May 20, 1930. A. C. CHRISTOPHERSON 1,759,542

PRINTING PRESS

Filed March 8, 1929 2 Sheets-Sheet 1

Fig. 1.

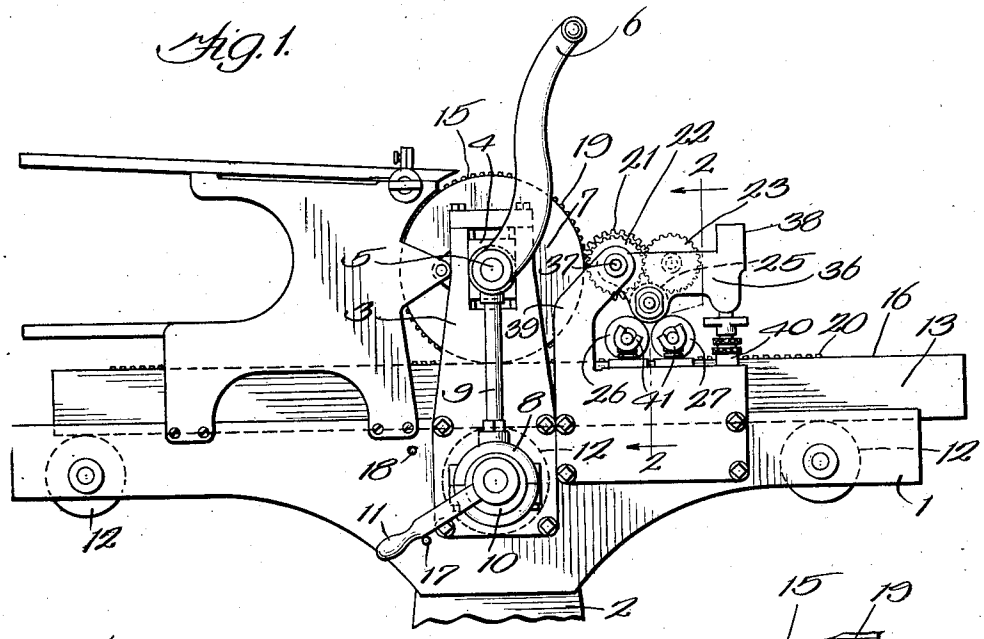
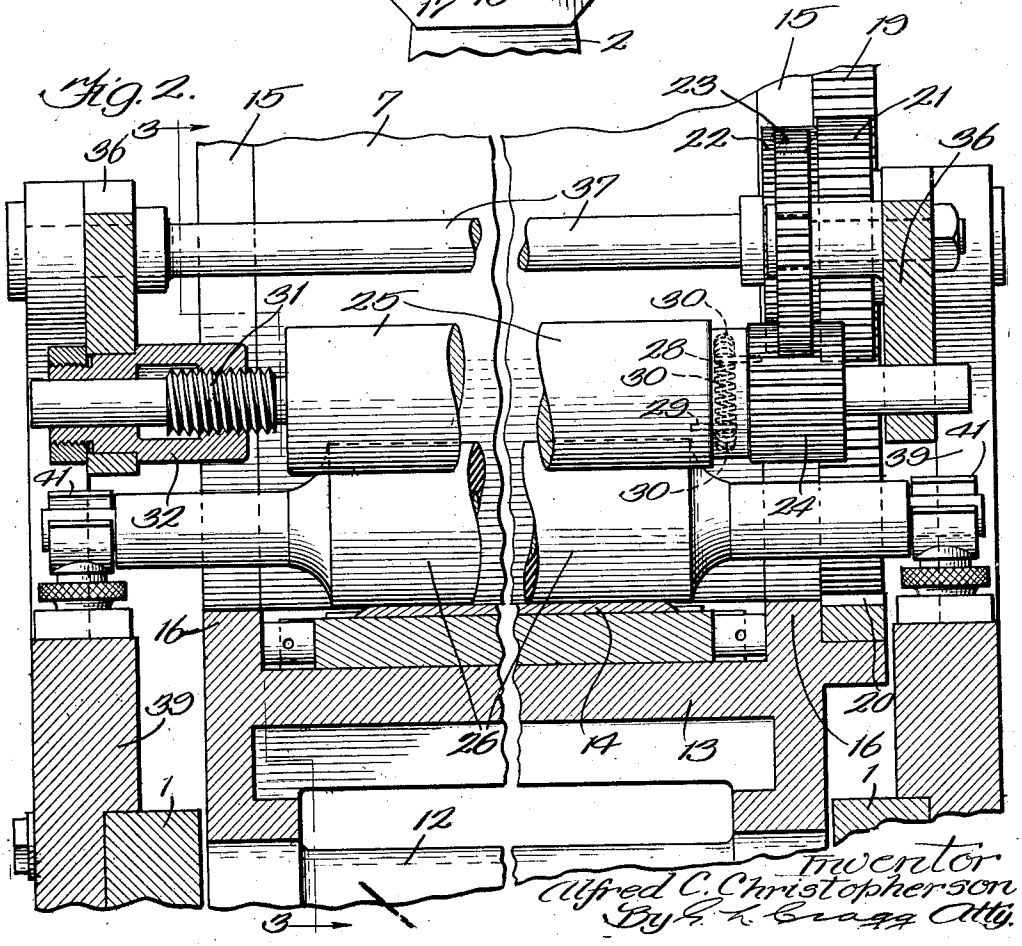


Fig. 2.



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PRINTING PRESS

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Fig. 3.

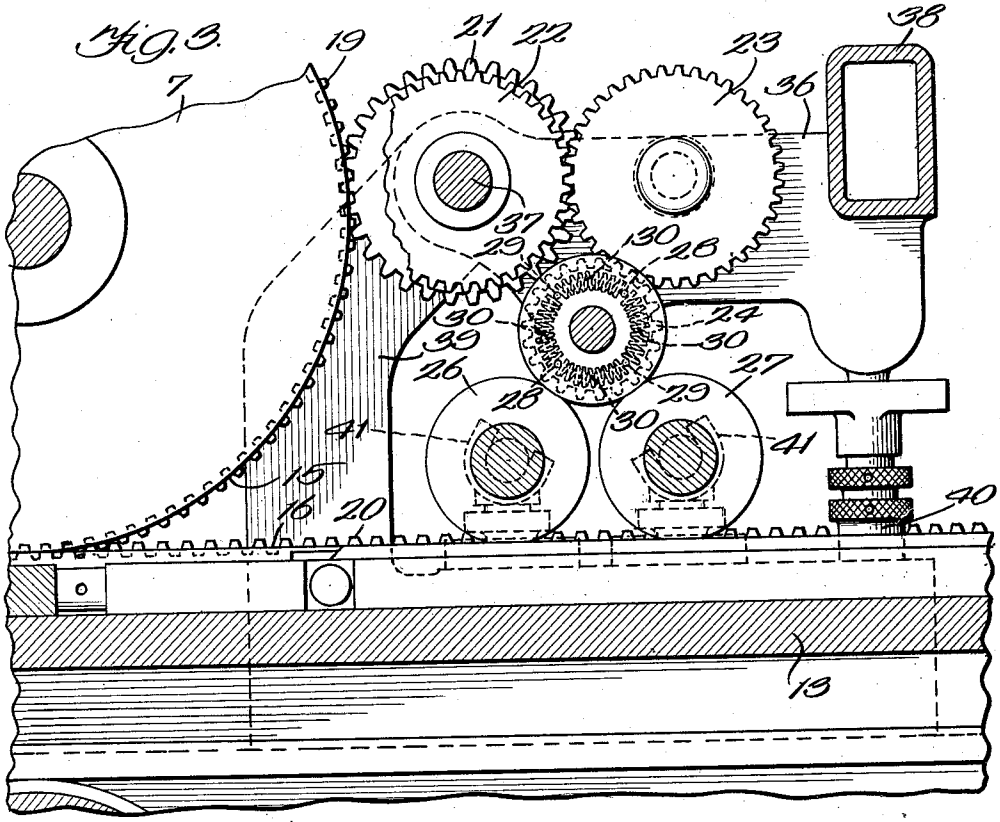


Fig. 4.

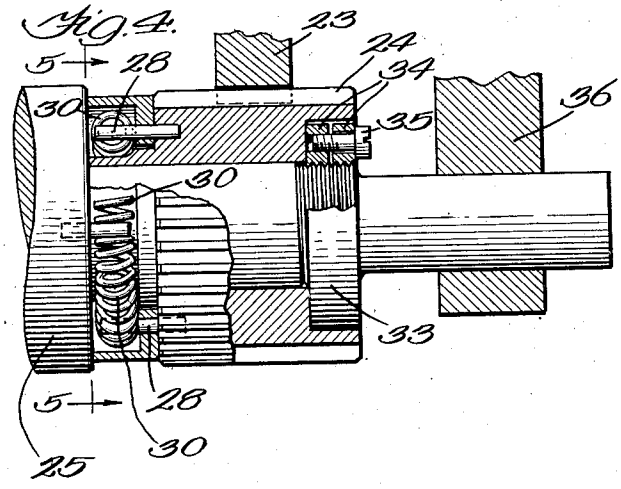
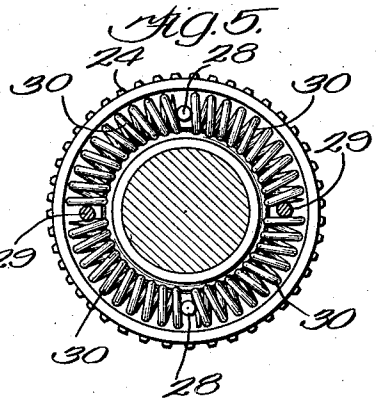


Fig. 5.



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UNITED STATES PATENT OFFICE

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PRINTING PRESS

Application filed March 8, 1929. Serial No. 345,378.

My invention relates to printing presses employing mechanism for inking the form upon one of the complemental printing members and itself operable by gearing which is desirably inclusive of a member that is coupled with one of the aforesaid printing members. Hitherto the gearing which operates the inking mechanism was positive in action, forcing an operation of the inking mechanism in synchronism therewith. It is obvious that unless there is exact correspondence between the movements of the form and of the portions of the inking rollers turning upon the form that slurring of ink upon the form will result, with corresponding imperfection in the printing. This undesirable effect is contributed to by the effect of the inertia of the rotating masses of the gearing and particularly the heavy metal distributing roller that bears upon and is in direct driving relation with the form inking rollers.

My invention resides in the employment of gearing, that operates the inking rollers, which will permit these rollers to idle when they tend to slur the ink upon the form. In carrying out my invention I establish lost motion relation between two members of the gearing that are in driving and driven relation and provide spring cushioning means between these gear members to prevent the form inking rollers from having slurring engagement with the form inked thereby. This spring cushion is weak enough to be overcome by the tractive force between the inking rollers and form when the rollers exhibit any tendency to slippage with respect to the form.

I will explain my invention more fully by reference to the accompanying drawings in which Fig. 1 is a side view illustrating an embodiment of the invention in a hand operated proof press; Fig. 2 is a sectional view on line 2—2 of Fig. 1; Fig. 3 is a sectional view on line 3—3 of Fig. 2, on a larger scale; Fig. 4 is a longitudinal sectional view through a part of the structure, portions being shown in elevation; and Fig. 5 is a sectional view in cross section on line 5—5 of Fig. 4.

The bed supporting frame 1 of the press is upon a pedestal 2. Uprights 3 carry sliding blocks 4 at their upper ends. A shaft 5 is journaled in said blocks, this shaft, in the embodiment of the invention shown, carrying a hand crank 6 by which it may be turned. The printing cylinder 7 is fixed upon the shaft. The shaft carrying blocks 4 are adapted to be vertically adjusted. These blocks are connected with eccentric straps 8 by means of the links 9 and these eccentric straps enclose the eccentrically mounted circular plates 10 that serve, as they are turned, to raise and lower the straps, the links 9, and the blocks 4. A hand lever 11 is connected with one of the plates 10 for turning it and the similar plate on the other side of the plate that is rigidly coupled with this particular plate. Bearer rollers 12 are carried by the frame 1 and support the flat printing bed 13 which carries the printing form 14 of any suitable character and is preferably reciprocating. The sheet to be printed upon is passed between the printing members 7 and 13, the printing pressure being exerted by the cylinder 7.

The printing cylinder is provided with the usual bearers 15 at the sides of the press and the bed is provided with the usual bearers 16, also at the sides of the press upon which the bearers 15 roll as the bed is moved in each printing operation, these bearers, when contacting, defining the normal printing space between the printing members 7 and 13. The printing cylinder is lowered for the printing stroke and raised for the non-printing stroke by operating the handle 11. The supporting frame 1 may carry a stop lug 17 to define a lower limit of movement for the handle 11 and a hole 18 for receiving a pin that will hold this handle in its upper position.

The complemental printing members 7 and 13 are brought into gear by means of the spur gear 19 which is fixed upon and is coaxial with the cylinder 7 and the rack 20 in mesh with the gear 19 and fixed upon the bed 13. As the crank 6 is turned, in the printing operation, the relation of the cylinder 7 to the form 14 is positively defined to reduce to a minimum or prevent backlash or lost motion between the members of the printing couple.

The spur gear 19 desirably also operates the inking mechanism by being in mesh with

a spur gear 21 which is fixed with respect to and coaxial with the spur gear 22, the latter spur gear being in mesh with a spur gear 23 which is in mesh with a spur gear 24 upon the ink distributing roller 25. The roller 25 may be of steel. It rests upon and between the comparatively soft composition rollers 26 and 27 which, in turn, bear upon the printing form 14 that is carried by the printing member 13. The spur gear 19 thus positively drives the spur gears 21, 22, 23 and 24. The roller 25 not only serves to spread or distribute the ink upon the inking rollers 26 and 27, but also constitutes a gear member which is in frictional driving engagement with said inking rollers. The latter two rollers have clinging engagement with the printing form and with the roller 25 so that they would be positively driven, in presses of prior construction, by the roller 25 and the gearing driving this roller under all circumstances with the result that there would be slurring slippage between them and the form 14 if the lineal travel of this form did not correspond exactly to the peripheral travel of these rollers.

According to my invention, I am able to maintain exact correspondence between the lineal travel of the form 14 and the peripheral travel of the inking rollers 26 and 27. I secure this result by introducing lost motion between the driving roller 25 and some gear member that is in driving relation thereto. In the preferred embodiment of the invention this lost motion is provided between this roller 25 and the spur gear 24. To this end I provide two diametrically opposite abutment pins 28 upon the inner end of the gear 24 and two diametrically opposite abutment pins 29 upon the adjacent end of the roller 25 and displaced ninety degrees with respect to the pins 28. I provide four coil compression springs 30, one between each two adjacent abutment pins. These springs are under light compression when the press is idle, their compression being increased somewhat before the gear 24 is effective to turn the roller 25. Said springs and the lost motion permitted thereby are effective to permit the bed 14 to be in driving relation with the inking rollers 26 and 27 when any tendency to slippage between these rollers and the form occurs, slurring engagement of these rollers with the form being thus prevented.

I have shown my invention in simple form, there being no ink fount shown for feeding ink to the rollers as such feeding may be accomplished by hand, if desired. The roller 25 may carry a screw 31 coaxial therewith and threaded within a bearing 32 whereby said roller 25 may be reciprocated along its axis to effect more even distribution of the ink upon the inking rollers. In order that the gear 24 may be properly assembled with the shaft of the roller 25, I provide a set nut 33 upon the shaft of roller 25, this set nut being screwed against the outer portion of the gear 24. Said set nut may be split transversely to its axis and partially around its circumference to provide two spring jaws 34 which may be drawn together by a screw 35 to cause these jaws to grip the threads in mesh therewith.

The shafts which carry the gears and the roller 25 are journaled in arms 36 which are swingingly mounted upon the common shaft 37 for the coaxial gears 21 and 22. These arms are rigidly coupled by the strut 38 so that they are swung in unison when the elements 22, 23, 24 and 25 carried thereby are raised and lowered. The shaft 37 is journaled in fixed brackets 39 and at least one of the arms 36 is provided with a vertically adjustable foot 40 that rests upon the bracket to define the extent to which the roller 25 may be lowered. The inking rollers 26 and 27 are also supported by the brackets 39, the means for supporting these rollers being inclusive of vertically adjusted U-shaped bearings 41 whereby the height of the rollers 26 and 27 with respect to the form 14 may be regulated.

Changes may be made without departing from my invention.

Having thus described my invention, I claim:

1. A printing press including two cooperating printing members between which the sheet to be printed upon is received, the printing form being carried by one of said members and being subject to printing pressure from the other member; inking mechanism inclusive of an inking roller engaging said form; and gearing in driving relation to said inking roller and inclusive of two members in driving and driven relation and in lost motion relation, wherein the printing pressure exerting printing member is a cylinder and the form bearing member is a flat bed in gear with the cylinder.

2. A printing press including two cooperating printing members between which the sheet to be printed upon is received, the printing form being carried by one of said members and being subject to printing pressure from the other member; inking mechanism inclusive of an inking roller engaging said form; and gearing in driving relation to said inking roller and inclusive of two members in driving and driven relation and in lost motion relation, wherein a spring cushion is interposed between the two gear members that are in lost motion relation, wherein the gearing for driving the inking roller is inclusive of a member which is fixed upon the printing pressure exerting printing member that is in the form of a cylinder, and wherein the form bearing member is a flat bed in gear with the cylinder.

3. A printing press including two cooperating printing members between which the

sheet to be printed upon is received, the printing form being carried by one of said members and being subject to printing pressure from the other member; inking mechanism inclusive of an inking roller engaging said form; and gearing in driving relation to said inking roller and inclusive of two members in driving and driven relation and in lost motion relation, wherein one of the gear members is an ink distributing roller that is in inking relation to the inking roller.

4. A printing press including two cooperating printing members between which the sheet to be printed upon is received, the printing form being carried by one of said members and being subject to printing pressure from the other member; inking mechanism inclusive of an inking roller engaging said form; and gearing in driving relation to said inking roller and inclusive of two members in driving and driven relation and in lost motion relation, wherein one of the gear members is an ink distributing roller that is in inking relation to the inking roller and wherein a spring cushion is interposed between the two gear members that are in lost motion relation.

5. A printing press including two cooperating printing members between which the sheet to be printed upon is received, the printing form being carried by one of said members and being subject to printing pressure from the other member; inking mechanism inclusive of an inking roller engaging said form; and gearing in driving relation to said inking roller and inclusive of two members in driving and driven relation and in lost motion relation, wherein one of the gear members is an ink distributing roller that is in inking relation to the inking roller and wherein the gearing for driving the inking roller is inclusive of a member which is fixed upon the printing pressure exerting printing member.

6. A printing press including two cooperating printing members between which the sheet to be printed upon is received, the printing form being carried by one of said members and being subject to printing pressure from the other member; inking mechanism inclusive of an inking roller engaging said form; and gearing in driving relation to said inking roller and inclusive of two members in driving and driven relation and in lost motion relation, wherein one of the gear members is an ink distributing roller that is in inking relation to the inking roller and wherein the printing pressure exerting printing member is a cylinder.

7. A printing press including two cooperating printing members between which the sheet to be printed upon is received, the printing form being carried by one of said members and being subject to printing pressure from the other member; inking mechanism inclusive of an inking roller engaging said form; and gearing in driving relation to said inking roller and inclusive of two members in driving and driven relation and in lost motion relation, wherein one of the gear members is an ink distributing roller that is in inking relation to the inking roller and wherein the printing pressure exerting printing member is a cylinder and the form bearing member is a flat bed in gear with the cylinder.

8. A printing press including two cooperating printing members between which the sheet to be printed upon is received, the printing form being carried by one of said members and being subject to printing pressure from the other member; inking mechanism inclusive of an inking roller engaging said form; and gearing in driving relation to said inking roller and inclusive of two members in driving and driven relation and in lost motion relation, wherein one of the gear members is an ink distributing roller that is in inking relation to the inking roller, wherein a spring cushion is interposed between the two gear members that are in lost motion relation and wherein the gearing for driving the inking roller is inclusive of a member which is fixed upon the printing pressure exerting printing member.

9. A printing press including two cooperating printing members between which the sheet to be printed upon is received, the printing form being carried by one of said members and being subject to printing pressure from the other member; inking mechanism inclusive of an inking roller engaging said form; and gearing in driving relation to said inking roller and inclusive of two members in driving and driven relation and in lost motion relation, wherein one of the gear members is an ink distributing roller that is in inking relation to the inking roller, wherein a spring cushion is interposed between the two gear members that are in lost motion relation and wherein the gearing for driving the inking roller is inclusive of a member which is fixed upon the printing pressure exerting printing member that is in the form of a cylinder.

10. A printing press including two cooperating printing members between which the sheet to be printed upon is received, the printing form being carried by one of said members and being subject to printing pressure from the other member; inking mechanism inclusive of an inking roller engaging said form; and gearing in driving relation to said inking roller and inclusive of two members in driving and driven relation and in lost motion relation, wherein one of the gear members is an ink distributing roller that is in inking relation to the inking roller, wherein a spring cushion is interposed between the two gear members that are in lost motion re-

lation, wherein the gearing for driving the inking roller is inclusive of a member which is fixed upon the printing pressure exerting printing member that is in the form of a cylinder, and wherein the form bearing member is a flat bed in gear with the cylinder.

11. A printing press including two cooperating printing members between which the sheet to be printed upon is received, the printing form being carried by one of said members and being subject to printing pressure from the other member; inking mechanism inclusive of an inking roller engaging said form; and gearing in driving relation to said inking roller and inclusive of two members in driving and driven relation and in lost motion relation, wherein the gearing is inclusive of a member which is provided upon one of the aforesaid cooperating printing members and wherein the printing pressure exerting printing member is a cylinder and the form bearing member is a flat bed in gear with the cylinder.

In witness whereof, I hereunto subscribe my name.

ALFRED C. CHRISTOPHERSON.