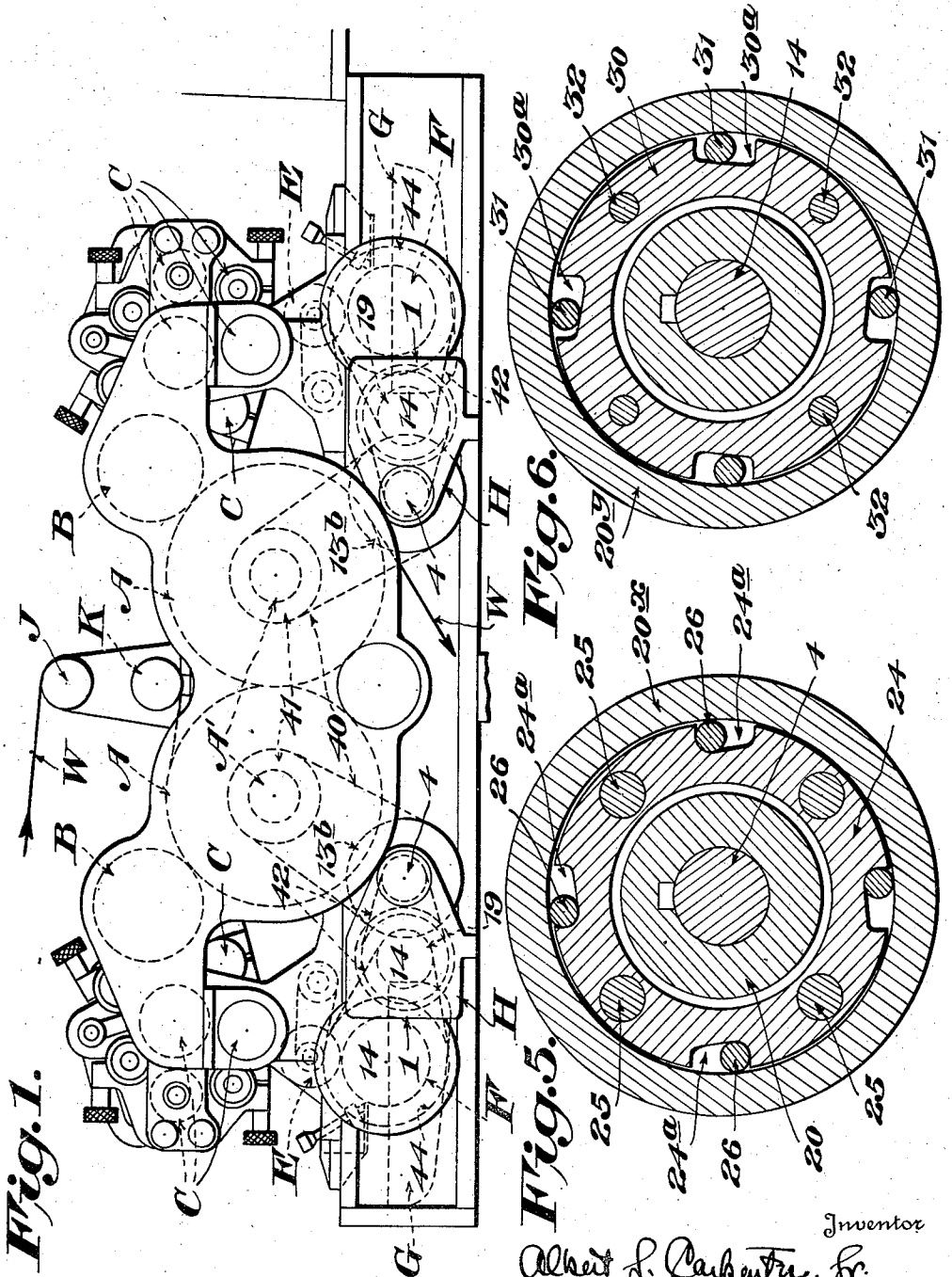


Fig. 1.

Fig. 6.

Fig. 5.

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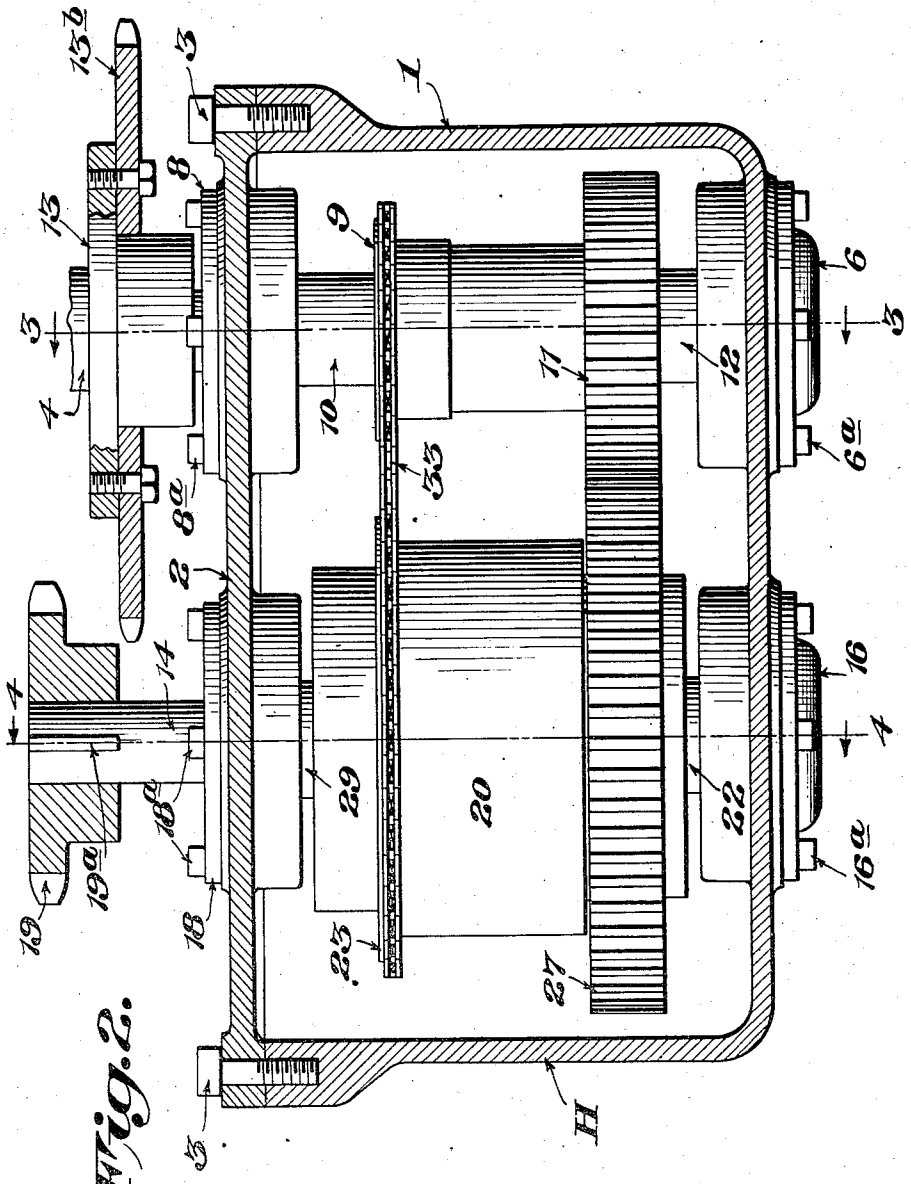


Fig. 2.

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Fig. 4.

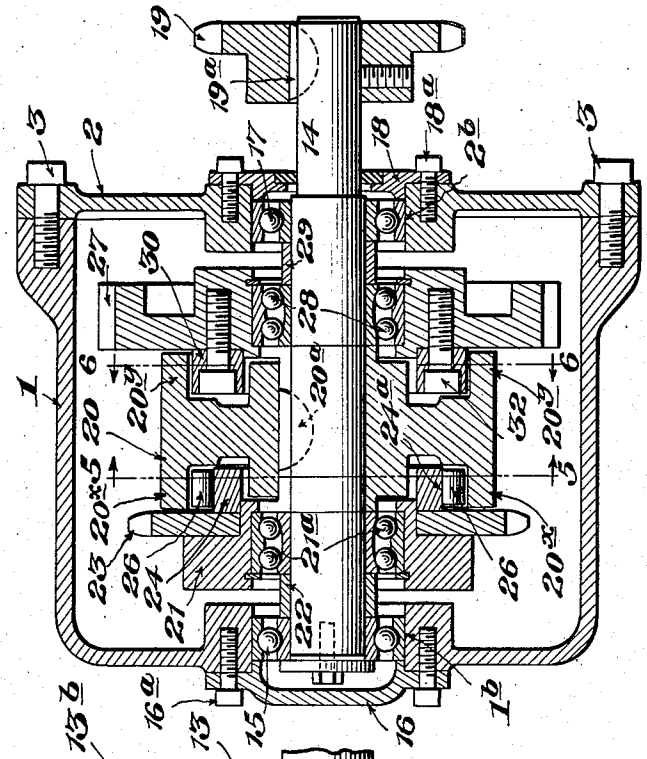
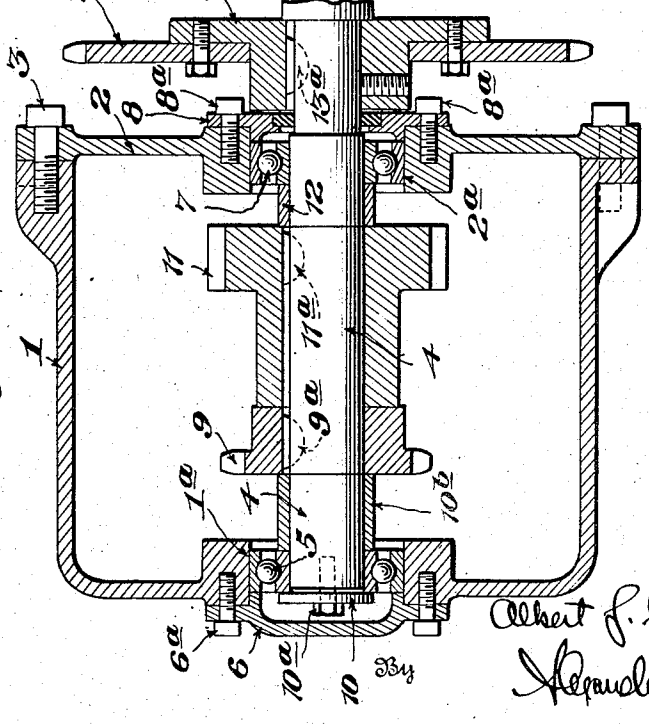


Fig. 3.



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UNITED STATES PATENT OFFICE

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INK FOUNTAIN DRIVE

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Application October 8, 1942, Serial No. 461,335

10 Claims. (Cl. 101—216)

This invention is a novel automatic uni-directional fountain drive for use in printing presses, particularly color printing presses in which the direction of rotation of the printing couples of the unit proper are subject to change, as one of the printing couples may be rotated in one direction while another is rotated in the other direction, or both printing couples may be rotated in the same direction.

Heretofore in driving ink fountains of such printing presses various manual operations have been necessary whenever it has been found expedient to change the direction of rotation of the printing couples, one method heretofore used being to change the relative rotations of the fountain rollers and printing couples by manually slipping certain gears into and out of mesh and alternating them with other trains of gears to give the requisite rotative fountain roll movement. Such procedure necessarily entailed manual manipulation of parts, such as gear guards and the like, and consequent delays and annoyance to the press operators.

The principal object of my invention is to provide a novel mechanism which eliminates the necessity for manual operation to change the direction of rotation of the fountain rollers, and which automatically drives the ink fountain rollers in the same constant direction regardless of the direction of rotation of the associated printing couples, the fountain roll according to my invention being rotated in one direction independent of the direction of rotation of the motive power, which direction is generally governed by the rotational governments of the associated printing couples.

I will explain the invention with reference to the accompanying drawings which illustrate one practical embodiment thereof, to enable others familiar with the art to adopt and use the same; and will summarize in the claims, the novel features of construction, and novel combinations of parts, for which protection is desired.

In said drawings:

Fig. 1 is a diagrammatic elevation of a pair of printing couples of a printing press showing the fountain rollers driven by means of my novel intermediate fountain drive, from the associated printing couples.

Fig. 2 is an enlarged plan view, partly in section, showing the intermediate drive of one fountain roller, detached.

Fig. 3 is a transverse section along the input shaft, on the line 3—3, Fig. 2.

Fig. 4 is a section along the output shaft, on the line 4—4, Fig. 2.

Fig. 5 is a transverse section on the line 5—5, Fig. 4.

Fig. 6 is a transverse section on the line 6—6, Fig. 4.

Fig. 1 illustrates, diagrammatically, a color printing press having a pair of printing couples consisting of two impression cylinders A, each having an associated plate cylinder B cooperating therewith, the plate cylinders each being supplied with ink from suitable inking drums C receiving ink through the usual form and composition rolls from a ductor roll E cooperating with a fountain roller F of fountains G, each fountain roll F being driven through my novel intermediate drive housed in a casing H, each intermediate drive being actuated from the shaft A' of the related impression cylinder A.

In Fig. 1 web W is led downwardly over a guide J and under guide K between one of the impression cylinders A and its plate cylinder B, then upwardly between the impression cylinders A and between the other impression cylinder and its plate cylinder B, from whence the web continues downwardly and may be passed between lower printing couples or led to other desired devices.

In Fig. 1 the arrangement is such that the printing couple prints on both sides of the paper web W; and two or more colors may be printed on each side of the web by various arrangements of printing couples. Changing rotatory movement of the couples is a function of color printing, and for the benefit of higher grade color work it is often found advisable to rotate both printing couples in the same direction. Thus in color printing the printing couples may be arranged to rotate in either the clockwise or anti-clockwise direction; but independent of whichever direction the printing couples rotate it is compulsory to retain the same direction of rotation of the fountain rolls F at all times, due to the fact that the rollers are operated in contiguity to their respective ink scraping plates which are carried by the ink fountains G. Heretofore, in driving the fountain rolls of printing presses, various manual operations have been necessary in order to change the relative rotation of the fountain rollers and printing couples of the unit proper, one method being to slip certain gears into and out of mesh and alternate them with other trains of gears arranged to give the requisite fountain roll movement.

According to my invention, a novel intermediate drive is provided which eliminates the necessity of such changes, and which automatically will drive the ink fountain roll F in the same constant direction regardless of the direction of rotation of the related printing couple which governs the drive of the fountain roll. My invention consists of a novel mechanism adapted to be used for an intermediate drive of the fountain roller allowing the press to be run in either direction but by means of which mechanism the fountain roll will always be driven in the same direction.

As shown in Figs. 2–6 the intermediate fountain drive H consists of a generally rectangular casing 1 open at one side, said open side having a cover plate 2 removably secured thereto by bolts 3 or the like. Adjacent one end of casing 1 is an input shaft 4 mounted at one end in anti-friction bearings 5 interposed between shaft 4 and a bore 1a in the side of casing 1, said bore being normally closed by cap plate 6. The opposite end of shaft 4 is similarly journaled in anti-friction bearing 7 mounted in a bore 2a in the plate 2, said bore being normally closed by a cover plate 8 secured to plate 2 by bolts 8a, the said end of the shaft 4 extending through the plate 8 as shown more particularly in Fig. 3. On the outer end of shaft 4 exteriorly of the casing 1 is a hub 13 keyed thereto as at 13a, said hub carrying a relatively large sprocket wheel 13b to impart rotation to the input shaft 4, as hereinafter explained.

Within casing 1, upon input shaft 4, is a chain sprocket 9 keyed thereto as at 9a, and a spacer 10 on shaft 4 is interposed between the hub of sprocket 9 and the inner race of anti-friction bearing 5, a plate 10 being secured to the adjacent end of shaft 4 by bolt 10a or the like and engaging the opposite end of the inner race of anti-friction bearing 5. On shaft 4 engaging the opposite side of sprocket wheel 9 is a pinion 11 of somewhat larger diameter than sprocket 9, said pinion being keyed to shaft 4 as at 11a. On shaft 4 between the hub of pinion 11 and the inner race of anti-friction bearing 7 is a sleeve 12 preventing axial movement of shaft 4 in its bearings.

Also journaled within casing 1, parallel but spaced from input shaft 4, is an output shaft 14 similarly journaled in anti-friction bearings 15 in the side of casing 1, said bearing 15 being disposed between the shaft 14 and the wall of bore 1b in casing 1, said bore being normally closed by removable cap 16 secured to casing 1 by bolt 16a or the like. The opposite end of the shaft 14 is similarly journaled in anti-friction bearings 17 interposed between the shaft and the wall of bore 2b in plate 2 in a manner similar to the input shaft 4, said bore being normally closed by plate 18 removably secured thereto by bolts 18a. The adjacent end of the shaft 14 extends outside of casing 1 and carries thereon a relatively small sprocket wheel 19 keyed thereto as at 19a, said sprocket 19 imparting rotation to the related fountain roll F (Fig. 1) as hereinafter explained.

Within the casing 1 upon the output shaft 14 is a clutch member 20 keyed thereto as at 20a, said member having an annular flange 20x projecting from one side and a similar annular flange 20y projecting from the opposite side. Rotatably mounted in anti-friction bearings 21a on the shaft 14 adjacent the annular flange 20x is a driving clutch member 21 freely rotating upon the shaft 14 and being properly maintained in spaced relation on the shaft 14 by means of spacers 22 interposed between the inner races anti-friction bearings 21a and 15. Clutch member 21 carries a relatively large sprocket wheel 23 which is fixedly secured thereto in any desired manner, and projecting from the face of sprocket wheel 23 is an annular clutch driving ring 24, entering within the annular flange 20x of clutch member 20 as clearly shown in Figs. 4 and 5, said ring 24 having in its outer face a series of tapering recesses 24a (Figs. 4 and 5) all tapering in the same direction, said slots 24a containing rollers 26 adapted to wedge against the flange 20x when disposed in the shallow ends of the recesses 24a so as to bind the clutch ring 24 to the clutch member 20 when the members 21—24 are rotated by the sprocket 23 in one direction, and to permit the member 24 to become disengaged from the clutch member 20 when the sprocket 23 is rotated in the opposite direction. Preferably the clutch ring 24 is secured to the clutch driving member 21 by bolts 25, as shown in Fig. 5.

On the opposite side of the clutch member 20 is a relatively large gear 27 journaled on anti-friction bearing 28 mounted on the shaft 14 so that the gear may freely rotate thereon, said gear 27 being maintained in spaced relation by means of spacers 29 (Fig. 4). On the face of gear 27 is a clutch driving ring 30 (Figs. 4 and 6) within the annular flange 20y of the clutch driving member 20, said ring 30 having tapered recesses 30a therein, similar to the recesses 24a of ring 24, all sloping in the same direction. In recesses 30a are rollers 31 adapted to wedge against the clutch member 20y when in the shallow ends of the recesses 30a and lock the gear 27 to the clutch member 20 when the gear 27 is rotated in one direction while permitting the gear 27 to freely rotate upon the shaft 14 when the gear is driven in the opposite direction. Ring 30 is secured to the face of gear 27 by means of tap screws 32 or the like.

The input and output shafts 4 and 14 are disposed in parallel relation, and are spaced apart so that the gear 27 on output shaft 14 meshes directly with the pinion 11 on input shaft 4. A chain 33 (Fig. 2) within the casing 1 runs around the spaced sprocket 23 on output shaft 14 and sprocket 9 on input shaft 4. By this arrangement the input shaft 4 when rotated in one direction will cause the clutch driving ring 24 on the output shaft 14 to rotate in the same direction and the clutch driving ring 30 on the output shaft to rotate in the opposite direction. Since the tapered slots in the clutch driving rings 24 and 30 are inclined in the same direction it is obvious that when the input shaft 4 is rotated in one direction the output shaft will be rotated in the same direction by means of the chain 33 running around the sprockets 9 and 23, said drive also rotating the clutch driving ring 24 in the same direction and the related rollers 26 binding in the shallow ends of the inclined recesses 24a to lock the ring 24 to the clutch member 20. At the same time the gear 11 on the input shaft A will freely rotate the gear 27 and the related clutch driving ring 30 on the output shaft 14 in the opposite direction from the driving ring 24, and the rollers 31 will be housed in the deeper ends of the recesses 30a permitting the gear 27 to merely rotate freely on the output shaft 14 in the opposite direction of rotation from shaft 14.

When the input shaft 4 is rotated in the reverse direction the clutch driving ring 24 will be loosely rotated upon the output shaft 14 in the opposite direction of rotation from the output shaft 14, while the meshing gears 11 and 27 will continue to rotate the output shaft 14 in the same direction as when the drive is through the chain 33 and sprockets 9 and 23. Thus the clutch driving discs 24 and 30 are free to rotate upon the output shaft 14 except when driven in such direction as to cause their related rollers 26 and 31 to wedge or bind against the annular flanges 20a and 20b; and whichever set of rollers 26 or 31 is being moved by the rotational forces against the clutch member 20 drives the clutch member 20, and if the input shaft direction is reversed, then the directional rotation of the gears and sprockets is reversed and one set of rollers moves into the

deeper ends of their inclined recesses so that the other set of rollers drives the clutch member 20 in the same direction it was driven before by the first set of rollers.

Obviously, the chain and sprocket drive of the mechanism might be replaced by a gear train without changing the purpose or action of the mechanism, so long as the two freely rotating parts 24 and 30 on the output shaft 14, whether gears or sprockets, turn in opposite directions. By proper selection of gears and sprockets either equal speed reductions, or speed increases, or different speeds of the output shaft 14, can be obtained.

Referring again to Fig. 1, two casings 1 are shown mounted in the frame of a printing press adjacent their related fountain rollers, and the large sprockets 13b on the input shafts 4 are shown driven by chains 40 running over sprockets 41, on the shafts A' of the impression cylinders A, thereby imparting rotation in either direction to the input shafts 4 according to whichever direction the impression cylinders A are rotated. The small sprockets 19 on the output shafts 14 are shown with chains 42 running over same and over sprockets 44 on the shafts of the fountain rollers F, whereby as above explained regardless of whichever direction the related impression cylinders A are rotated, the related fountain rollers F will always be rotated by means of my mechanism in the same constant direction, thus obviating the manual operations heretofore necessary in order to give the requisite fountain roll rotational movements when the rotation of the related impression cylinder is reversed.

I do not limit my invention to the exact form shown in the drawings, for obviously changes may be made therein within the scope of the claims.

I claim:

1. In combination, a printing press having cooperating printing members; means for driving the printing members; an ink fountain; an ink fountain roll cooperating with the fountain for supplying ink to the printing members; and a unidirectional drive for said roll comprising a drive shaft adapted to be driven in either direction, a driven shaft driving the fountain roll, a pair of rotatable members on the driven shaft rotated in opposite directions by the drive shaft, and clutch means in said respective rotatable members acting in the same direction for causing rotation of the driven shaft in a constant direction by whichever rotatable member is rotating in said direction.

2. In a combination as set forth in claim 1, said clutch means comprising clutch rings carried by the rotatable members, said rings having tapered recesses all inclined in the same direction; and rollers in said recesses adapted to lock the related ring to the driven shaft when the related rotatable member is rotating in a direction to cause binding of the rollers in their recesses.

3. In a combination as set forth in claim 1, said clutch means comprising a clutch member fixedly mounted on the driven shaft and having annular flanges projecting from opposite sides thereof; clutch rings carried by the rotatable members and entering the respective annular flanges, said rings having tapered peripheral recesses all inclined in the same direction; and rollers in said recesses adapted to lock the related ring to the clutch member when the related rotatable member is rotating in a direction to cause binding of the rollers in their recesses.

4. In a combination as set forth in claim 1, said drive shaft and said driven shaft being disposed in parallel relation; a gear on one rotatable member; a second gear on the drive shaft meshing with the first gear; and means connecting the drive shaft and other rotatable member to cause the latter to rotate in the opposite direction from the first rotatable member.

5. In a combination as set forth in claim 1, said drive shaft and said driven shaft being disposed in parallel relation; a gear on one rotatable member; a second gear on the drive shaft meshing with the first gear; a sprocket on the other rotatable member; a second sprocket on the drive shaft; and a chain running around said sprockets.

6. In combination, a printing press having a printing couple; means for rotating the couple in either direction; an ink fountain; an ink fountain roll cooperating with said fountain for supplying ink to said printing couple; and a unidirectional drive for said roll comprising a drive shaft adapted to be driven in either direction by the printing couple, a driven shaft driving the fountain roll, a pair of rotatable members on the driven shaft rotated in opposite directions by the drive shaft, and clutch means in said respective rotatable members acting in the same direction for causing rotation of the driven shaft in a constant direction by whichever rotatable member is rotating in said direction.

7. In a combination as set forth in claim 6, said clutch means comprising clutch rings carried by the rotatable members, said rings having tapered recesses all inclined in the same direction; and rollers in said recesses adapted to lock the related ring to the driven shaft when the related rotatable member is rotating in a direction to cause binding of the rollers in their recesses.

8. In a combination as set forth in claim 6, said clutch means comprising a clutch member fixedly mounted on the driven shaft and having annular flanges projecting from opposite sides thereof; clutch rings carried by the rotatable members and entering the respective annular flanges, said rings having tapered peripheral recesses all inclined in the same direction; and rollers in said recesses adapted to lock the related ring to the clutch member when the related rotatable member is rotating in a direction to cause binding of the rollers in their recesses.

9. In a combination as set forth in claim 6, said drive shaft and said driven shaft being disposed in parallel relation; a gear on one rotatable member; a second gear on the drive shaft meshing with the first gear; and means connecting the drive shaft and other rotatable member to cause the latter to rotate in the opposite direction from the first rotatable member.

10. In a combination as set forth in claim 6, said drive shaft and said driven shaft being disposed in parallel relation; a gear on one rotatable member; a second gear on the drive shaft meshing with the first gear; a sprocket on the other rotatable member; a second sprocket on the drive shaft; and a chain running around said sprockets.

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