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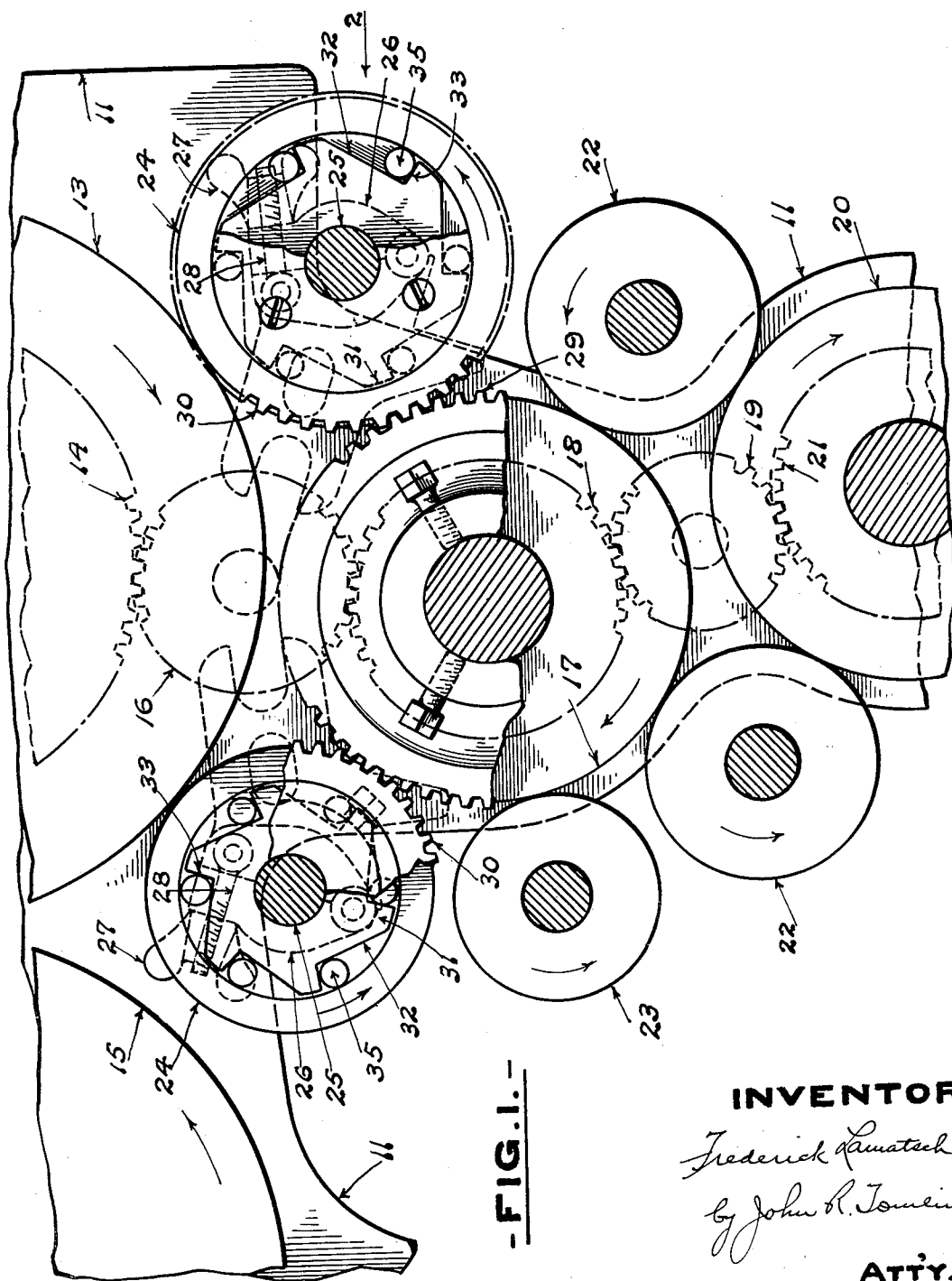
F. LAMATSCH

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FORM ROLLER FOR PRINTING MACHINES

Filed April 1, 1932

2 Sheets-Sheet 1



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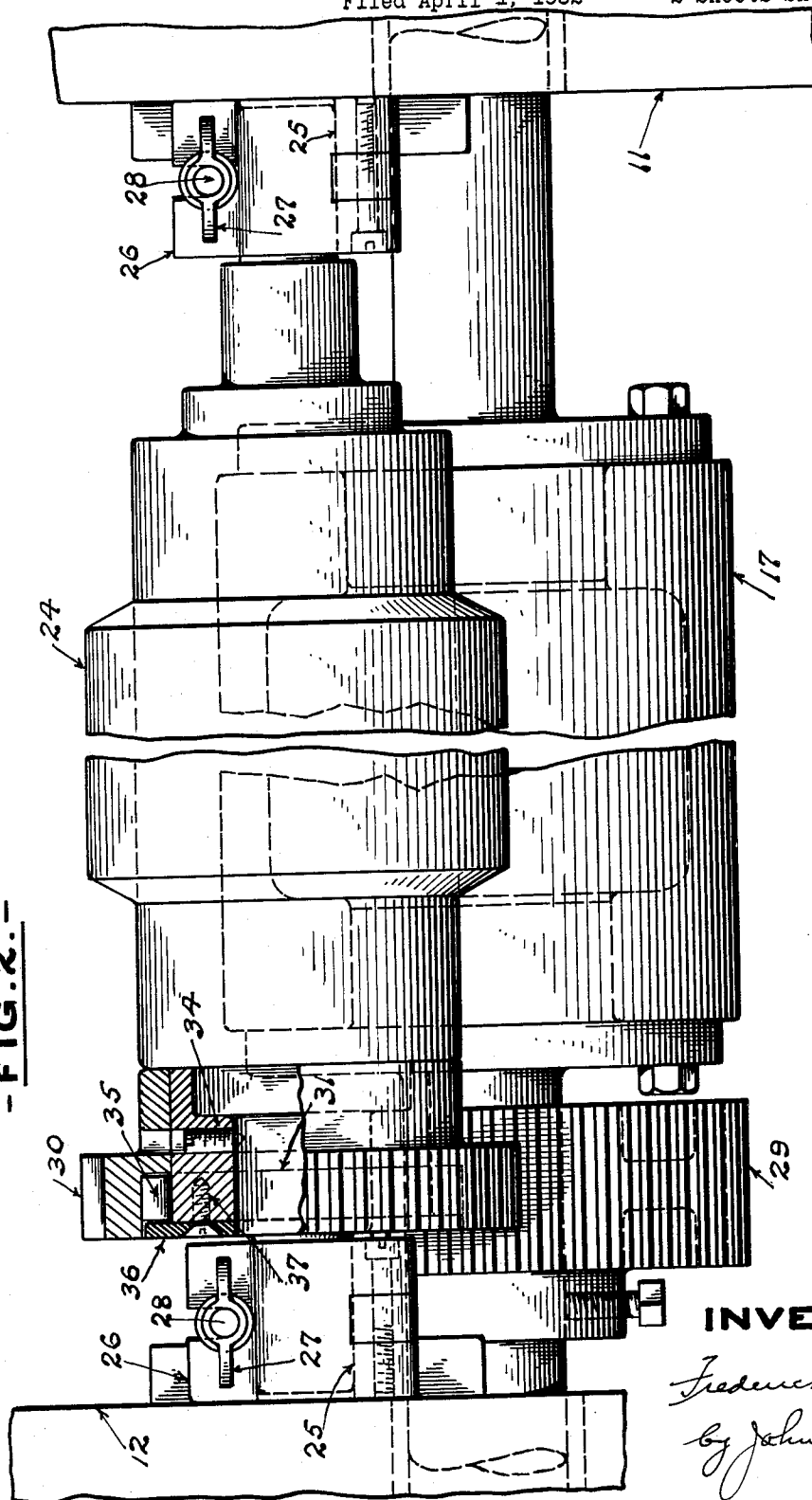
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- FIG. 2. -



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FORM ROLLER FOR PRINTING MACHINES

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9 Claims. (Cl. 101—349)

This invention relates to inking mechanism for printing machines and especially for those of the rotary type adapted to produce newspapers, magazines and similar products from a continuous web of paper, which, after printing, is cut, folded, and assembled.

Such machines are customarily provided with ink cylinders which are generally made of metal on which the ink may be deposited in various ways and spread uniformly thereon by ink rollers, preferably with composition surfaces, which may be rotated by frictional contact with the ink cylinders and vibrated longitudinally thereof to more thoroughly distribute the ink thereon.

The ink is thence transferred from the ink cylinder to the type or printing plates of the form cylinder by one or more form rollers which are rotated by surface contact with both of these cylinders and is thus deposited on the printing surfaces, from which it is impressed on the web of paper. These form rollers may have a composition or rubber surface, to yieldingly contact with the type or plates of the form cylinder and deliver the ink to the printing surfaces thereof.

Heretofore it has been customary to rotate the form rollers solely by the frictional contact of their surfaces with those of the form cylinders and the ink cylinders, but with the present high speeds and large heavy form rollers, it is found, especially on starting and stopping frequently as is necessary for various reasons, that, on account of their inertia, such frictionally operated form rollers slip, at times, relatively to the form cylinders, thus producing bad results and damage.

For example:—when the machine is started, the form roller, on account of its frictional drive, does not at once start to rotate with the form cylinder. In some cases, this results in wiping ink from the contact surface of the form roller thus first producing irregularly inked and imperfect impressions as the form cylinder rotates.

Such action may also result in scoring or wearing the contact portions of the form roller, thus producing flat parts thereon, which further produces bad results in printing and helps to destroy the roller.

On the other hand certain kinds of plate forms, such as comparatively smooth half tone cuts or other smooth printing surfaces, would have a considerable amount of ink wiped from them when the form cylinder rotates at greater or lesser surface speed than that of the contacting form roller, thus producing pale and imperfect impressions.

It is one of the objects of this invention to pro-

vide an efficient arrangement for uniformly supplying ink to the printing surfaces, which will obviate the difficulties hereinbefore mentioned.

These objects are attained by providing a positive driving means for the form rollers, operative at certain surface speeds with respect to those of the form cylinder and which is particularly useful when the machine is starting after a stoppage.

The means of accomplishing this and certain mechanism preferably used, including intermeshing gears of predetermined speed ratios and an over-running clutch will be described in detail hereinafter.

Another object of this invention is to provide an inking system of simple but efficient construction that will provide an uniform or desired amount of ink to all of the inking surfaces and will prevent undue wear or scoring of the form rollers.

With the foregoing and other objects in view, 75 which will appear as the description proceeds, the invention resides in the combination and arrangement of parts, and in the details of construction hereinafter described and claimed, it being understood that various changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

In the accompanying drawings which show 85 present preferred embodiments of the invention:—

Figure 1 is an end elevation of a group of cylinders and rollers of a printing machine including the present invention; and

Figure 2 is a side elevation and partial section of portions of Figure 1, looking in the direction of the arrow 2, including the secondary ink cylinder and a form cylinder geared together as illustrated.

The arrangement of the ink cylinders and rollers is such that they may be adapted to be rotated by positive means, such as driven gearing or other mechanism, or some of them may be rotated by frictional surface contact and all or some may be moved axially to and fro or vibrated by suitable mechanism to better distribute the ink as desired.

Referring now to the characters of reference on the drawings:—

As illustrated in Figure 1, the frame of the printing machine on the far side is indicated as 11 while the companion frame is indicated as 12 in Figure 2.

A portion of the form cylinder is indicated as 110

13 and this is driven by the impression cylinder 15 through gears, not shown, and by surface contact therewith as customary.

The intermeshing gear wheels of the form and impression cylinders and their surface contact are not shown in Figure 1, in order to more clearly illustrate the other parts of the mechanism, but as such an arrangement is usual and customary this will be readily understood, especially by those skilled in this art.

The form cylinder 13 is provided with a toothed gear wheel 14 which meshes with an idler gear 16 which in turn drives the secondary ink cylinder 17 through its gear wheel 18, and this same gear 18 also drives the idler gear 19 which rotates the primary ink cylinder 20 through its attached gear wheel 21; all these rotations being in the directions of the arrows on the various parts.

Ink is initially supplied to the primary ink cylinder 20 in any usual manner and to spread the ink thereon one or more distributing rollers may rotate and vibrate in contact therewith, but these are not illustrated as they may be of any of the usual or customary forms of such construction.

Contacting with the surface of the primary ink cylinder 20 and that of the secondary ink cylinder 17 is a pair of transfer rollers 22 which carry the ink to the secondary ink cylinder 17.

In order to further spread the ink on the secondary ink cylinder 17 a distributing roller 23 is provided and is adapted to rotate by surface contact therewith and also to vibrate longitudinally thereof.

In the drawings illustrating this invention, two ink cylinders are shown namely:—a primary ink cylinder 20 and a secondary ink cylinder 17, but frequently only one ink cylinder is used which in such cases would be the cylinder 17, as will be readily understood by one skilled in this art.

As shown in Figure 1, the toothed gear wheels 14, 16, 18, 19 and 21 are on the far side of the machine as viewed in this figure.

The two form rollers 24 are rotatably mounted on shafts 25 supported in the hinged bearings 26, furnished with the thumb nuts 27 and the eye bolts 28 to provide ease of opening and closing the bearings expeditiously for removal and replacement of these rollers as such is frequently necessary, particularly when the machine is stopped, as these rollers, especially when made of composition, are short lived, besides which they should be withdrawn when the machine is stopped for any considerable time in order to prevent their indentation or distortion by stationary contact with the printing forms.

On the other hand the form rollers preferably used with this invention have a rubber or rubber compound surface which is tougher and longer lived than the prior types of composition rollers and hence need not be so frequently renewed on account of wear nor need such rubber rollers be withdrawn from contact with the printing forms during ordinary stoppages of the machine, as they are not so readily indented or distorted as those of the composition types.

The ink cylinder 17 is provided with a toothed gear 29 concentrically secured thereon and adapted to drive the form rollers 24 through their ring gears 30, each of which forms part of an overrunning clutch as illustrated in Figure 1 and at the left hand portion of Figure 2.

The gear wheel 29 has a wider face than that of ring gears 30 which it drives, in order to permit the axial vibration of the ink cylinder 17. The

ring gear 30 is mounted on the clutch disk 31, which latter is carried on the hub or mandrel of the form roller 24 and secured thereto by the set screw 34.

The ring gear, forming part of the over-running clutch, is preferably neatly but slidably fitted on the clutch disk 31 so that it can rotate in either direction relatively thereto but is restrained in these respects, within limits, by the wedging surfaces 32 in cooperation with the rollers 35 mounted within the serrations formed by the wedging surfaces 32 and the stop surfaces 33.

Within each of the serrations of the clutch disk a roller 35 is provided and retained in position axially by the annular cover 36 which is removably secured to the clutch disk 31 by the tap screws 37. The form rollers 30 are originally made of normal desired diameters with their surfaces truly cylindrical, but in use their external diameters may slightly increase by swelling, due to heat of operation, absorption of liquid from the ink, continued compressive flexure, or other reasons.

The gear and over-running clutch drive for a form roller, according to this invention, is preferably so arranged and proportioned that a new form roller of normal diameter is started thereby to rotate at a surface speed very slightly less than the surface speed of the printing form. By this means, the heavy form roller is started to rotate as soon as the machine starts instead of slipping for a time before attaining the surface speed of the printing form with which it contacts as in prior purely frictional surface drives so that this arrangement therefore obviates the difficulties previously mentioned herein.

The initial rotation of a form roller is accomplished by driving it from the form cylinder by positive gearing, with the final interposition of an over-running clutch adapted to complete the driving connection.

On referring to the drawings it will be seen that a slight rotation of the ring gear 30 in the direction of the arrow, around the clutch disk 31 will cause the rollers 35 to move forthwith into the narrow spaces between it and the wedging surfaces 32 so that the clutch disk 31, and the ring gear 30 are locked together and rotate as one.

This continues until the form roller 24, by reason of its surface contact with the printing forms on the form cylinder 13, acquires a circumferential speed slightly greater than the speed acquired from the positive rotating drive, whereupon the rollers 35 travel backwardly to the stop surfaces 33 and the over-running clutch is disengaged, thus permitting the form roller to continue its rotation by surface contact with and at the surface speed of the printing forms.

As previously stated, the arrangement and proportions of the driving gears for the form roller, may be adapted to rotate it positively at a surface speed slightly less than that of the printing forms, but these may also be arranged to positively drive a new form roller of normal diameter at about the same surface speed as that of the printing forms, thus compensating for the slightly greater speed when driven by friction due to an increase in the diameter of the form roller by swelling for reasons previously referred to herein.

In other words, it is one of the objects of this invention to positively start and accelerate the rotation of a form roller at surface speeds slightly less than the concurrent speeds of the printing forms and to then continue its rotation by surface contact with said printing forms, whereby the

positive means is automatically out-run or put out of commission when the surface speeds of the form roller and printing forms are substantially identical.

5 This arrangement of positive drive for a form roller while the machine is starting and accelerating and with a friction drive thereafter all automatically accomplished, are important and particular features of this invention.

10 It will thus be seen that by reason of this invention a form roller will be positively started to rotate and accelerate in harmony with the rotation of the form cylinder.

After starting and when running at normal 15 operative speeds, the form roller will be rotated solely by frictional contact with the printing forms as at such times the over-running clutch which is the final element of the positive transmission has been automatically disengaged and 20 is out of commission.

This automatic action of disengaging the clutch, saves wear and tear on the idling parts of the clutch and final gears, as these are only operative for short periods of time when starting and accelerating. 25

What I claim is:

1. In a rotary printing machine, a rotatable form cylinder, a rotatable form roller normally in surface contact therewith, driven gears adapted to positively rotate the form roller, and an over-running clutch forming part of the gear drive. 30

2. In a rotary printing machine, a rotatable form cylinder, a rotatable form roller in surface contact therewith, gears adapted to positively rotate the form roller at a surface speed slightly less than that of the form cylinder and an over-running clutch forming part of the gear drive. 35

3. In a rotary printing machine, a rotatable form cylinder, a rotatable form roller in surface contact therewith, a gear train driven from said form cylinder and adapted to rotate said form roller at a surface speed slightly less than that of the form cylinder, an over-running clutch in said gear train adapted to start and accelerate said form roller and to disengage when, by frictional contact, the form roller has attained a speed slightly greater than that transmitted by the positive drive. 40 45

4. In a rotary printing machine, a rotatable form cylinder, a rotatable form roller in surface contact therewith, a gear train operated by said machine and adapted to positively rotate said roller at a surface speed slightly less than that of the form cylinder, an over-running clutch in said gear train adapted to engage when starting and accelerating and to automatically disengage when, by said surface contact, the form roller has attained a speed slightly greater than that produced by its positive drive. 50 55

erating and to automatically disengage when, by said surface contact, the form roller has attained a speed slightly greater than that produced by its positive drive.

5. In a rotary printing machine, a rotatable form cylinder, a rotatable form roller in surface contact therewith, a gear train operated by said machine and adapted to positively rotate said roller at a speed slightly less than that of the form cylinder, an over-running clutch in said gear train adapted to be automatically operatively engaged in starting and accelerating, and to automatically disengage when the form roller has attained, by surface contact, a speed in excess of that transmitted by the gear and clutch drive. 80 85 90

6. In a rotary printing machine, a rotatable form cylinder, a rotatable form roller adapted for surface contact therewith, an over-running clutch having a serrated disk secured to said form roller, a ring gear rotatably mounted on said disk, rollers in the disk's serrations, and means for positively rotating said ring gear. 95

7. In a rotary printing machine, a rotatable form cylinder, a rotatable form roller adapted for surface contact therewith, an over-running clutch having a serrated disk secured to said form roller, a ring gear rotatably mounted on said disk, rollers in the disk's serrations, and means for positively rotating said ring gear to produce a surface speed of the form roller slightly less than that of the form cylinder. 100 105

8. In a rotary printing machine, a rotatable form cylinder, a rotatable form roller in surface contact therewith, an over-running clutch having a serrated disk secured to said form roller, a ring gear rotatably mounted on said disk, movable rollers mounted in the disk's serrations and adjacent to the interior surface of said ring gear, and means for rotating said ring gear, whereby the form roller is positively started and accelerated as such clutch is operatively engaged by the initial rotation of said ring gear. 110 115

9. In a rotary printing machine, a rotatable form roller adapted for surface contact with the form cylinder, adjustable hinged bearings for rotatably supporting said form roller, an over-running, non-frictional clutch having a serrated disc secured to said form roller, a ring gear rotatably mounted on said disc, rollers in the disc serrations, and means for positively rotating the ring gear for producing surface speeds of the form roller slightly less than that of the form cylinder. 120 125

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