Sept. 3, 1946. A. TAYLOR ET AL 2,406,928

FOUNTAIN INKER DRIVE MECHANISM

Filed March 2, 1943 2 Sheets-Sheet 1

Fig. 1.

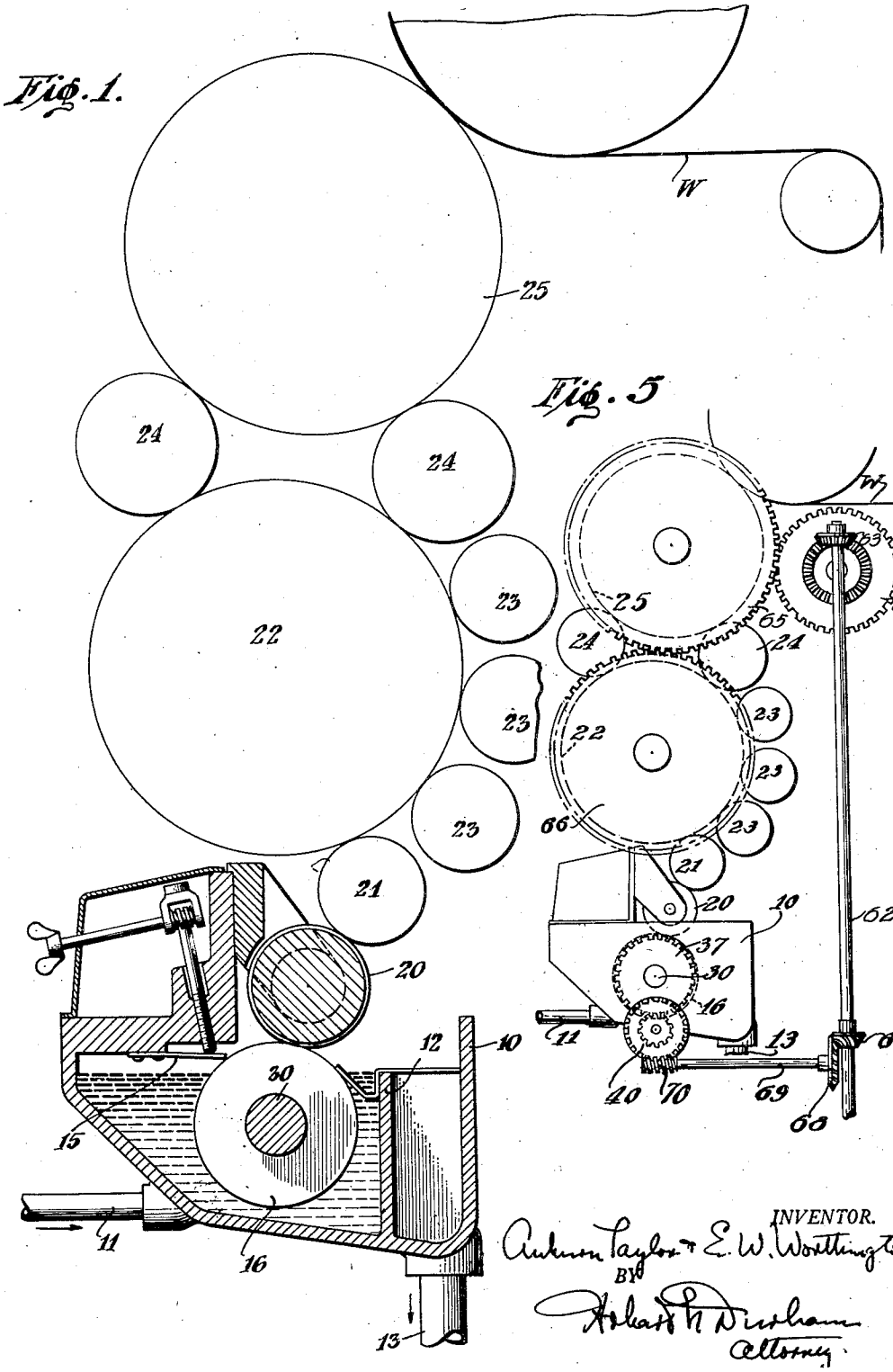


Fig. 5

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Fig. 2

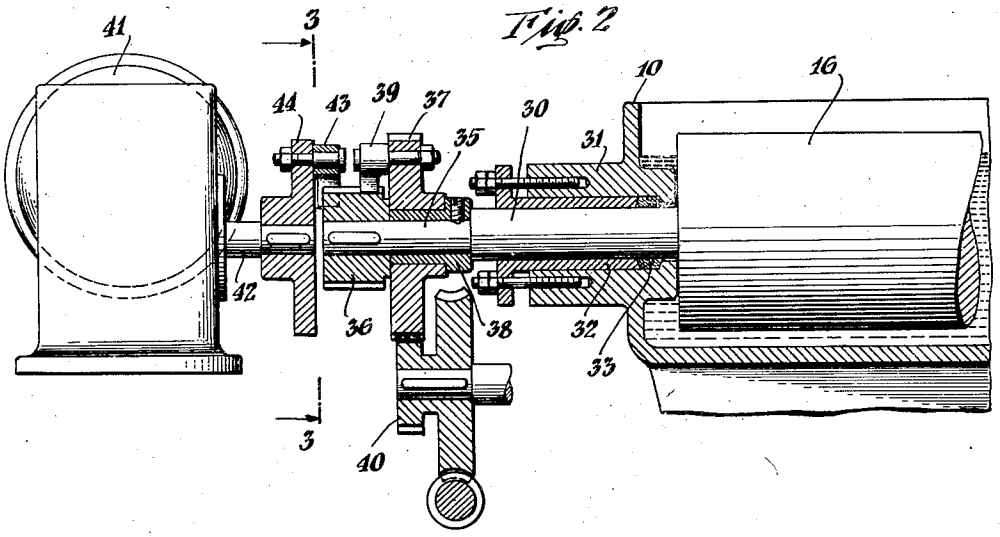


Fig. 3

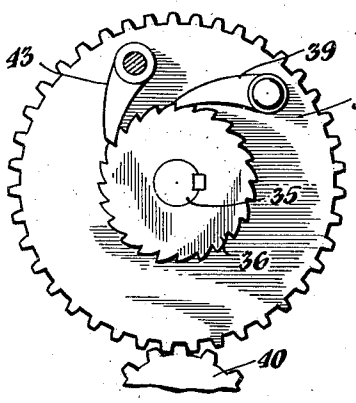
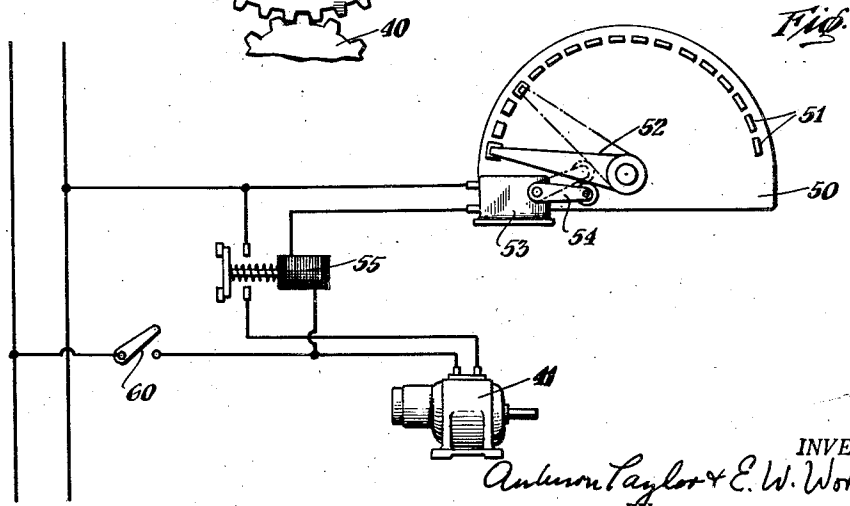


Fig. 4



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UNITED STATES PATENT OFFICE

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FOUNTAIN INKER DRIVE MECHANISM

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Application March 2, 1943, Serial No. 477,686

11 Claims. (Cl. 101—350)

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The present invention relates to printing presses and more particularly to inking mechanisms for rotary printing presses.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate one embodiment of the invention, and together with the description, serve to explain the principles of the invention.

The present invention has for an object the provision of an inking mechanism for rotary printing presses which insures an adequate and uniform supply of ink to the plate cylinder throughout the printing operation of the press. A further object is the provision of an inking mechanism which will furnish adequate and proper amounts of ink to the plate cylinder immediately upon the starting of the press preventing wasting of material through production of unprinted or imperfectly inked copies at such time. The invention also provides an inking mechanism which continues to furnish the necessary amounts of ink to the printing forms when the press is being operated at comparatively slow speeds. Another object is the provision of inking mechanism which may be continued in partial operation when the printing press is stopped in order to have ink for printing immediately available in proper amount when the press is started. Still another object is the provision of an inking mechanism which is particularly adaptable for use with water base inks or inks of similar characteristics which have a tendency to dry on the inking mechanism when the press is not in operation and likewise to drain off of inked surfaces, giving rise to difficulties when operation of the press is resumed.

Of the drawings:

Fig. 1 is a cross sectional view of an inking mechanism for a rotary printing press;

Fig. 2 is a side elevation of the fountain roller shown in Fig. 1, certain of the driving means for the roller being shown in cross section;

Fig. 3 is a cross sectional view taken along line 3—3 of Fig. 2;

Fig. 4 is a diagrammatic showing of the main control switch of a printing press embodying the present invention; and

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Figure 5 is a diagrammatic showing of gearing for driving certain of the press parts.

With the stated and other objects in view there is provided in an illustrative embodiment of the present invention an inking mechanism for a rotary printing press comprising an ink fountain, a fountain roller to rotate in contact with the ink in the fountain, a pickup roller to transfer ink from the fountain roller to a transfer roller which transfers the ink to an ink drum. The ink is uniformly distributed in a thin film over the surface of the ink drum by means of vibrating rollers, and thereafter transferred by form rollers to the forms on the plate cylinder for impression on the traveling web.

The fountain roller during printing operation of the press is normally driven from the press unit gear train, but independent means are provided for driving the fountain roller when the press is being operated at a relativley slow speed. Said means may also drive the fountain roller when the press is stopped, if desired. These means take over the drive of the fountain roller at such relatively slow speeds and drive it at a higher rate of speed than it would receive from the press unit gear train. As embodied, the fountain roller is driven at higher press speeds through a shaft having a ratchet wheel which is engaged by a pawl mounted on a pawl carrier, the carrier being driven by suitable gearing from the press unit gear train. Another pawl is provided to engage the ratchet wheel, and this pawl is mounted on a pawl carrier driven by an electric motor.

The control of the electric motor for the independent drive of the fountain roller is tied in with the main switch control of the press, so that when the main control is brought to a relatively slow speed, the electric motor will be started to take over the drive of the fountain roller. The independent drive will continue for any slower speed of the press and will drive the fountain roller faster than would be the case if it were driven from the press unit gear train in order to insure an adequate supply of ink to the plate cylinder during slow operation of the press. When the main switch control of the press is brought to stop, the operation of the independent drive continues until terminated by independent switch means.

It will be understood that the foregoing general description and the following detailed description as well are exemplary and explanatory

of the invention but are not restrictive thereof.

Referring now in detail to the illustrative embodiment of the invention shown by way of example in the accompanying drawings, and referring first to Fig. 1, the inking mechanism of a rotary printing press may comprise an ink fountain 10 into which ink is introduced through an inlet pipe 11, passing over a baffle 12 and out an outlet pipe 13, the ink having continuous circulation through the fountain in order to continuously replace ink used up in printing. A fountain blade 15 is provided to adjust the thickness of the film of ink on the fountain roller 16 as may be desired, the fountain roller being mounted for rotation in the ink fountain and driven as hereinafter described.

The transfer of ink from the fountain 10 preferably takes place by means of a spiral or other reduced peripheral surface roller 20 which is mounted to rotate just out of peripheral contact with fountain roller 16. Further details of the construction and operation of the roller 20 may be had by reference to the copending application Serial Number 365,575 filed November 14, 1940.

A transfer roller 21 is mounted to rotate in peripheral contact with the spiral roller 20 and an ink drum 22. Ink is thereby conveyed to the surface of drum 22, and a plurality of vibrating rollers 23 distribute the ink in a thin and uniform enveloping film over that surface. Form rollers 24 in peripheral contact with the ink drum 22 and the printing plates on plate cylinder 25 transfer ink to the plates for printing on the web W.

Referring now to Fig. 2, means for driving fountain roller 16 from the main driving means of the printing press are provided, and, as illustratively embodied, comprise the shaft 30 by which roller 16 is rotatably mounted in a bearing member 31 at the end of ink fountain 10, the shaft being journalled in a sleeve 32 which may be tightened up against packing 33. Shaft 30 has an end portion 35 of reduced diameter on which is secured a ratchet wheel 36. A pawl carrying gear 37 is mounted for independent relative rotation upon bearing 38 which is secured to the reduced portion 35, and pawl 39 on gear 37 engages ratchet wheel 36. Gear 37 is driven from a gear 40 which is in turn preferably driven from the press unit gear train.

Means are provided for driving the fountain roller independently of the main drive of the press at slower printing speeds and when the press is stopped. As embodied these means comprise the electric motor 41 which is equipped with reduction gearing to drive shaft 42 and pawl 43 on carrier 44, the carrier being mounted on the shaft 42 for correlative rotation therewith. Pawl 43 is positioned to engage ratchet wheel 36 in common with pawl 39, and the fountain roller 16 is thus driven either by the press unit gear train or by the separate motor 41, depending upon which source of power is producing the greater speed at the moment.

As shown in Fig. 4, the control of the motor 41 is so tied in with the main control switch of the printing press that the motor will be started and operated during relatively slow speeds of the press and also when the press is stopped to drive the fountain roller 16, the motor being automatically stopped at higher speeds whereupon the drive of the fountain roller is taken over by the press unit gear train. As shown, the printing press is operated by the main dial switch 50 having a plurality of contacts 51 thereon for various speeds at which the press is to be run.

The speed of the press is controlled by switch arm 52 which engages the contacts 51. The motor 41 is controlled by the limit switch 53 which has an arm 54 to engage the main switch arm 52, the switch energizing magnetic relay 55 to start the motor. By means of switch arm 54 the motor 41 will be operated during slower speeds of the press, corresponding to the first several contacts 51 of the main dial switch 50. As the main switch arm 52 is advanced to further contacts 51 for higher speeds of the press the movement of switch arm 54 will cut off operation of motor 41, and the drive of fountain roller 16 will continue from the press unit gear train. Limit switch 53 does not stop operation of motor 41 when the main dial switch 50 is set for stopping operation of the press, but continuous operation of the motor for this position of arms 52 and 54. Thus rotation of fountain roller 16 is continued when other parts of the printing and inking mechanism are brought to a stop until the circuit to the motor 41 is interrupted by opening switch 60 and the fountain roller stopped.

Figure 5 shows diagrammatically one form of gearing for driving various of the press parts. As there shown unit drive shaft 62 carries bevel gear 63 which meshes with the bevel gear of compound gear 64, compound gear 64 drives gear 65 fast to the impression cylinder shaft, and also drives gear 66 on the ink drum 22. Vertical shaft 62 also carries hypoid gear 67 driving hypoid 68 on the horizontal shaft 69 to drive worm 70 meshing with the worm gear of compound gear 40 which in turn drives gear 37 on the fountain roller shaft 30. Thus the main inking drum is driven at a speed considerably in excess of the speed of the fountain roller during normal operation.

The present invention is particularly adaptable in printing presses embodying continuous ink feed principles and is particularly useful where fast drying or very thin printing inks are used. Such inks, as well as other inks, sometimes tend to dry on the inking mechanism of the press and particularly upon the exposed portion of the fountain roller when the press is not in operation for a period of time. Moreover, these inks, and other printing inks as well, tend to drain off of the various inking rollers back into the fountain upon the press standing idle. These problems arise in the use of water base inks in printing, and many other inks used at the present time.

When the press is started after some idle period and some of the ink on the various inking rollers has either hardened or drained off or both, there will not be ink immediately available to the plate cylinders for proper printing, and several imperfect or completely unprinted products may be turned out before continuous and ample supply of ink is effected to the printing plates. The plate cylinder of the printing press will ordinarily be so geared as to rotate at several times the speed of the fountain roller when the latter is driven only from the press unit gear train, and many copies may be turned out while the fountain roller is turning in the ink in the fountain to bring ink from the ink level to the spiral roller 20, where it may first begin to go through the ink transfer roller system to the printing plates. Further copies, of course, will be turned out as the sufficient supply of ink is spreading over the various rollers and moving toward the impression.

With the present invention the speed of the motor 41 will preferably be such that it will drive the fountain roller 16 several times faster than it would be driven from the press unit gear train, thus greatly reducing the time required for sufficient ink to be supplied to the printing plates, and this is true both when the press is being inked up for the first time on a printing run and when it has been shut down and allowed to stand for some time. When the press has arrived at a relatively high speed, which, for instance, might be slightly above threading speed, switch 53 may be so arranged as to cut off motor 41 and the drive of the fountain roller 16 will thereafter be taken over automatically by the press unit gear train. Likewise, of course, the drive of the fountain roller will be taken over at any time that the speed of the press unit gear train exceeds the speed of motor 41. If the press is to be shut down for only a relatively short period of time it may be found convenient to continue rotation of fountain roller 16 in order to have sufficient ink immediately available when operation is resumed. Likewise, rotation of the fountain roller 16 may be begun by closing switch 60 before a printing run is begun in order to coat the entire surface of the roller with ink.

Although an arrangement for driving the fountain roller has been shown utilizing a ratchet wheel common to two pawls, it will be understood that an overrunning clutch construction or other equivalent device may be used for effecting the same purpose.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but departures may be made therefrom within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

What we claim is:

1. In an inking mechanism for a printing press having a driving gear train said mechanism having rollers to transfer ink from an ink source to members to be inked, means for driving certain of the rollers from the printing press gear train and independent means for driving the said certain of the rollers at a higher speed at relatively slow press speeds.

2. In an inking mechanism for a printing press having a driving gear train said mechanism having an ink fountain and a fountain roller rotatably mounted to pick up ink from the ink fountain, means for driving the fountain roller from the printing press gear train and independent means for driving said roller at a higher speed for relatively slow press speeds.

3. In a printing press inking mechanism having rollers to transfer ink from an ink source to a member to be inked, motor means for driving certain of the rollers at a speed directly proportionate to the speed of the printing press at relatively high press speeds and other independent motor means for taking over the drive from said first means and independently driving the said certain of the rollers at speeds higher than said proportionate speed at lower press speeds.

4. In a printing press, in combination, a member to be inked and an inking mechanism to be driven at different rates of speed to supply ink to the member to be inked at different rates of supply, motor means for driving the inking mechanism at a rate of speed directly proportional to the rate of operating speed of the printing press for relatively high press speeds, and other independent motor means for taking over the drive from said first means and independently driving the inking mechanism at a rate of speed higher than said proportional rate of speed for lower press speeds.

5. In a printing press inking mechanism, in combination, an ink fountain and a fountain roller rotatably mounted to pick up ink therefrom, means for driving the fountain roller from the printing press drive at a speed directly proportional to the operating speed of the press for relatively high press speeds, and independent means for driving the fountain roller at a rate higher than said proportional speed for lower press speeds.

6. In a printing press inking mechanism, in combination, an ink fountain and a fountain roller rotatably mounted to pick up ink therefrom, means for driving the fountain roller from the printing press drive at a speed directly proportional to the operating speed of the press, and independent means for automatically taking over the drive of the fountain roller below a given speed to drive the said roller at a speed higher than said proportional speed.

7. In a printing press inking mechanism having rollers to transfer ink from an ink source to a member to be inked, motor means for driving certain of the rollers at a speed directly proportionate to the operating speed of the printing press, and other independent motor means for automatically taking over the drive of said certain of the rollers from said first means below a predetermined operating speed of the press to drive said certain of the rollers at a higher rate of speed than said proportionate speed.

8. In a printing press, in combination, printing press driving means, an inking mechanism comprising an ink fountain and a fountain roller to pick up ink therefrom, means interconnecting the printing press driving means and the fountain roller for driving said roller from said driving means and including a ratchet wheel, independent driving means, and means interconnecting the independent driving means and the roller and including said ratchet wheel.

9. In a printing press, in combination, printing press driving means, an inking mechanism comprising an ink fountain and a fountain roller to pick up ink therefrom, independent driving means for the fountain roller, means interconnecting the press driving means and fountain roller, means interconnecting the independent driving means and fountain roller, said last two mentioned interconnecting means having common members whereby the fountain roller is driven by the driving means delivering the greater rate of speed, control means for the press driving means for driving the press at selected operating speeds from stop to high speed, and control means for the independent driving means to start said means independently and to stop said means when the press has reached a predetermined operating speed.

10. In an inking mechanism for a printing press having a driving gear train said mechanism having rollers to transfer ink from an ink source to members to be inked, means for driving certain of the rollers from the printing press gear train and independent means for driving the said certain of the rollers at a higher speed at relatively slow press speeds and when the printing press is stopped.

11. In a printing press inking mechanism having rollers to transfer ink from an ink source to

a member to be inked, motor means for driving certain of the rollers at a speed directly proportionate to the operating speed of the press, and other independent motor means for taking over the drive of said certain of the rollers from said first motor means below a predetermined operating speed of the press and at stopped speed of the press to drive said certain of the rollers at a higher rate of speed than said proportionate speed.

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