G. J. SUCH.

OFFSET MECHANISM FOR PRINTING PRESSES.

APPLICATION FILED JUNE 9, 1911.

1,006,313.

Patented Oct. 17, 1911.

2 SHEETS—SHEET 1.

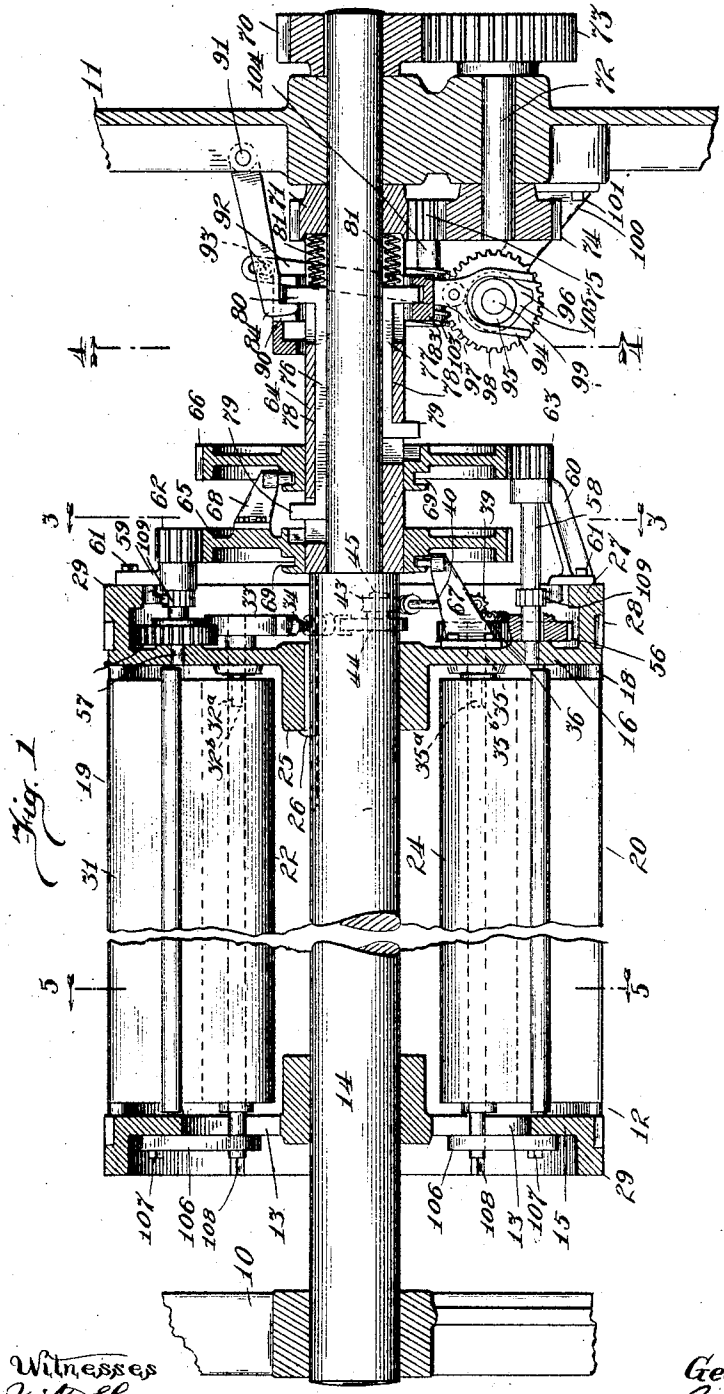

Fig. 1.

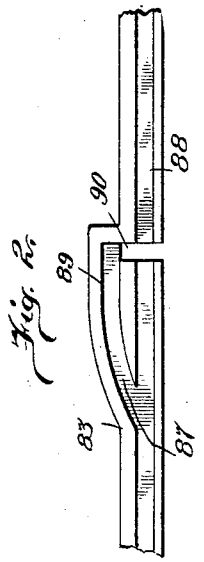

Fig. 2.

Witnesses
Milton Lenoir
E. M. Klatcher

Inventor
George J. Such,
Gilson & Gilson
Attorneys.

G. J. SUCH.

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2 SHEETS—SHEET 2.

Fig. 3.

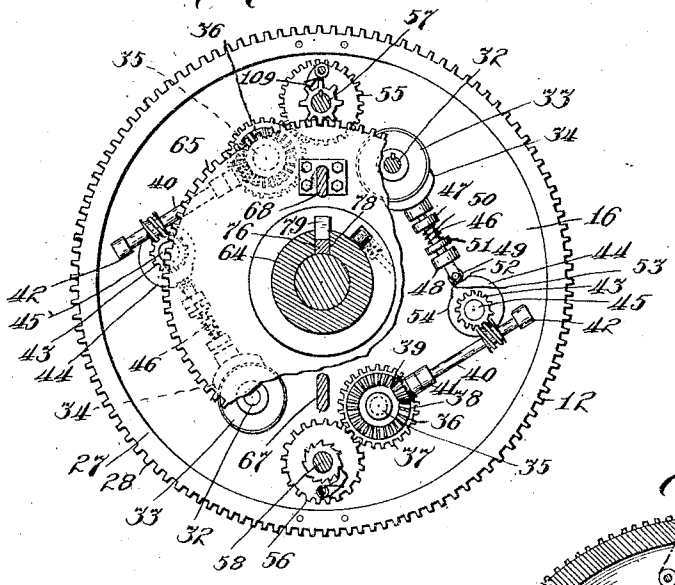


Fig. 5.

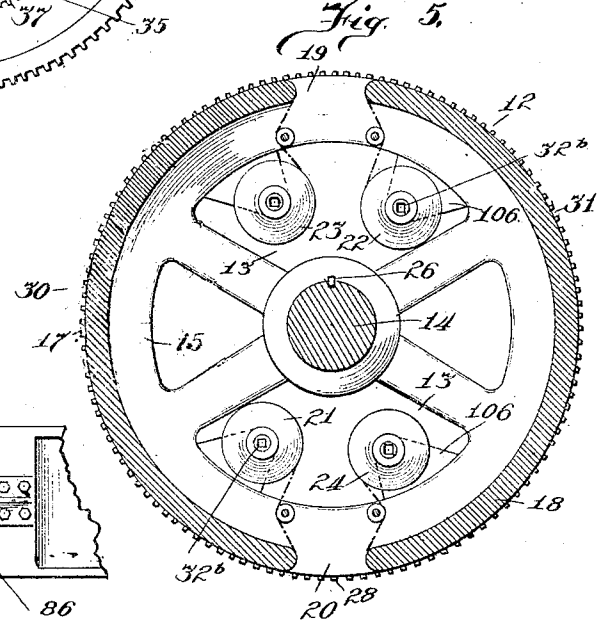
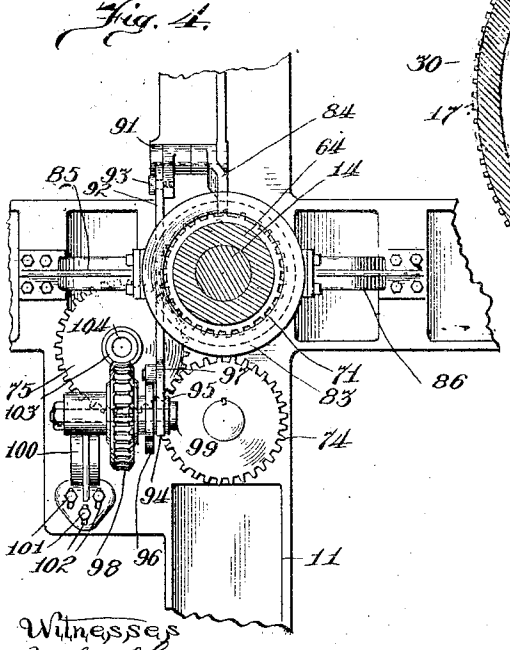


Fig. 4.



Witnesses

Milton Lenoir

E. M. Klatcher

Inventor

George J. Such

By Gilson & Gilson

Attorneys

UNITED STATES PATENT OFFICE.

GEORGE J. SUCH, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-FOURTH TO ROBERT F. GRADY, OF CHICAGO, ILLINOIS.

OFFSET MECHANISM FOR PRINTING-PRESSES.

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Application filed June 9, 1911. Serial No. 632,301.

To all whom it may concern:

Be it known that I, GEORGE J. SUCH, a citizen of the United States, and resident of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Offset Mechanism for Printing-Presses, of which the following is a specification, and which are illustrated in the accompanying drawings, forming a part thereof.

The invention relates to printing presses, and particularly to means for shifting the so-called top sheet used for covering the tympan surface of the press whereby a clean surface may be presented from time to time to the freshly printed sheets.

The object of the invention is to provide means of simple and improved construction for the purpose described.

The invention is exemplified in the structure to be hereinafter described and illustrated in the accompanying drawings, in which:—

Figure 1 is a detail cross-sectional view of a printing press taken centrally through the tympan or impression cylinder; Fig. 2 shows in diagram the form of a cam groove used in the mechanism described; Figs. 3 and 4 are sectional views taken on the lines 3—3 and 4—4 respectively, of Fig. 1; and Fig. 5 is a sectional view taken through the tympan cylinder illustrated in Figs. 1 and 3.

Details of the side frame members of a printing press are shown in the drawings at 10 and 11. One of the tympan cylinders of the press is generally designated by the numeral 12. This cylinder is mounted upon and turns with a shaft 14, which extends transversely across the frame of the press and is journaled adjacent its opposite ends in the frame members 10 and 11, respectively. As is usual in printing presses of this kind, the walls of the tympan cylinder 12 comprise a pair of end frames, marked 15 and 16, respectively, and a pair of impression members, marked 17 and 18. The impression members 17, 18, are carried by and connect the end frames 15 and 16. Each of the impression members 17 and 18 is curved in cross-section to substantially the form of a semi-circle, and comprises nearly half of the peripheral surface of the cylinder 12. The adjacent edges of the two members 17 and 18 are separated, thereby providing slots 19 and 20 for permitting the passage of sheets of paper between the members 17, 18. Preferably the end frame 15 is of skeleton construction, whereby rolls of paper, as 21, 22, 23 and 24, may be introduced or removed from the interior of the cylinder 12 through the openings, as 13, of the frame. The end frame 16 preferably takes the form of a substantially solid plate having a hub 25 for receiving the shaft 14. The hub 25 is secured to the shaft 14 by a key 26. Preferably the end frame 16 has an outwardly facing marginal flange 27. The usual gear 28 for turning the cylinder 12 and bearing surface 29 are formed upon the exterior of the marginal flange 27 of the end frame 16.

The top sheets, as 30 and 31, used for covering the tympan surfaces 17 and 18, respectively, of the cylinder 12 are each supplied from one of the rolls, as 21, 22, hereinafter referred to as the supply rolls. These sheets extend in continuous strips over the corresponding tympan surface 17, 18, and are wound upon the rolls 23 and 24, respectively. The rolls 23 and 24 are hereinafter designated the winding rolls.

In carrying out the invention improved means are provided for intermittently turning the rolls 23 and 24 to wind the top sheets 30 and 31 thereon. In order that the sheets may be delivered by the rolls 21 and 22, respectively, when the rolls 23 and 24 are rotated, each of the rolls 21 and 22 is rotatably mounted, as by being applied to the inner end of a spindle 32 journaled in the end frame 16 and extending through the same. In order that the spindles 32 shall turn with the corresponding supply roll, as 21, 22, the inner end 32^a of the spindle is squared and enters a squared socket 32^b in the end of the roll. A friction disk 33 is applied to the outer end of each of the spindles 32, and a movable brake shoe 34 cooperates with the periphery of the disk to hold the rolls, as 21, 22, against movement when paper is not being drawn therefrom.

For turning each of the rolls 23, 24, to wind the corresponding top sheet, as 30, 31, thereon, each of these rolls is applied to the squared inner end 35^a of a spindle 35, which spindles are also journaled in and extend through the end frame 16. A gear wheel 36 is mounted upon the outer end of each of the spindles 35 for turning the same. Each of the gear wheels 36 has a set of spurred gear teeth 37 formed on its periphery, and a set

of beveled gear teeth 38 formed on its face. The beveled gear teeth 38 mesh with a beveled pinion 39 mounted upon the end of a worm shaft 40. This worm shaft is journaled in lugs, as 41 and 42, formed upon the outer face of the end frame 16. This worm shaft 40 controls the brake shoe 34, which cooperates with the friction disk 33 on the spindle 32 of the corresponding supply roll 21, 22. To this end it meshes with a worm wheel 43, which turns a cam disk 44. As shown, the worm wheel 43 and cam disk 44 are formed integral, and they are rotatably mounted upon a stud 45 which projects from the face of the end frame 16.

The brake shoe 34 is mounted upon one end of a plunger 46. This plunger has a longitudinal sliding movement in lugs 47 and 48, formed upon the face of the end frame 16. The other end of the plunger 46 carries a cam roller 49 for coöperating with the periphery of the cam disk 44. A spring 50 is coiled about the plunger 46 and reacts between one of the lugs, as 47, and a collar 51 mounted on the plunger to hold the cam roller 49 in engagement with the periphery of the cam disk 44. The periphery of the cam disk 44 is so formed as to provide a projection 52, adapted to coöperate with the cam roller 49 for holding the brake shoe 34 tightly against the periphery of the friction disk 33. It also has a portion 53 which, when engaged with the cam roller 49, holds the brake shoe 34 lightly against the periphery of the friction disk 33. A reduced portion 54 of the cam disk 44, when engaged with the roller 49, permits the brake shoe 34 to be drawn out of contact with the periphery of the friction disk 33 by the spring 50.

A gear pinion, as 55, 56, meshes with the spur gear teeth 37 of each of the gear wheels 36. Each of these gear pinions is mounted upon a shaft, as 57, 58, which is journaled at one end in the end frame 16 and extends outwardly therefrom through a bracket, as 59, 60. The brackets 59 and 60 are shown as being rigidly secured to the marginal flange 27 of the end frame 16, as by bolts 61, and they extend inwardly therefrom to provide bearings for the corresponding shaft 57, 58, intermediate its ends. The shafts 57 and 58 are preferably of unequal length. Each has a pinion, as 62, 63, mounted upon its outer end.

A sleeve 64 extends over the shaft 14 between the end frame 16 of the cylinder 12 and the adjacent side frame member, as 11, of the printing press. Two gears, as 65 and 66, are loosely mounted upon the sleeve 64 adjacent its inner end. One of the gears 65, 66, meshes with each of the pinions 62, 63. For maintaining the gears 65, 66, in alinement with the corresponding pinions 62, 63, they are held against longitudinal movement on the sleeve 64, as by means of a pair of yokes 67 and 68, each of which runs in a groove 69 formed in the hub of one of the gears. The yoke 67 is secured to the face of the end frame 16 of the cylinder 12, and the yoke 68 is secured to the outer face of the gear 65.

In the normal operation of the printing press the gears 65 and 66 turn in the same direction and at a uniform speed with the cylinder 12. When it is desired to turn the winding rolls 23, 24, for shifting the top sheets 30 and 31 on the surface of the tympan cylinder 12, the gears 65, 66, are rotated relatively to the cylinder 12, preferably by turning them in the reverse direction, thereby rotating the pinions 62 and 63 to drive the spindles 35 of the winding rolls. The sleeve 64 is preferably continuously rotated on the shaft 14 in the reverse direction from that at which the shaft turns, but preferably at the same speed. As shown, a gear 70 is mounted upon the end of the shaft 14 adjacent to but upon the outside of the side frame member 11 of the printing press, and a gear 71 is formed upon the end of the sleeve 64 adjacent to but upon the inside of the frame member 11. A countershaft 72, journaled in and extending through the frame member 11, has gears 73 and 74 mounted upon its opposite ends. The gear 73 meshes with the gear 70 mounted on the shaft 14. The gear 74 meshes with an idler 75. This idler in turn meshes with the gear 71 formed on the sleeve 64.

A pair of clutch arms 76 and 77 are slidingly mounted in the sleeve 64. One of these clutch arms coöperates with each of the gears 65, 66, to cause said gear to rotate with the sleeve 64 to drive the corresponding pinion 62 or 63. As shown, the clutch arms 76 and 77 are mounted in longitudinal slideways 78 formed in the sleeve 64. Each clutch arm has outwardly projecting lugs 79 and 80 formed upon its opposite ends. Each of these clutch arms is urged inwardly by a spring 81, housed within the corresponding slideway 78 and reacting between the outer end of the corresponding clutch arm and the end of the slideway. The hub of each of the gears 65, 66, is recessed, as indicated at 82, for receiving the outwardly projecting lug 79 formed upon the inner end of the corresponding clutch arm 76, 77, when the clutch-arms are moved inwardly, thereby causing the gears 65 and 66 to turn with the sleeve 64. Normally, however, the clutch arms 76 and 77 are retracted against the effort of the springs, as by a cam block 83 and latch 84. The cam block 83 is of annular form, and surrounds the sleeve 64 adjacent the gear 71. As shown, this cam block is held in fixed position by brackets 85 and 86 secured to the inner face of the frame member 11 of the printing press. The inner surface of the cam block 83 is provided with

cam grooves 88 and 89. The cam groove 88 extends completely about the inner surface of the cam block 83. The cam groove 89 preferably extends half the distance about the inner surface of the cam block. One end portion, as 87, of the cam groove 89 is inclined and communicates with the cam groove 88. The other end portion of the cam groove 89 is turned abruptly inward and provides an opening or passage 90 connecting the grooves 88, 89. The end of the latch 84 normally rests in the opening 90. When so located this latch prevents the lugs 80 from entering the cam groove 89.

Provision is made for lifting the latch 84 whenever it is desired to have the gears 65 and 66 turn with the sleeve 64 to shift the top sheets 30 and 31 on the tympan surfaces 17 and 18 of the cylinder 12. As shown, the latch 84 is pivotally attached to the frame member 11 of the press at 91. A link 92 is pivotally connected to the latch 84 at 93, and extends downwardly therefrom at one side of the sleeve 64. The lower end of the link 92 is bifurcated, as indicated at 94, and straddles the hub 95 of a cam 96. A cam roller 97 is mounted upon one side of the link 92 adjacent its lower end, and coöperates with the cam 96 for raising the link at intervals. Preferably the cam 96 has a worm wheel 98 formed integral therewith, and both are mounted upon a transversely mounted stub shaft 99. This stub shaft is conveniently carried by a bracket 100, held against the inside face of the frame 11 of the press. In order that the size of the worm wheel 98 and the configuration of the cam 96 may be varied, the bracket 100 is adjustably held in position, as by means of bolts 101, which pass through slotted openings 102 in the bracket. A worm gear 103, turned by the intermediate gear or idler 75, is employed for turning the worm wheel 98 and cam 96. As shown the worm gear 103 and gear 75 are formed integral and they are mounted upon a stub shaft 104 which projects inwardly from the frame 11.

In the operation of the press the top sheets 30 and 31 will be shifted each time the cylinder 12 has made a predetermined number of revolutions. This number of revolutions will be determined by the size of the worm wheel 98 and configuration of the cam 96. The cam 96 will in any event have elevated portions 105, adapted to engage the cam roller 97 to raise the latch 84 and hold the same in an elevated position during one complete revolution of the sleeve 64. When the latch 84 is raised, the clutch arms 76 and 77 will be forced inwardly by the springs 81, the projecting lugs 80 passing through the opening 90 which connects the cam grooves 88 and 89. Each of the clutch arms 76 and 77 is withdrawn from engagement with the corresponding gear, 65, 66, when the cylinder 12 has turned through half a revolution, by the engagement of the lug 80 carried thereby, with the inclined portion 87 of the cam groove 89. The gears 65 and 66 will thus be caused to turn with the sleeve 64 in the reverse direction from that in which the cylinder 12 turns, thereby driving the pinions 62 and 63, respectively, and turning the spindles 35 upon which the winding rolls 23 and 24 are mounted. It will be seen that the turning of the gears 65 and 66 respectively, takes place during successive half revolutions of the cylinder 12, whereby each of the top sheets 30 and 31 may be shifted without interfering with the operation of the press and while an impression is being made against the other tympan surface, as 17, 18, of the cylinder. When each of the rolls 23, 24, first begins to turn, paper will be drawn from the corresponding supply roll 21 or 22, such roll turning with some difficulty at first because of the engagement of the brake shoe 34 with the friction disk 33. When the winding roll 23 or 24 has been turned through a short distance, however, the corresponding cam 44 will have been turned far enough to bring the depressed portion 54 of the cam in front of the cam roller 49, whereby the brake shoe 34 will be released from the friction disk 32 by the action of the spring 50. When this occurs the supply roll 21, or 22 will turn freely, delivering clean paper for the top sheet 30 or 31, as fast as the soiled portion of the sheet is wound upon the roll 23 or 24. Before the winding roll as 23, 24, comes to rest, the turning of the corresponding supply roll as 21, 22, will be arrested by the engagement of the enlarged portion 52 of the cam 44 with the cam roller 49, whereby the brake shoe 34 is pressed tightly against the friction disk 33. A further turning of the winding roll as 23, 24, will thereby stretch the top sheet, as 30, 31, tightly over the tympan surface, as 17, 18. Before the shifting of the top sheet has been entirely completed the enlarged portion 52 of the cam 44 will have passed the cam roller 49, whereby the friction disk 33 will be held against turning by the brake shoe 34 with sufficient force to prevent accidental turning of the corresponding supply roll, 21 or 22, while still permitting the turning of these rolls when the winding roll, as 23, 24 next begins to revolve.

Preferably the openings, as 13, in the end frame 15 of the cylinder 12 are covered by plates, as 106 which provide bearings for the ends of the rolls as 21, 22, 23, 24. As shown, these plates are detachably held against the frame member 15 by screw bolts 107, whereby they may be removed for the insertion and removal of the winding and supply rolls. In order that the winding rolls, 23, 24, may be turned by hand, if desired, as

when a freshly filled supply roll, as 21, 22 has been inserted, each has a spindle 108 which extends through the corresponding plate 106, such end of the spindle being arranged to receive a crank, (not shown).

To insure the gears, as 65, 66 being rotated with the cylinder 12 when the clutch arms, as 76, 77, are released therefrom, the pinions 62, and 62 are held against rotation in one direction, as by a ratchet and pawl mechanism 109 applied to each of the shafts 57 and 58.

I claim as my invention—

1. In a printing press, in combination, a shaft, a tympan cylinder turning with the shaft, a top sheet winding roll carried by the cylinder, a sleeve loose on the shaft, a gear normally loose on the sleeve, driving connection between the gear and the winding roll, and clutch connection between the gear and sleeve.

2. In a printing press, in combination, a shaft, a tympan cylinder turning with the shaft, a top sheet winding roll carried by the cylinder, a sleeve loose on the shaft, a gear normally loose on the sleeve, driving connection between the gear and the winding roll, clutch connection between the gear and sleeve, and means for reversely driving the shaft and sleeve.

3. In a printing press, in combination, a rotatable shaft, a tympan cylinder turning with the shaft, a top sheet winding roll carried by the cylinder, a gear and sleeve loose on the shaft, gear connection between the shaft and sleeve whereby the shaft and sleeve are oppositely rotated, clutch connection between the sleeve and gear, and gear connection between the first-mentioned gear and the winding roll.

4. In combination with a tympan surface, a top sheet winding roll and a top sheet supply roll, a brake engageable with the supply roll, a cam for moving the brake, means for intermittently turning the winding roll, and gear connection between the winding roll and cam.

5. In a printing press, in combination, a sleeve, a shaft turning in the sleeve, a tympan cylinder mounted on the shaft and turning therewith, a top sheet winding roll carried by the cylinder, a gear loose on the sleeve, driving connection between the gear and winding roll, a spring-advanced clutch-arm carried by the sleeve for engaging the gear, a retracting cam and latch acting on the clutch arm, a cam for lifting the latch and worm, and wheel connection between the last-mentioned cam and the shaft whereby said cam is turned at a less rate than the shaft.

6. In a printing press, in combination, a sleeve, a shaft turning in the sleeve, a tympan cylinder mounted on the shaft and turning therewith, a pair of top sheet winding rolls carried by the cylinder, a pair of gears loose on the sleeve, driving connection between each of the gears and one of the winding rolls, a yoke carried by the cylinder and engaging the hub of one of the gears, a yoke carried by the last-mentioned gear and engaging the hub of the other gear, a pair of clutch arms carried by the sleeve, one being engageable with each of the gears, and one of said clutch arms being extended through the sleeve beyond one of the gears, and means for operating the clutch arms.

7. In combination with a tympan surface, a top sheet winding roll and a top sheet supply roll, means for holding the supply roll against rotation, a cam controlling the operation of such holding means, means for intermittently turning the winding roll and gear connection between the winding roll and cam.

8. In a printing press, in combination, a rotatable shaft, a tympan cylinder turning with the shaft, a pair of top sheet winding rolls carried by the cylinder, a pair of gears loose on the shaft, a sleeve mounted on the shaft and extending through one of the gears, operative connection between each of the gears and one of the winding rolls, clutch connection between the sleeve and each of the gears, and gear connection between the shaft and sleeve.

9. In a printing press, in combination, a rotatable shaft, a tympan cylinder turning with the shaft, a pair of top sheet winding rolls carried by the cylinder, a pair of gears loose on the shaft, a sleeve mounted on the shaft and extending through one of the gears, operative connection between each of the gears and one of the winding rolls, a pair of spring advanced clutch arms carried by the sleeve, one thereof being engageable with each of the gears, a latch for holding the clutch arms in retracted position, a cam for releasing the latch and gear connection between the shaft and cam.

10. In a printing press, in combination, a rotatable shaft, a tympan cylinder turning with the shaft, a pair of top sheet winding rolls carried by the cylinder, a pair of gears loose on the shaft, a sleeve mounted on the shaft and extending through one of the gears, operative connection between each of the gears and one of the winding rolls, and clutch connection between the sleeve and each of the gears.

11. In a printing press, in combination, a rotatable shaft, a tympan cylinder turning with the shaft, a pair of top sheet winding rolls carried by the cylinder, a pair of gears loose on the shaft, a sleeve mounted on the shaft and extending through one of the gears, operative connection between each of the gears and one of the winding rolls, a pair of spring advanced clutch arms carried

by the sleeve, one thereof being engageable with each of the gears, a latch for holding the clutch arms in retracted position, a cam for releasing the latch, gear connection between the shaft and cam and gear connection between the shaft and sleeve.

12. In a printing press, in combination, a tympan cylinder, a winding roll carried by the cylinder, a gear loosely mounted on the spindle of the cylinder, operative connection between the gear and winding roll, a clutch arm engageable with the gear for holding it against rotation with the cylinder, a cam controlling the operation of the clutch arm and gear connection between the cylinder and cam.

13. In a printing press, in combination, a tympan cylinder, a plurality of top sheet winding rolls carried by the cylinder, a plurality of independently revoluble gears coaxially mounted with the cylinder, operative connection between each of the gears and one of the said winding rolls, and means intermittently acting on each of the said gears for causing relative rotation between the gear upon which it acts and the cylinder.

14. In a printing press, in combination, a tympan cylinder, a pair of top sheet winding rolls carried by the cylinder, a pair of independently revoluble gears coaxially mounted with the cylinder adjacent one end thereof, operative connection between each of the gears and one of the said winding rolls, and means intermittently acting on each of said gears for causing relative rotation between the gear upon which it acts and the cylinder, the said means acting on one of the gears including a member which is axially extended through the other gear.

GEORGE J. SUCH.

Witnesses:
CHARLES B. GILLSON,
E. M. KLATCHER.