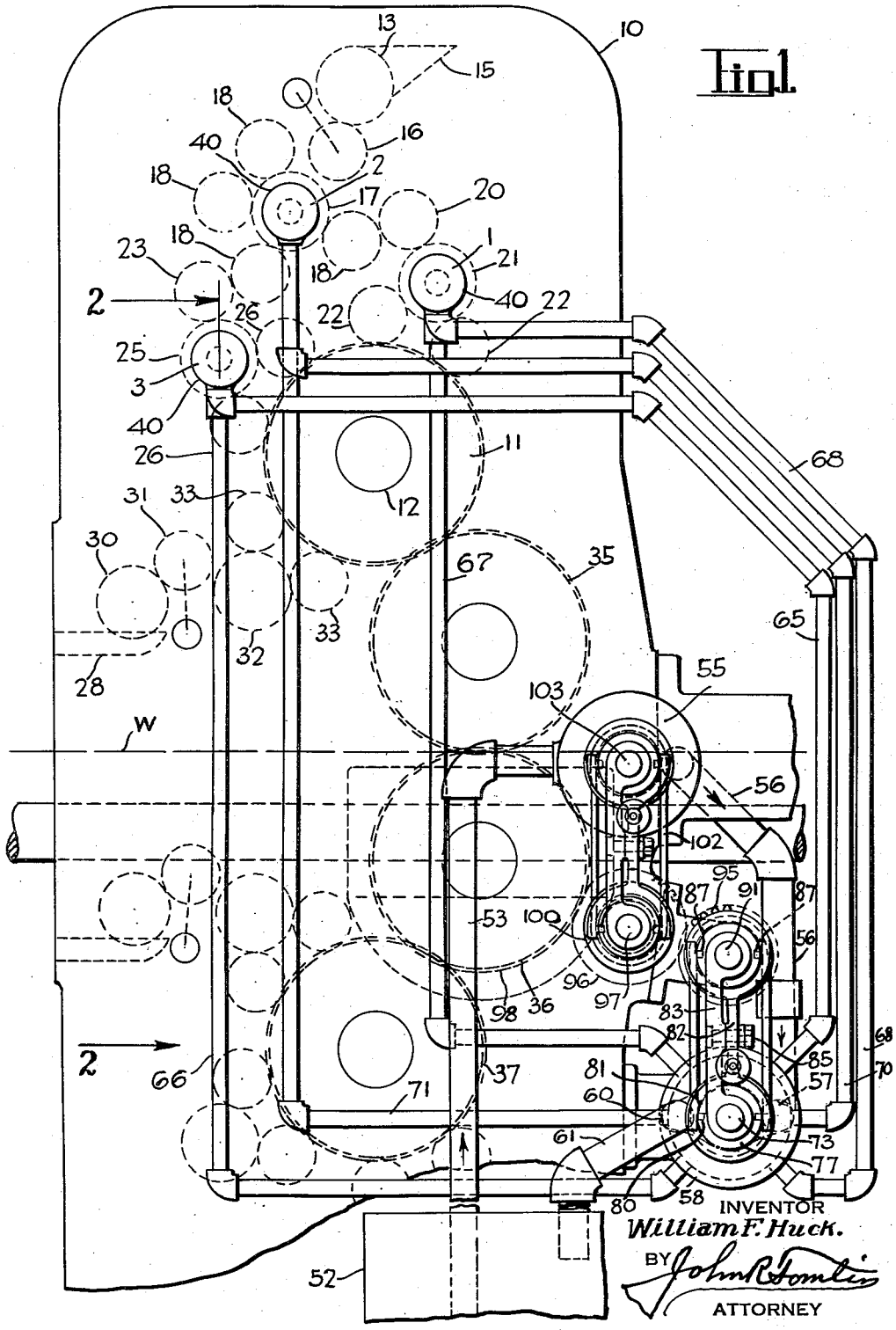
May 20, 1941. W. F. HUCK 2,242,214

DISTRIBUTING DEVICE FOR PRINTING MACHINES

Filed June 30, 1939 2 Sheets-Sheet 1

Fig. 1.



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DISTRIBUTING DEVICE FOR PRINTING MACHINES

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Fig.2.

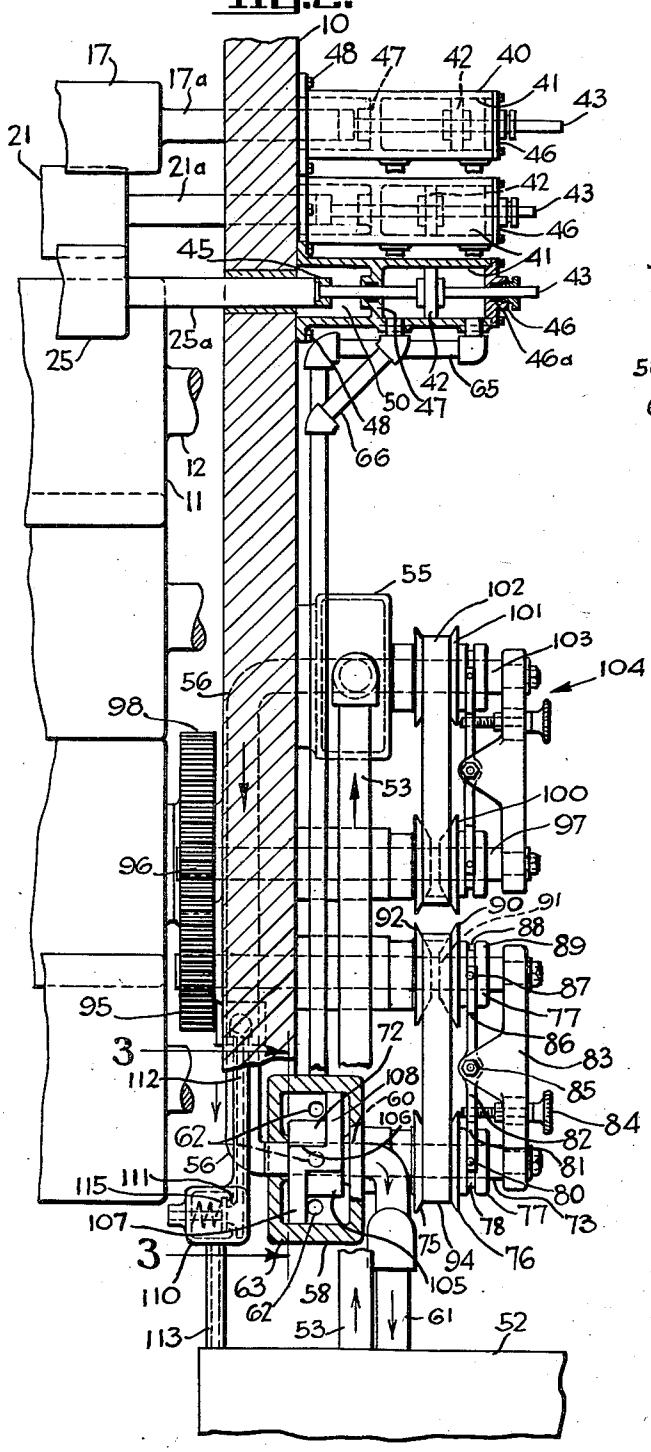
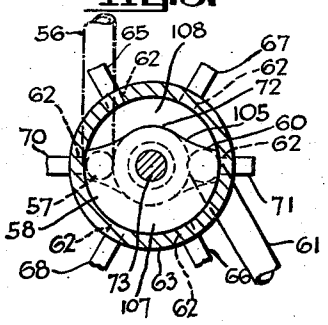


Fig.3.



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Patented May 20, 1941

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UNITED STATES PATENT OFFICE

2,242,214

DISTRIBUTING DEVICE FOR PRINTING MACHINES

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Application June 30, 1939, Serial No. 282,292

17 Claims. (Cl. 101—350)

This invention relates to printing machines, and more particularly to improved means for reciprocating fluid distributing cylinders, such as ink distributing cylinders, or moisture distributing cylinders usually employed in ink and moisture distributing systems of printing machines.

Heretofore, cylinders or rollers employed as components of ink or moisture distributing systems of printing machines have been reciprocated by means of mechanical elements such as cams, eccentrics, levers and the like operably connected to a moving component of the printing machine, so that the reciprocatory movement of each roller or cylinder is in fixed time relation to the movement of the components of the printing machine. Furthermore, the amplitude of the reciprocatory stroke of the cylinder or roller is usually fixed, and, in instances where provision is made for adjusting the amplitude of the reciprocatory movement of the roller or cylinder, complicated and inconvenient operations must be performed to effect the adjustment.

An object of this invention is to provide improved means for reciprocating ink or moisture distributing cylinders or rollers of printing machines through instrumentalities operably interposed between each cylinder or roller and the operating components of the printing machine, and incorporating conveniently adjustable means for varying the amplitude of the reciprocatory stroke of each cylinder or roller.

Another object of this invention is to provide conveniently adjustable means operably interposed between the ink or moisture distributing cylinders or rollers of printing machines and the operating components of the machine to the end that the speed of reciprocation of the rollers or cylinders may be varied relative to the speed of the printing machine or to each other, and the amplitude of the reciprocatory stroke of the cylinders or rollers conveniently varied.

Another object of this invention is to provide in a printing machine driving means operably interposed between the operating components of the printing machine and the ink or moisture distributing cylinders or rollers, the said driving means being variably operable to control the number of press revolutions required to produce each reciprocatory stroke of each distributing cylinder or roller.

A specific object of this invention is to provide in a printing machine a separate or independent fluid engine or motor for a selected ink or moisture distributing cylinder or roller, the motor being operably connected to the distributing cylinder or roller to reciprocate it, and the speed of operation of the motor being determined by a driven timing or distributing valve communicated with the motor and a source of fluid supply under pressure.

A more specific object of this invention is to provide in a printing machine a separate or independent fluid engine or motor for a selected ink or moisture distributing cylinder or roller, a movable component of the motor being operably connected to the distributing cylinder or roller to reciprocate it, and the speed of operation of the motor and the amplitude of its reciprocatory stroke being determined by a timing or distributor valve communicated with the motor and a source of fluid supply, interposing a forced feed device or pump between the source of fluid supply and the timing or distributor valve, and driving the pump or forced feed device and the distributor valve through variable speed mechanisms operably interposed between an operating component of the printing machine and the pump and distributor valve.

It is also an object of this invention to provide a distributor mechanism for a printing machine of generally improved construction, whereby the device will be simple, durable and inexpensive in construction, as well as convenient, practical, serviceable and efficient in its use.

With the foregoing and other objects in view, 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 form, proportion, and details of construction may be made within the scope of the claims without departing from the spirit or sacrificing any advantages of the invention.

For a complete disclosure of the invention, a detailed description of an improved mechanism for reciprocating distributing cylinders or rollers of printing machines will now be given in connection with the accompanying drawings forming a part of the specfication wherein:

Figure 1 is a fragmental side elevation of a printing machine showing the invention applied thereto;

Figure 2 is a longitudinal vertical sectional view taken approximately on the line 2—2 of Figure 1, parts being broken away and parts appearing in elevation, and

Figure 3 is a detailed sectional view taken through the distributor valve on the line 3—3, indicated in Figure 2.

Referring to the drawings in which similar reference characters designate corresponding parts, there is depicted, a portion of a printing unit of a web fed multicolor offset perfecting press having the usual side frame members 10 which operably support the printing cylinders, inking mechanism and moisture distributing mechanisms, in conformity with the usual practice well understood by those skilled in the art. While only one frame member 10 is depicted in the drawings, it is, of course, to be understood that a similar frame member is provided at the opposed side of the machine.

Although this invention has been shown as applied to a rotary web fed offset perfecting press, it is to be understood, of course, that it may be applied to any type of press in which distributing cylinders are reciprocated.

In the drawings, there is depicted a plate or form cylinder 11 rotatably supported in the machine frame members 10 by a shaft 12. The plate or form cylinder is arranged to support the usual planographic plate employed in offset printing machines, and, inasmuch as this plate is of the usual well known construction, it has not been depicted in the drawings. Ink is supplied to the form on the plate or form cylinder 11 through an ink distributing mechanism, which includes a fountain roller 13 rotatably supported by a fountain 15. Ink is conveyed from the fountain roller 13 by a ductor roller 16 of usual construction to an ink distributing cylinder 17. Inking rollers 18 of usual construction engage the peripheral portion of the ink distributing roller or cylinder 17 to uniformly distribute the ink thereon. A transfer roller 20 engages one of the inking rollers 18 and conveys ink to a second distributing roller or cylinder 21 from which the ink is conveyed to the form on the form cylinder 11 by form rollers 22. Ink is conveyed from one of the inking rollers 18 by a transfer roller 23 to a third ink distributing roller or cylinder 25 from which ink is conveyed to the form on the form cylinder by form rollers 26.

A conventional dampening mechanism or moisture distributing system for the plate or form cylinder 11 is depicted, and it includes a fountain 28, fountain roller 30, ductor roller 31, distributing roller or cylinder 32 and form rollers 33. The form rollers 33 engage the form on the plate or form cylinder 11 to supply moisture thereto in conformity with the established practice which is well understood by those skilled in the art.

While the moisture distributing systems and ink distributing systems disclosed in this application are an exemplification of an improved form, it is to be understood, of course, that any suitable moisture or ink distributing system in which reciprocatory rollers or cylinders are used may be employed in connection with this invention.

A blanket or transfer printing cylinder 35 of usual construction operably engages the plate or form cylinder 11 and this blanket cylinder cooperates with a similar blanket cylinder 36, the blanket cylinders 35 and 36 engaging the running web W to "perfect" or simultaneously print on the opposed sides thereof. A plate or form cylinder 37, similar to the plate cylinder 11, operably engages the blanket cylinder 36, and ink and moisture are provided to the form on the form cylinder 37 through an ink distributing system and a moisture distributing system similar to the hereinbefore disclosed systems for supplying ink and moisture to the cylinder 11, therefore these distributing mechanisms are not duplicated in full in the drawings.

In order to reciprocate selected rollers or cylinders of the ink distributing and moisture distributing systems, a fluid-actuated or hydraulic engine or motor 40 is provided for each selected component, and, in the arrangement illustrated, an engine or motor 40 is provided for each of the ink distributing cylinders 17, 21 and 25 and for other selected distributing components. However, in order to avoid duplication, the engines or motors 40 are depicted in the drawings as being operably connected to the cylinders or rollers 17, 21 and 25, only, but, of course, it is to be understood that any selected reciprocatory roller or cylinder of the printing machine may be operated by such instrumentalities.

Each engine or motor includes a cylinder 41 having a piston 42 mounted for reciprocation therein, and the piston 42 is secured to a piston rod or stem 43, connected to the outer terminal of the shaft of the selected distributing roller. In Figure 2, one of the motors or engines 40 is shown in cross section, and its piston rod or stem 43 is swiveledly connected to the outer terminal of the shaft 25a of the distributing roller 25 by means of a retaining member or cap 45. The pistons 42 of the remaining motors or engines 40 are similarly connected to the outer terminals of the shafts 21a and 17a of rollers or cylinders 17 and 21. By this arrangement, the rollers 17, 21 and 25 may rotate relative to the piston rods or stems 43, and reciprocatory motion of each piston 42 will impart similar motion to its operably connected roller or cylinder. Each cylinder 41 is provided at its outer terminal with a cylinder head 46, through which a piston rod 43 slides, a suitable packing box 46a being provided. Intermediate the terminals of each cylinder a fluid tight intermediate wall or partition 47 is provided through which also the piston rod 43 slides. The inner terminal of each cylinder 41 is secured by suitable securing devices 48 to the outer wall of a frame member 10, and a chamber or recess 50 is provided within each cylinder 41 between the outer face of the frame member 10 and the partition 47 for the reception of the outer terminal of its distributor roller shaft.

In order to operate the pistons within the fluid pressure or hydraulic engine or motor cylinders 41, a system of fluid supply is provided which includes a supply tank or container 52 conveniently located relative to the printing machine, and a pipe or conduit 53 extends from this container to the inlet side of a rotary pump 55, of any suitable commercially acceptable structure. A pipe or conduit 56 extends from the outlet of the rotary pump 55 to an inlet port or aperture 57 formed in an end wall of a cylindrical valve casing or housing 58. An outlet port or aperture 60 is formed in the opposed end wall of the valve housing 58 and communicates with a pipe or conduit 61 which leads back into the supply tank or container 52.

A plurality of ports 62 (see Figure 3) extend through the cylindrical wall 63 of the valve housing 58, and these ports communicate with pipes or conduits 65, 66, 67, 68, 70 and 71 which lead from the valve housing 58 to the cylinders 41 of the fluid actuated or hydraulic engines 40. Although it is to be understood that any preferred number of fluid actuated engines or motors 40 may be provided, and any preferred num-

ber communicated with the control or timing valve housing 58, there is depicted in these drawings, for the sake of convenience and to avoid duplication, three fluid actuated or hydraulic engines 40, and the cylinders of these engines are selectively communicated in predetermined sequence with the interior of the valve housing 58, as will be hereinafter more fully disclosed.

In order to communicate the valve housing 58 with the engine cylinders 41 and with the supply and discharge conduits 56 and 61, there is provided a timing or distributing valve rotor 72 which is rotatably mounted within the valve housing 58 on a shaft 73 which is operably connected to a composite pulley or sheave having separate opposed frusto-conical components 75 and 76. This sheave forms a component of a well known commercial variable speed drive, commonly known as a "Reeves" drive, and, inasmuch as this drive is well understood by those skilled in the art, it has been diagrammatically depicted in the drawings, and this description will be limited to its cardinal components. The frusto-conical component 75 of the sheave is keyed or otherwise secured to the shaft 73 to hold it against rotation relative thereto. The component 76 of the sheave is secured against rotation relative to the shaft 73, but it is axially slidably thereon, and a sleeve 77 extends outwardly from the sheave component 76. This sleeve is provided with an annular groove 78 for the reception of pins or rollers 80 carried by the bifurcated terminal 81 of a rocker arm 82 which is pivotally secured to a bracket 83, as indicated at 85. A manipulating member or screw 84 is swiveled to the bracket 83, and the inner terminal of the screw 84 threadedly engages the rocker arm 82, so that when rotary motion is manually or otherwise imparted to the screw 81 the rocker arm 82 is moved about its pivot or fulcrum 85 to thereby move the sleeved frusto-conical component 76 of one of the composite pulleys 75—76 outwardly and the corresponding component 90 of an opposed composite pulley or sheave 90—92 inwardly. A more complete disclosure of the composite pulley or sheave 90—92 will be given hereinafter. By this arrangement a frusto-conical component of one composite expansible pulley or sheave may be moved towards its mating component to thereby increase the effective diameter of that composite pulley, and a frusto-conical component of the other composite pulley, moved away from its mate to thereby correspondingly decrease the effective diameter of this composite pulley, so that an adjustable variable speed drive is provided. The opposed terminal of the rocker arm 82 is bifurcated, as indicated at 86, and the terminals of the bifurcated portions carry pins or rollers 87 which are received within an annular groove 88 formed in a sleeve 89 extending from the frusto-conical component 90 of the expansible composite pulley or sheave 90—92, which is similar in construction and arrangement to the expansible composite sheave 75—76. The sheave component 90 is mounted for axial movement on the shaft 91, but it is keyed or otherwise secured against rotation relative to the shaft 91. The frusto-conical sheave component 92 is secured on the shaft 91, being held by any suitable means against both rotation and axial movement relative thereto. A belt 94, which is preferably V-shaped in cross section, is trained around the composite pulleys 75—76 and 90—92 to impart movement from the shaft 91 to the shaft 73, as will hereinafter be more fully disclosed.

A pinion 95 is secured to the inner terminal of the shaft 91, and this pinion meshes with a gear or pinion 96 secured to the inner terminal of a shaft 97, and the gear 96, in turn, meshes with a gear 98 which rotates with the cylinder 36. A composite expansible pulley 100, similar to the hereinbefore described composite pulleys 75—76 and 90—92, is operably supported by the outer terminal of the shaft 97, and this pulley is drivingly connected with a similar pulley 101 through the instrumentality of a belt or flexible band 102. The composite expansible pulley 101 is operably secured to a pump shaft 103 which is suitably secured to the rotor of the pump. Inasmuch as the pump rotor is of usual commercial construction, it has not been depicted in detail in these drawings. The expansible composite pulleys or sheaves 100—101 are actuated through a mechanism, indicated generally at 104 similar to the mechanism hereinbefore described for adjusting the expansible pulleys 75—76 and 90—92.

In order to communicate the interior of the valve housing 58 in predetermined sequence with the conduits which lead to the fluid actuated or hydraulic motors 40, the valve 72 is provided with a central or body portion 105 which extends diametrically across the interior of the valve housing 58 so that its opposed concentrically-disposed ends or terminals 106 wipingly engage the inner cylindrical surface of the valve housing 58. An arcuate wing or flange 107 extends radially from one axial terminal of the valve body 105, and the outer or peripheral portion of the wing or flange 107 accurately engages the inner cylindrical surface of the valve housing 58. A similar wing or flange 108 extends radially from the opposed axial terminal of the valve body 105, and the peripheral portion of this wing or flange is shaped to accurately engage in wiping relation the cylindrical inner surface of the valve housing 58. By this arrangement, when rotary motion is imparted to the distributor or timing valve 72, fluid from the container 52 may be distributed in predetermined sequence to the cylinders 41 of the hydraulic or fluid actuated engines 40, as will be more fully explained hereinafter.

A safety or relief valve is interposed between the outlet conduit 56 of the rotary pump 55 and the container 52, and this valve includes a hollow casing 110 having a valve seat 111 formed therein surrounding a port which communicates with a conduit 112 which leads to the valve casing 110 from the outlet conduit 56 of the rotary pump 55. Another conduit 113 extends from the valve casing 110 to the supply tank or container 52. A spring actuated valve 115 is held under tension against the seat 111 within the valve casing 110. By this arrangement, if a pressure in excess of a predetermined pressure exists or is built up in the pump outlet conduit 56, then the relief valve 115 will be forced from its seat 111 to permit fluid from the pump to discharge back into the supply tank or container 52.

Should the feed of ink be interrupted, or for any other reason, an unusual resistance to reciprocation of any of the rollers develop, the relief valve 115 will operate to relieve the fluid pressure and there will be no further reciprocation of the roller effected until the condition causing the resistance is corrected. This action avoids injury to roller coverings that would be caused under similar conditions, in a machine in which

the mechanism for reciprocting the rollers is positively driven.

In operation, the adjusting screw 84 of the selected variable speed "Reeves" type drive is rotated so that a predetermined drive ratio is established. As the printing cylinders rotate, the cylinder gear 98 drives the pinions 96 and 95, thus imparting rotary motion to the shafts 97 and 91 of the variable speed drives. Motion is imparted from the shaft 91 through the belt 94 to the valve drive shaft 73, and motion is imparted from the drive shaft 97 through the belt 102 to the pump drive shaft 103. As the pump shaft 103 rotates, the rotary pump 55 draws oil or other suitable fluid from the container 52 through the conduit 53 into the pump housing 55, and forces it from the pump housing 55, through the conduit 56 into the intake side of the distributor valve housing 58. As the distributor or timing valve 72 rotates within the valve housing 58, communication in proper sequence is established with the conduit 56, fluid actuated or hydraulic motors 40, and the conduit 61 which leads back to the supply tank or container 52. Fluid from the valve housing 58 passes through the conduit of the selected cylinder 41, and fluid on the opposite side of the piston of this cylinder flows back to the valve housing 58 and then through the housing 58 and the conduit 61 back to the supply tank 52.

In the position of the parts as depicted in Figures 1 and 2, oil or other fluid from the container 52 is drawn from the container 52 and forced through the rotary pump 55 into the distributor timing valve housing 58. From the housing 58 the oil or fluid passes through an uncovered port 62 into the conduit 65 and then into the cylinder 41 at the right side of the piston 42. This cylinder, for the sake of convenience, has been shown in cross section in Figure 2. This fluid under pressure forces the piston 42 towards the left, and the fluid present in the cylinder at the opposite side of the piston 42 flows out through the conduit 66 back into the valve housing 58, through the uncovered outlet port 60 and into the conduit 61 back to the container 52. In this depicted position, oil or other suitable fluid flows through the valve housing 58 in the manner hereinbefore described, and then through the conduit 67 into the cylinder 40, shown at the right in Figure 1, and fluid is then exhausted from this cylinder through the conduit 68 back to the container 52 through the instrumentalities hereinbefore described. Also in the position depicted, the ports of the valve housing 58 which communicate with the conduit 70 and 71 are closed for the instant so that no power is imparted to the engine or motor depicted at the top of Figure 1. During this instant the components of the timing or distributing rotor 72 are approaching the position to reverse the flow of the actuating fluid within the cylinder 41 of the uppermost fluid-actuated motor 40 to initiate its reverse stroke.

By this arrangement a positive but flexible drive is provided for reciprocating the fluid distributing components of the printing machine in any preferred timed relation to the printing cycles of the printing machine. Although the rotors of the pump 55 and timing valve 58 are preferably driven from movable components of the printing machine, the speed of the pump may be varied relative to the speed of operation of the press or varied relative to the speed of operation of the timing valve. Conversely, the speed of operation of the timing valve may be varied relative to the speed of operation of the press, and, also relative to the speed of operation of the pump so that the amplitude of reciprocatory motion of the liquid distributing rollers may be varied and the timed duration of each reciprocation varied relative to the number of press revolutions.

It will be understood that the invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and it is therefore desired that the present embodiment be considered in all respects as illustrative and not restrictive, and it will be further understood that each and every novel feature and combination present in or possessed by the mechanism herein disclosed forms a part of the invention included in this application.

Having thus described my invention, what I claim as new and useful is:

1. In a printing machine having a liquid distributing system, a liquid distributing roller cooperable with other rollers in the liquid distributing system and mounted for axial reciprocatory movement, a cylinder, a piston mounted for axial reciprocatory movement within the cylinder and operably connected with the roller, a fluid-control valve communicable with a source of fluid supply and with the source of fluid supply under pressure and with the opposed terminals of the cylinder, a power driven component for the valve operable to simultaneously communicate the said fluid under pressure with the cylinder at one side of the piston and to communicate the cylinder at the opposed side of the piston with the source of fluid supply to discharge fluid from the cylinder through the valve back to the source of fluid supply, whereby the piston and distributing roller are moved axially.

2. In a printing machine having a liquid distributing system, a liquid distributing roller cooperable with other rollers in the liquid distributing system and mounted for axial reciprocatory movement, a cylinder, a piston mounted for axial reciprocatory movement within the cylinder and operably connected with the roller, a source of liquid supply, a pump communicating with the source of liquid supply, a constantly driven fluid-control valve communicable with the pump and the cylinder and operable to communicate the fluid under pressure from the pump with the cylinder at one side of the piston and to communicate the cylinder at the opposed side of the piston with the source of liquid supply to discharge fluid from the cylinder back to the source of liquid supply whereby the piston and distributing roller are moved axially.

3. In a printing machine having a liquid distributing system, a liquid distributing roller cooperable with other rollers in the liquid distributing system and mounted for axial reciprocatory movement, a cylinder, a piston mounted for axial reciprocatory movement within the cylinder and operably connected with the roller, a valve housing communicable with a source of fluid supply under pressure and with the cylinder, a valve movable within the housing and operable to communicate the said fluid with the cylinder at one side of the piston and to communicate the cylinder at the opposed side of the piston with a discharge passage to discharge fluid from the cylinder whereby the piston and distributing roller are moved axially, and variable speed mechanism for driving the movable valve.

4. In a printing machine having a liquid distributing system, a liquid distributing roller cooperable with other rollers in the liquid distributing system and mounted for axial reciprocatory

movement, a cylinder, a piston mounted for axial reciprocatory movement within the cylinder and operably connected with the roller, a source of fluid supply, a pump communicating with the source of fluid supply, a valve housing communicable with the pump and cylinder, a valve movable within the housing and operable to communicate the fluid under pressure from the pump with the cylinder at one side of the piston and to communicate the cylinder at the opposed side of the piston with the source of fluid supply, variable speed mechanism for driving the pump, and a separate variable speed mechanism for driving the said movable valve.

5. In a printing machine having a liquid distributing system, a liquid distributing roller cooperable with other rollers in the liquid distributing system and mounted for axial reciprocatory movement, a cylinder, a piston mounted for axial reciprocatory movement within the cylinder and operably connected with the roller, a valve housing communicable with a source of fluid supply under pressure and with the cylinder, a valve rotatably mounted within the housing, means for constantly rotating the valve, the valve being operable to communicate the said fluid with the cylinder at one side of the piston and to communicate the cylinder at the opposed side of the piston with a discharge passage to discharge fluid from the cylinder whereby the piston and distributing roller are moved axially.

6. In a printing machine having a liquid distributing system, a liquid distributing roller cooperable with other rollers in the liquid distributing system and mounted for axial reciprocatory movement, a cylinder, a piston mounted for axial reciprocatory movement within the cylinder and operably connected with the roller, a valve housing communicable with a source of fluid supply under pressure and with the cylinder, a valve rotatably mounted within the housing and operable to communicate the said fluid with the cylinder at one side of the piston and to communicate the cylinder at the opposed side of the piston with a discharge to discharge fluid from the cylinder whereby the piston and distributing roller are moved axially, and variable speed mechanism for rotating the valve.

7. In a printing machine having a liquid distributing system, a liquid distributing roller cooperable with other rollers in the liquid distributing system and mounted for axial reciprocatory movement, a cylinder, a piston mounted for axial reciprocatory movement within the cylinder and operably connected with the roller, a source of fluid supply, a pump having a movable component and communicating with the source of fluid supply, a fluid-control valve having a constantly driven movable component and communicable with the pump and with the cylinder and operable to communicate the fluid under pressure from the pump with the cylinder at one side of the piston and to communicate the cylinder at the opposed side of the piston with the source of fluid supply to discharge fluid from the cylinder whereby the piston and distributing roller are moved axially, means for operably connecting the movable component of the pump with a movable element of the printing machine, and means for operably connecting the movable component of the control valve with a constantly moving element of the printing machine.

8. In a printing machine having a liquid distributing system, a liquid distributing roller cooperable with other rollers in the liquid distributing system and mounted for axial reciprocatory movement, a cylinder, a piston mounted for axial reciprocatory movement within the cylinder and operably connected with the roller, a source of fluid supply, a pump having a movable component and communicating with the source of fluid supply, a fluid-control valve having a movable component and communicable with the pump and with the cylinder and operable to communicate the fluid under pressure from the pump with the cylinder at one side of the piston and to communicate the cylinder at the opposed side of the piston with the source of fluid supply to discharge fluid from the cylinder whereby the piston and distributing roller are moved axially, and variable speed mechanism for operably connecting the movable component of the pump with a movable element of the printing machine, and variable speed mechanism for operably connecting the movable component of the control valve with a movable element of the printing machine.

9. In a printing machine having printing cylinders and a liquid distributing system, a liquid distributing roller cooperable with other rollers in the liquid distributing system and mounted for axial reciprocatory movement, a cylinder, a piston mounted for axial reciprocatory movement within the cylinder and operably connected with the roller, a valve housing communicable with a source of fluid supply under pressure and with the cylinder, a valve movable within the housing and operable to communicate the said fluid with the cylinder at one side of the piston and to communicate the cylinder at the opposed side of the piston with a discharge to discharge fluid from the cylinder whereby the piston and distributing roller are moved axially, and variable speed mechanism operably connecting the said movable valve with a printing cylinder whereby the speed of movement of the valve may be varied relative to the speed of rotation of the said printing cylinder.

10. In a printing machine having printing cylinders and a liquid distributing system, a liquid distributing roller cooperable with other rollers in the liquid distributing system and mounted for axial reciprocatory movement, a cylinder, a piston mounted for axial reciprocatory movement within the cylinder and operably connected with the roller, a source of fluid supply, a pump having a movable component and communicating with the source of fluid supply, a valve housing communicable with the pump and cylinder, a valve movable within the housing and operable to communicate the fluid under pressure from the pump with the cylinder at one side of the piston and to communicate the cylinder at the opposed side of the piston with the source of fluid supply, variable speed mechanism operably connecting the movable component of the pump with a printing cylinder whereby the speed of movement of the movable element of the pump may be varied relative to the speed of rotation of the said printing cylinder, and variable speed mechanism operably connecting the said movable valve with a printing cylinder whereby the speed of movement of the valve may be varied relative to the speed of rotation of the said printing cylinder.

11. In a printing machine having a liquid distributing system, a liquid distributing roller cooperable with other rollers in the liquid distributing system and mounted for axial reciprocatory movement, a cylinder, a piston mounted for axial reciprocatory movement within the cylinder and operably connected with the roller, a stationary valve housing having a plurality of fluid-distribut-

ing ports therein, a conduit communicating the cylinder at one side of the piston with a distributing port of the valve housing, a second conduit communicating the cylinder at the opposed side of the piston with a separate distributing port of the valve housing, a fluid-inlet port communicating the valve housing with a source of fluid supply under pressure, a fluid-outlet port communicating the valve housing with a discharge, a valve rotatably mounted within the housing and constructed and arranged to operably cooperate with the said distributing ports, said fluid-inlet port, and said fluid-outlet port, and means for constantly rotating the said valve whereby fluid from the source of fluid supply under pressure is conveyed through the valve housing and through a conduit into the cylinder at one side of the piston and from the cylinder at the opposed side of the piston through a conduit and through the valve housing to the discharge to thereby axially move the piston and distributing roller.

12. In a printing machine having a liquid distributing system, a liquid distributing roller cooperable with other rollers in the liquid distributing system and mounted for axial reciprocatory movement, a cylinder, a piston mounted for axial reciprocatory movement within the cylinder and operably connected with the roller, a stationary valve housing having a plurality of fluid-distributing ports therein, a conduit communicating the cylinder at one side of the piston with a distributing port of the valve housing, a second conduit communicating the cylinder at the opposed side of the piston with a separate distributing port of the valve housing, a fluid-inlet port communicating the valve housing with a source of fluid supply under pressure, a fluid-outlet port communicating the valve housing with a discharge, a valve rotatably mounted within the housing and constructed and arranged to operably cooperate with the said distributing ports, said fluid-inlet port, and said fluid-outlet port, and variable speed mechanism for rotating the said valve whereby fluid from the source of fluid supply is conveyed through a conduit into the cylinder at one side of the piston and from the cylinder at the opposed side of the piston through a conduit and through the valve casing to the discharge to thereby axially move the piston and distributing roller.

13. In a printing machine having a liquid distributing system, a liquid distributing roller cooperable with other rollers in the liquid distributing system and mounted for axial reciprocatory movement, a cylinder, a piston mounted for axial reciprocatory movement within the cylinder and operably connected with the roller, a stationary valve housing having a plurality of fluid-distributing ports therein, a conduit communicating the cylinder at one side of the piston with a distributing port of the valve housing, a second conduit communicating the cylinder at the opposed side of the piston with a separate distributing port of the valve housing, a fluid-inlet port formed in the valve housing, a source of fluid supply, a rotary pump operably interposed between the source of fluid supply and the valve housing to force the fluid under pressure through the inlet port into the valve housing, a fluid-outlet port, an outlet conduit communicating the valve housing through the outlet port with the source of fluid supply, a valve rotatably mounted within the housing and constructed and arranged to operably cooperate with the said distributing ports, said fluid-inlet port and said fluid-outlet port, means for constantly rotating the said valve, and means for rotating the said pump whereby fluid from the source of fluid supply is conveyed through the pump, valve casing and conduit into the cylinder at one side of the piston and from the cylinder at the opposed side of the piston through a conduit, through the valve housing and outlet conduit back to the source of fluid supply.

14. In a fluid pressure operated ink roller reciprocating mechanism for a printing machine, a cylinder, a piston mounted for reciprocatory movement within the cylinder and connected to and adapted to reciprocate the ink roller, a pump, a reversing valve, means for constantly driving the reversing valve, and conduits connecting the valve to the pump and to the cylinder on opposite sides of the piston to supply fluid pressure to the cylinder to reciprocate the piston and ink roller.

15. In a printing machine, fluid pressure operated means for sequentially reciprocating a plurality of ink rollers, including a plurality of cylinders, a piston mounted for reciprocatory movement within each cylinder and connected to an ink roller, a pump, a reversing valve, means for constantly driving the reversing valve, and conduits connecting the reversing valve to the pump and to each cylinder on opposite sides of its piston to supply fluid pressure to the cylinder to reciprocate the piston and connected ink roller.

16. In a fluid pressure operated ink roller reciprocating mechanism for a printing machine, a cylinder, a piston mounted for reciprocatory movement within the cylinder and connected to and adapted to reciprocate the ink roller, a pump, a reversing valve, means for constantly driving the reversing valve, conduits connecting the valve to the pump and to the cylinder on opposite sides of the piston to supply fluid pressure to the cylinder to reciprocate the piston and ink roller, and a relief valve connected between the valve and the pump to limit the fluid pressure applicable to reciprocate the piston and roller.

17. In an ink roller reciprocating mechanism for a printing machine, a cylinder having a piston connected to and adapted to reciprocate the ink roller, a pump, a reversing valve, conduits connecting the valve to the cylinder and to the pump, and change speed devices connecting the pump and the valve to the machine, whereby the speed of the pump relative to the machine can be varied to regulate the length of the reciprocating stroke of the roller, and the speed of movement of the reversing valve can be regulated to vary the number of revolutions of the roller occurring during a reciprocatory stroke of the roller.

WILLIAM F. HUCK.