Jan. 19, 1954 J. R. LAUFFER 2,666,372

AUTOMATIC COUNTING AND TABBING MACHINE FOR PRESSES

Filed May 2, 1950 5 Sheets-Sheet 1

Fig. 1.

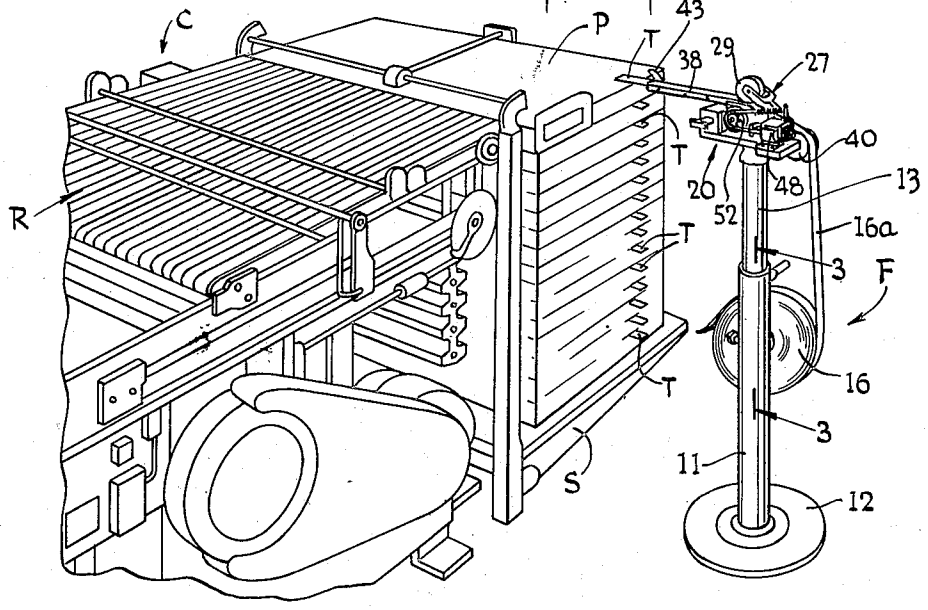


Fig. 2.

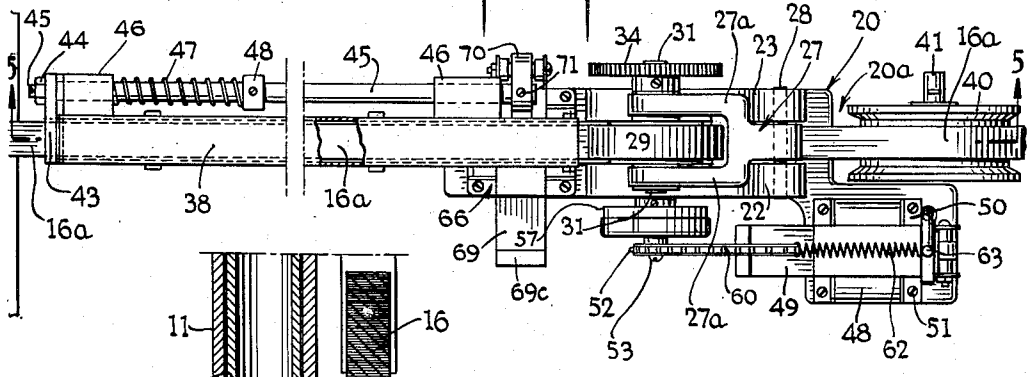
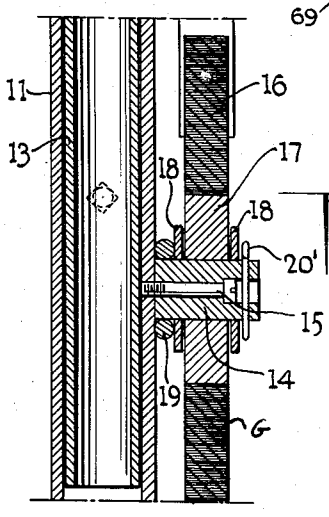


Fig. 3.



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Fig. 4.

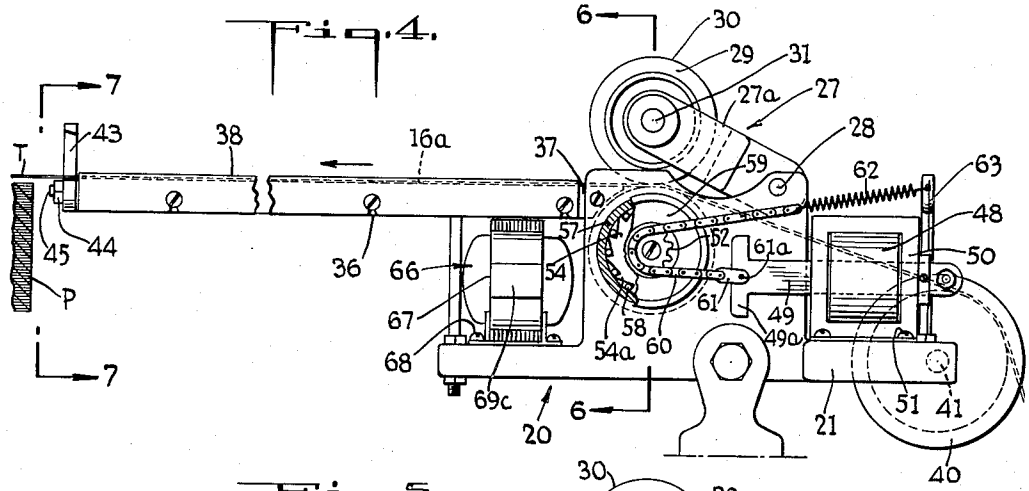


Fig. 5.

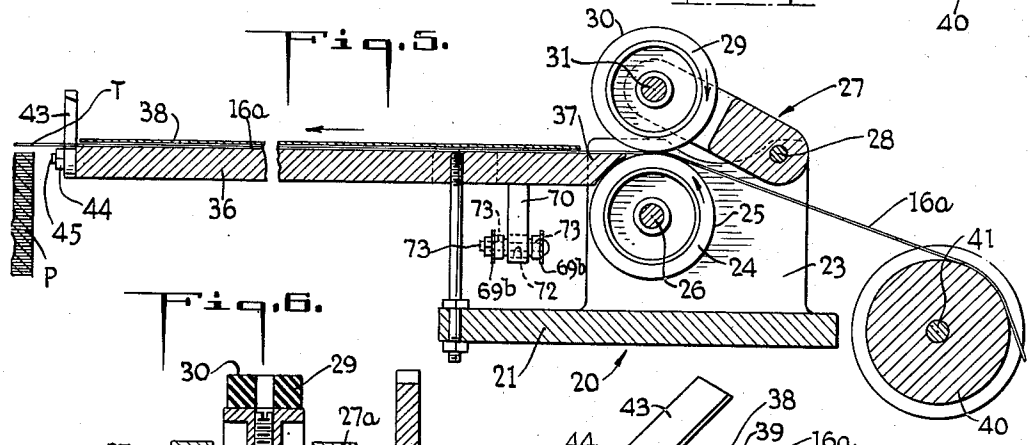


Fig. 6.

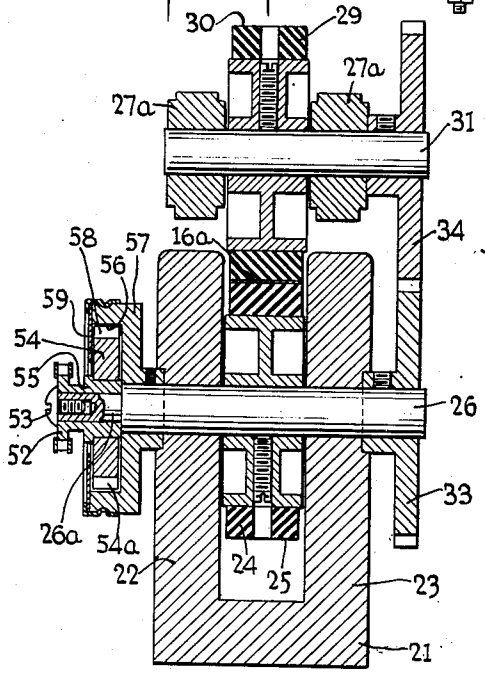
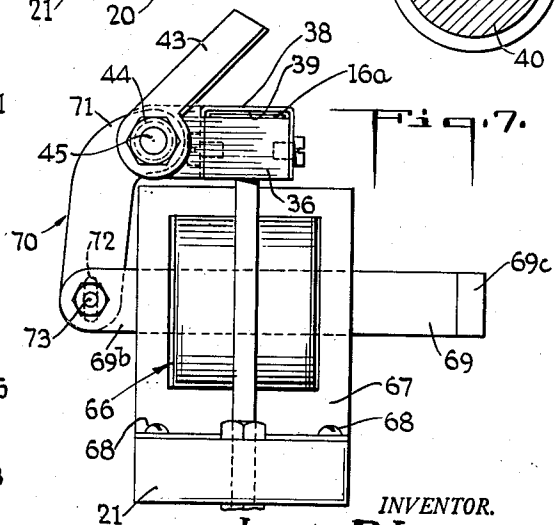


Fig. 7.



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Fig. 8.

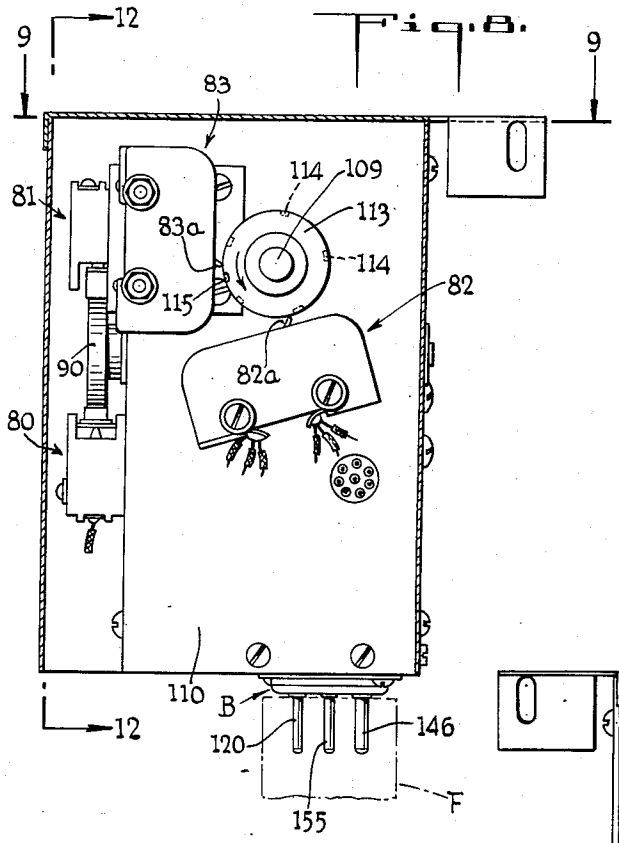


Fig. 15.

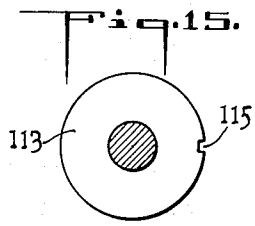


Fig. 16

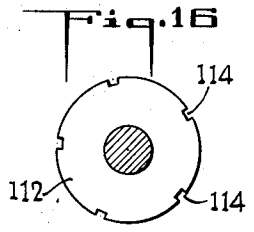


Fig. 10.

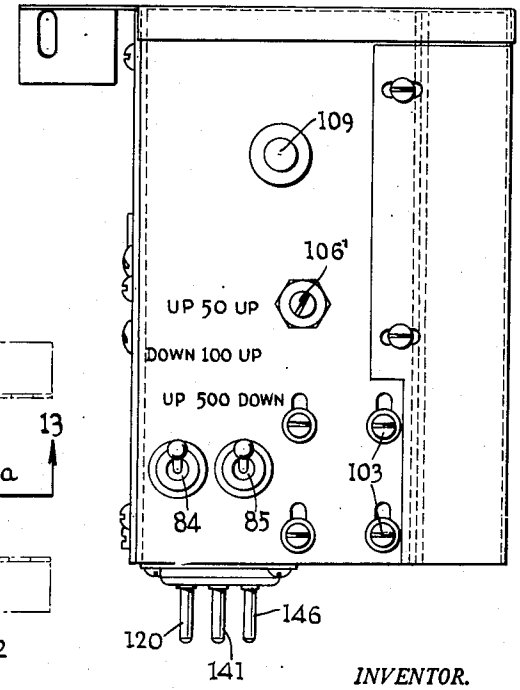
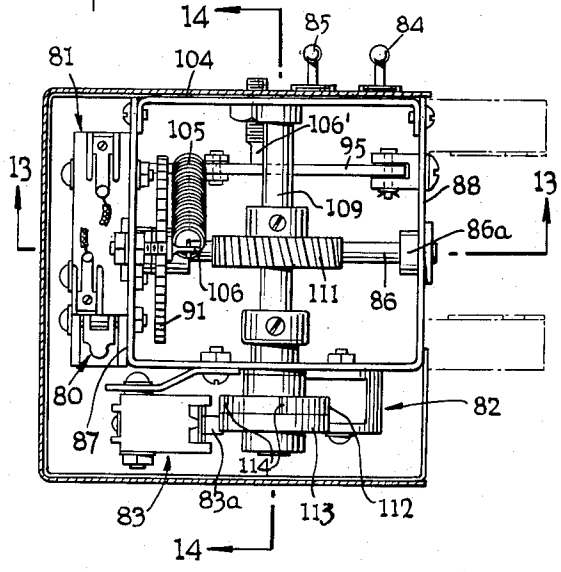


Fig. 9.



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AUTOMATIC COUNTING AND TABBING MACHINE FOR PRESSES

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Fig. 11.

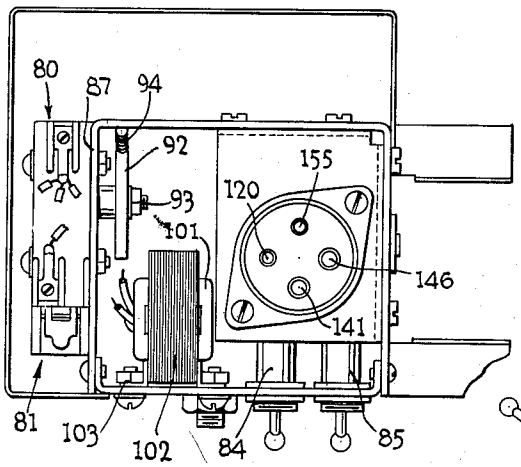


Fig. 12.

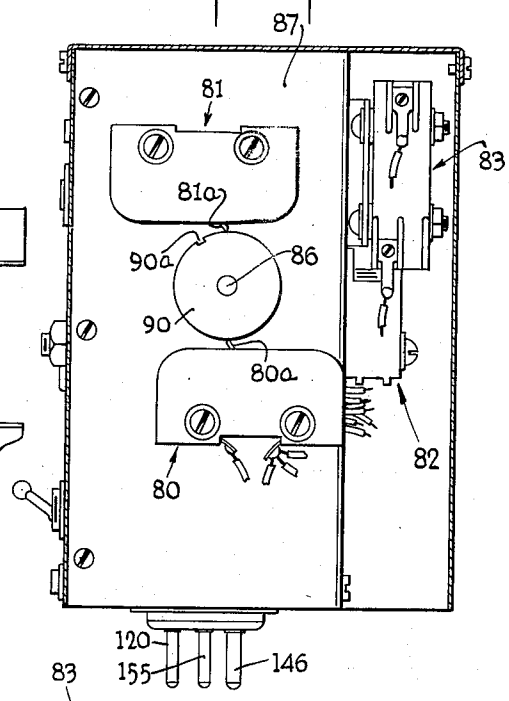
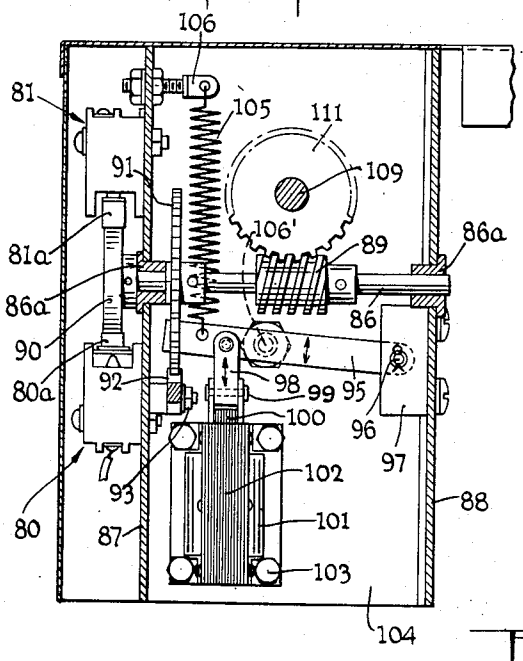


Fig. 13.



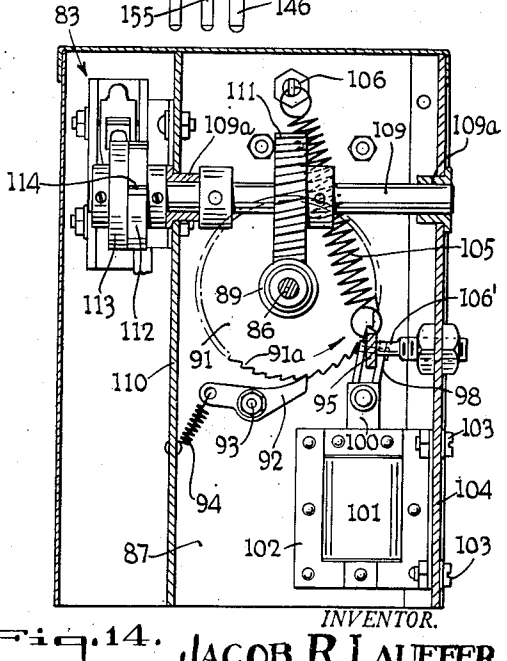


Fig. 14.

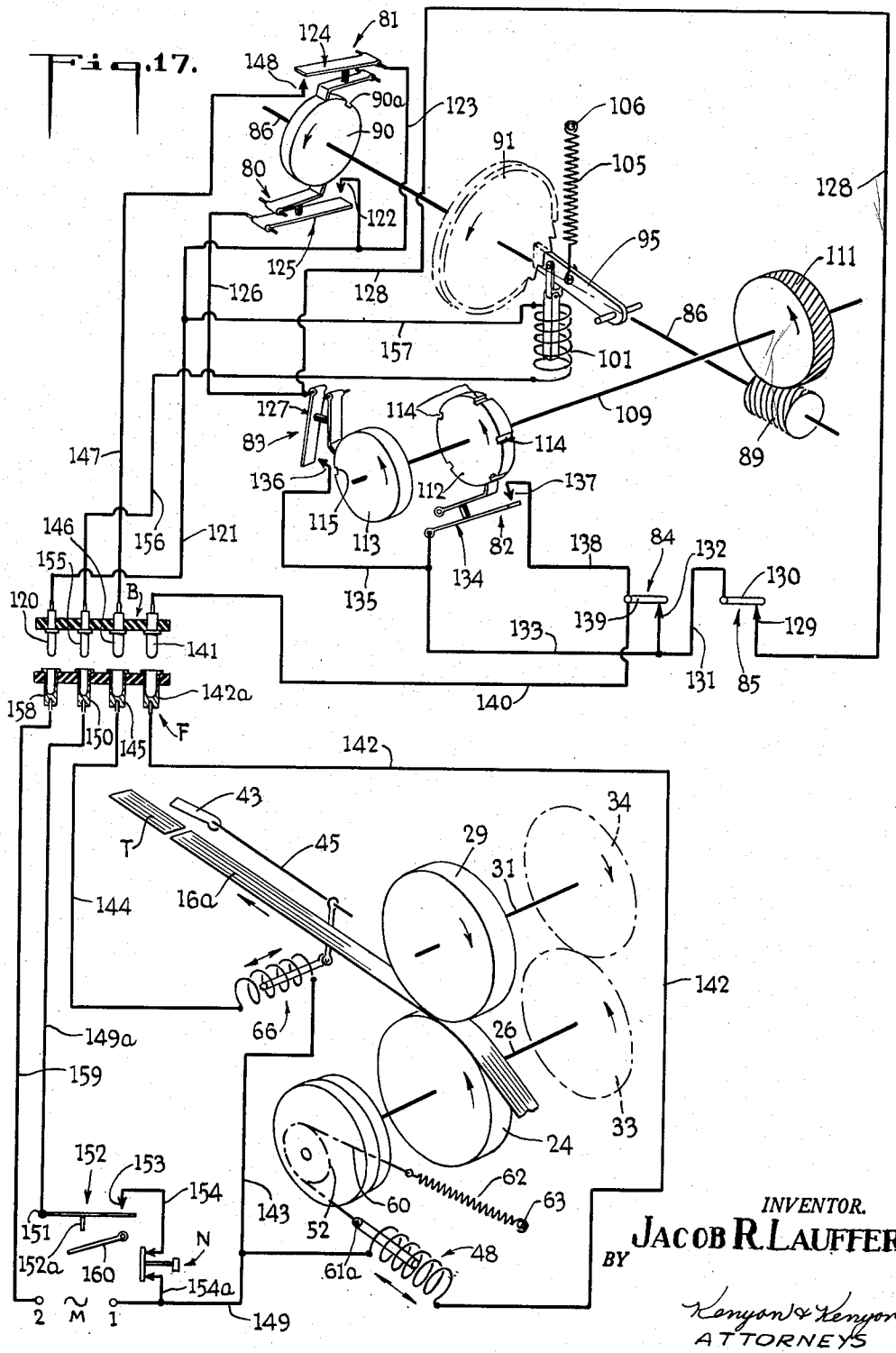
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AUTOMATIC COUNTING AND TABBING MACHINE FOR PRESSES

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Fig. 17.



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UNITED STATES PATENT OFFICE

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AUTOMATIC COUNTING AND TABBING MACHINE FOR PRESSES

Jacob R. Lauffer, Valley Stream, N. Y., assignor, by mesne assignments, to Hills-McCanna Company, Chicago, Ill., a corporation of Illinois

Application May 2, 1950, Serial No. 159,469

9 Claims. (Cl. 93—93)

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This invention relates to automatic counting and tabbing mechanism for use with printing presses or other sheet handling machines to count and tab automatically predetermined numbers of sheets delivered to a pile at a reception point from a press or other machine handling sheet-like material, each tab being left on the uppermost sheet of a determined count of sheets delivered to the pile and remaining in overhanging position along an edge of the pile for ready physical and visual indication of the counted sheets.

Manual counting and tabbing of sheets delivered to a pile from a printing press has been the almost universal practice up to the present time. This manual as well as time wasting practice has often been inaccurate and has materially increased printing costs as well as providing other material disadvantages such as spoilage due to offset of manually handled freshly printed sheets. Principal features and objects of this invention are the provision of portable automatic counting and tabbing means applicable readily to printing presses extant without modification thereof, to provide automatic counting and tabbing of printed sheets delivered by the press to a receiving pile at a reception point.

Other objects and features of the invention are the provision of portable mechanism which may be moved from press to press as the occasion arises, requiring simply the plugging in of an electric cable connector at each press between the latter and the portable mechanism of this invention.

Further objects and features of the invention are the provision of absolutely accurate automatic counting and tabbing mechanism that will eliminate manual counting and handling of freshly printed sheets, thereby cutting down the danger of offset and spoilage, and further the provision of mechanism applicable to presses irrespective of their size or speed of operation.

Other objects and novel features of the invention will become apparent from the following specification and accompanying drawings wherein:

Fig. 1 is a perspective elevation illustrating association of the counting mechanism with the delivery pile of a printing press;

Fig. 2 is a top plan view, partially in section of the tab-feeding and cutting-off mechanism embodied in the invention;

Fig. 3 is a section taken along line 3—3 of Fig. 1 illustrating the tab tape supply roll construction associated with the invention;

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Fig. 4 is a front elevation, partially in section of the mechanism of Fig. 2;

Fig. 5 is a vertical longitudinal section taken along line 5—5 of Fig. 2;

Fig. 6 is a vertical transverse section taken along line 6—6 of Fig. 4;

Fig. 7 is a vertical transverse section taken along line 7—7 of Fig. 4;

Fig. 8 is a front side elevation, partially in section of the timing control mechanism associated with the device of Fig. 2;

Fig. 9 is a horizontal section taken along line 9—9 of Fig. 8;

Fig. 10 is a rear side elevation of the timing control mechanism;

Fig. 11 is a bottom plan view of the timing control mechanism;

Fig. 12 is a vertical section taken along line 12—12 of Fig. 8;

Fig. 13 is a vertical elevation taken along line 13—13 of Fig. 9;

Fig. 14 is a vertical elevation taken along line 14—14 of Fig. 9;

Fig. 15 is an elevational view of one of the electric switch control discs of the timing control mechanism;

Fig. 16 is a similar elevation of a second one of the electric switch control discs of the timing control mechanism; and

Fig. 17 is a schematic showing of the electrical circuits interconnecting the timing control mechanism and the mechanism of Fig. 2.

Referring to the drawing and first to Fig. 1, the delivery end of the printing press R is shown delivering sheets of printed paper to the pile P on the vertically movable receiving platform S where, heretofore, they have been counted by hand and had appropriate marking tabs inserted after a determined count of fifty or one hundred or more sheets delivered thereto. A tab feeder and inserter mechanism constituting a portion of the present invention and denoted generally by the reference character F is shown positioned to one side of the pile P. This feeder contains operating mechanism to be described, motivated electrically in response to operations on a timing control mechanism C connected electrically to the press R and is adapted to feed marking or tallying tabs T automatically into the pile P at the completion of determined counts of sheets delivered from the press to the pile P. In the embodiment shown, the tabs T have been fed to the pile at each fifty sheet delivery thereto, each tab having been inserted on the uppermost sheet of a fifty sheet count and

covered by the succeeding sheets with an overhanging portion leaving a visual tab indicator T of each fifty sheet count.

Tab feeder and cut off mechanism

The tab feeder and cut off mechanism of the invention denoted generally by the reference character F is shown in perspective in Fig. 1 and is illustrated in detail in Figs. 2–7 inclusive. Referring to these figures, a tubular stand 11 having a base 12, telescopically and adjustably supports a vertically movable post 13. A lateral stub shaft 14 is secured to the stand 11, for example, by a threaded bolt 15. A roll 16 of relatively stiff marker tab material 16*a* such as Bristol board or the like in strip form wound on a spool 17 is supported on the shaft 14 between the washers 18, the inner one of which bears against the friction ring 19, and the outer one of which is retained in place by the cotter pin 20'. Other conventional means for demountably supporting the spool 17 may be utilized, that shown being merely exemplary. One side face of the roll 16 is gummed at G so that the roll 16 will not unroll by itself. This gumming also aids in regulating the length of the tab fed from the roll. Other equivalent braking means for the roll may be used.

A frame 20 is horizontally supported by the post 13. This frame 20 includes a base portion 21 (Figs. 4, 5 and 6) and two spaced-apart upright flanges 22 and 23. A tape feeding roller 24 provided with a friction surfacing 25 of rubber or the like is supported between the flanges 22 and 23 by a shaft 26 rotatively journaled therein. A yoke 27 is pivotally supported by a pivot pin 28 between the flanges 22 and 23. This yoke 27, in turn, carries between its spaced arms 27*a* a second tape feeding roller 29 provided with a friction surface 30 of rubber or the like, said roller 29 being secured to the shaft 31 rotatively journaled in the arms 27*a* of the yoke. The yoke 27 and consequently roller 29 and its surface 30 are biased toward the surface 25 of the roller 24 by gravity or in other ways. Meshing gears 33, 34 secured respectively on the shafts 26 and 31 provide driven rotation of shaft 31 and its roller 29 when roller 24 is driven as will be described.

A horizontally extending guide platform 36 is secured at 37 to the flanges 22 and 23, its upper surface being alined substantially with the bite between roller surfaces 25 and 30. The upper surface of the platform 36 is covered by a substantially U-shaped cover plate 38 which is spaced apart from the upper surface of the platform 36 to define a guide channel 39 for the tab strip 16*a*. A guide pulley 40 is rotatively supported on a spindle 41 extending laterally of the platform 20 in a cut-away portion 20*a* of the latter. The tab strip material 16*a* from the roll 16 thereof is threaded around guide pulley 40, and then through the bite between friction surfaces 25 and 30 of the rollers 24 and 29 and thereafter through the guide channel 39 to and beyond the forward end of the platform 36.

At the forward end of platform 36, a cut-off knife 43 is mounted so as adapted to be swingable transversely thereof to periodically sever tape or tab strip material 16*a* extending beyond said end. This knife 43 is secured at 44 to the end of a horizontally extending shaft 45 (Fig. 2). Shaft 45 is rotatively supported in guides 46 extending laterally of the platform 36. A biasing spring 47 positioned between a collar 48 fixed on the shaft 45 and one of the guides 46 biases

the knife 43 toward the outer or delivery end of platform 36 to insure clean severance of the leading portion of tape strip 16*a* whenever knife 43 is swung in a cutting stroke by mechanism presently to be described.

The feeding roller 24 is rotated intermittently at determined time intervals in a feeding direction (counterclockwise as seen in Fig. 5) and because of meshing gears 33 and 34, the feeding roller 29 is simultaneously rotated (clockwise as seen in Fig. 5) so that the tape 16*a* gripped in the bite between friction surfaces 25 and 30 is advanced beyond the forward edge of the platform 36 a predetermined amount each time roller 24 is rotated.

The mechanism for intermittently rotating the roller 24 in a feeding direction comprises a solenoid coil 48 and plunger 49 adapted to be drawn into solenoid coil when electric energizing power is supplied to the latter as will be described. The solenoid coil 48 is supported in a core frame 50 secured to the base 21 at 51 so that the plunger 49 is movable horizontally in the longitudinal direction of said base 21. A sprocket wheel 52 (Fig. 6) is rotatively secured at 53 to a reduced portion 26*a* of the shaft 26. A ratchet wheel 54 is fixedly mounted on the projecting bearing 55 of the sprocket wheel 52. This ratchet wheel 54 lies in a circular recess 56 provided in the outer side face of a wheel 57 secured to the shaft 26. Loose pins 58 are inserted in the recess 56 one in each space defined by a ratchet tooth 54*a* of the ratchet wheel 54 and the inner wall of recess 56. The pins are held in place by a snap-on cap 59. A sprocket chain 60 is mounted on the sprocket wheel 52 and one end is pivotally secured to a link 61 pivoted at 61*a* to the crosshead 49*a* of the solenoid plunger 49. The other end of chain 60 is secured to one end of a tension spring 62 whose opposite end is secured to a post 63 secured in turn to the base 21. The tension of spring 62 biases the solenoid plunger 49 in a withdrawn position relative to coil 48 and into the position shown in Fig. 4. When the solenoid coil 48 is energized by electric current, plunger 49 is drawn inwardly (toward the right of Fig. 4) against the biasing action of spring 62 on chain 60. This movement of plunger 49 draws the chain 60 around sprocket wheel 52, rotating the latter and with it ratchet wheel 54. The inclined planes of the ratchet teeth 54*a* then wedge the pins 58 against the inner wall of recess 56 and clutch couple wheel 57 to ratchet wheel 54 causing driven rotation thereof and of roller 24 in feeding direction (counterclockwise as seen in Fig. 4). Simultaneously, because of the mesh between gears 33 and 34, roller 29 is also driven (clockwise as seen in Fig. 4). The forward end of tape 16*a* between friction surfaces 25 and 30 is thus fed beyond the forward edge of platforrm 36 a determined distance. Deenergization of solenoid 48 causes spring 62 to retract the plunger to its initial position. The pins 58 at this time move onto lower portions of the inclined planes of the ratchet teeth 54*a* and become uncoupled by disengaging the inner wall of the recess 56 so that no rotation is imparted to rollers 24 and 29 during the return stroke of the plunger 49. Thus an effective one-way clutch coupling and one-way feed for the rollers 24 and 29 is effected. Since energization and deenergization of the solenoid coil 48 is effected at timed intervals and is cyclic, the feed of tape 16*a* forwardly by rollers 24 and 20 likewise occurs at timed intervals.

The knife 43 is also adapted to be rotated at timed intervals in a cutting direction from its inoperative position (as seen in Figs. 4 and 5) to a cutting position (as seen in Fig. 2) and then returned to its inoperative position. To this end, a solenoid coil 66 supported by its core frame 67 at 68 from the base 21 is provided. This coil has a solenoid plunger 69 movable horizontally and transversely of the longitudinal direction of the platform 36. A crank 70 is secured at one end 71 to the shaft 45. Adjacent its opposite end, crank 70 has a longitudinal slot 72 in which pivot pins 73 extending laterally from the forked ends 69b of the solenoid plunger 69 engage. The plunger 69 is suitably biased to outward position relative to coil 66 (as seen in Fig. 7). In this position, the shaft 45 and knife 43 are in inoperative position of the latter and knife 43 is clear of the outer end of platform 36. Energization of coil 66 draws plunger 69 inwardly of the coil (to the left as seen in Fig. 7) rotating crank 70 and with it shaft 45 and knife 43 to a cutting off position to sever the tape 16a projecting beyond the forward edge of platform 36.

The operations effected by the two solenoid coils 48 and 66 upon energization in timed sequence is first a forward feed of the tape 16a upon energization of coil 48 to project the tape 16a beyond the forward edge of platform 36, and subsequent thereto, upon energization of coil 66 while coil 48 is deenergized to effect a cutting operation on tape 16 by knife 43, and thereafter deenergization of coil 66 to permit knife 43 to return to its initial inoperative position clear of the path of the tape at the end of the platform 36. The two coils are separately energized from separate electric circuits to be described and neither is energized at the same time as the other.

Timing control mechanism

Sequential and timed operation of the feed rollers 24, 29 and knife 43 by appropriate energization and deenergization of the solenoid coils 48 and 66 is effected by a detachable timing control mechanism C which is readily attachable to the printing machine R and electrically interconnected by multiple cable with the coils 48 and 66. In the embodiment shown, the timing control mechanism C comprises generally, two pairs of normally closed microswitches or equivalent switches 80, 81 and 82, 83, a pair of by-pass switches 84, 85 and mechanical parts for operating the four microswitches in a sequential manner to be described. While microswitches are described as used any other type of equivalent switch may be used and the term microswitches as used herein is intended to include such equivalent switches.

A shaft 86 (Fig. 13) is rotatively supported in bearings 86a at opposite side walls 87, 88 of a casing. This shaft 86 carries a worm 89 fixed thereto. Outwardly of wall 87, a switch operating disc 90 is secured to rotate with shaft 86. The two switches 80, 81 are attached to the side 87 of the box so that their respective operating levers 80a and 81a engage the periphery of disc 90 at different points. The diameter of disc 90 is such that this engagement of the levers 80a and 81a maintains open circuit in each normally closed switch 80 and 81. A single notch or recess 90a (Fig. 12) is provided in the periphery of disc 90 and the depth of this notch or recess 90a is such that when alined with either one of the two switch levers 80a and 81a it permits that one of the two switches 80 or 81 to move to a

circuit closing position. Thus with each complete rotation of disc 90 each switch is closed once only while the notch or recess 90a is alined with its operating lever and maintained open during the remainder of the period of rotation of disc 90. Switch 81 is closed only after a 180° of rotation of disc 90 from the closing position of switch 80.

A ratchet wheel 91 is fixed to the shaft 86. A pawl 92 engaging the teeth of wheel 91 and pivotally secured at 93 to the wall 87 of the casing and biased by a spring 94 pemits one-way rotation only of ratchet wheel 91. Step-by-step one-way rotation of wheel 91 (counterclockwise as seen in Fig. 14) is effected by a reciprocally movable lever 95 engageable successively with the teeth of wheel 91. This lever is loosely pivoted at 96 to a bracket part 97 secured to the wall 88. A shackle link 98 pivoted loosely to the lever 95 intermediate its ends is pivotally secured at 99 to a reciprocally movable solenoid plunger 100 movable vertically into and out of a solenoid coil 101 carried in a core frame 102 secured at 103 to another side wall 104 of the casing. A biasing spring 105 attached at one end to the lever 95 and at its opposite end to a stud 106 mounted on wall 87 biases the lever 95 toward feeding engagement with the successive teeth of ratchet wheel 91. Energization of solenoid coil 101 draws plunger 100 downwardly and with it rotates lever 95 downwardly about its pivot 96 against the biasing action of spring 105. Deenergization of coil 101 releases plunger 100 and the retracting action of spring 105 then draws lever 95 upwardly against a straight side of a tooth 91a of ratchet wheel 91, the stroke of plunger 100 being limited so that the retracting action of spring 105 causes a single tooth advance of wheel 91 each time the coil 101 is energized and deenergized once. The laterally located limit stud 106' fixed to wall 104 of the casing prevents excessive side motion of the lever 95 during its upward feeding stroke and limits feed rotation of wheel 91 to a single tooth at a time. Thus step-by-step rotation of shaft 86 is effected. In the present embodiment, fifty teeth 91a are provided on the ratchet wheel 91 so that fifty complete reciprocations of lever 95 are required to complete a single revolution of ratchet wheel 91 and with it shaft 86.

A second shaft 109 is rotatively supported in bearings 109a at opposite side walls 104 and 110 of the casing. A worm gear 111 which meshes with the worm 89 is secured to the shaft 109 and the gear ratio of the worm and worm gear is selected so that ten revolutions of the worm causes one complete revolution of worm gear 111. Thus, since ratchet wheel 91 requires fifty reciprocations of lever 95 for one revolution, five hundred reciprocations of lever 95 are required to produce a single revolution of worm gear 111 and its supporting shaft 109.

A pair of switch operating discs 112, 113 are secured to the shaft 109 outwardly of the wall 110. Disc 112 has five equally spaced-apart notches or recesses 114 in its periphery 72° apart. Disc 113 has a single recess or notch 115 in its periphery. The notch 115 of disc 113 is positioned to be centralized relative to two notches 114 of disc 112 as seen clearly in Figs. 15 and 16. The pair of microswitches 82 and 83 are secured to the side wall 110 so that their operating levers 82a and 83a respectively engage the peripheries of the respective discs 112, 113, lever 82a operating on the periphery of inner five notched disc

112 and lever 83a on the periphery of outer single notched disc 113. Except when one of the notches 114 lies alined with lever 82a or the notch 115 lies alined with lever 83a, both switches 82 and 83 are maintained in open circuit condition by surface engagement of discs 112 and 113, respectively, with levers 82a and 83a. Thus, in a single rotation of shaft 109, switch 82 will close five times while switch 83 will close but once. The relative position of the notch 90a of the disc 90 on shaft 86 and of the notches 114 and 115 on discs 112 and 113 on shaft 109 is such that the notch 90a of disc 90 will lie alined with lever 80a of switch 80 at the same time notch 115 lies alined with switch lever 83a of switch 83 and one of the notches 114 lies alined with switch lever 82a of switch 82 for purposes presently to be described.

Electric circuits

The four microswitches 80, 81, 82 and 83 are connected in electric circuits to provide properly timed energization of the feed solenoid coil 48 and cutter solenoid coil 66. In the embodiment shown, as illustrated diagrammatically in Fig. 17, a terminal prong 120 in a connector block B is connected by a wire 121 to the fixed contact 122 of the microswitch 80 and also by wire 123 to the movable contact 124 of the microswitch 81. The movable contact 125 of microswitch 80 is connected by a wire 126 to the movable contact 127 of microswitch 83 and also by wire 128 to the fixed contact 129 of the by-pass switch 85. The movable contact 130 of the by-pass switch 85 is connected by wire 131 to the fixed contact 132 of by-pass switch 84 and by wire 133 to the movable contact 134 of microswitch 82. The latter contact 134 is also connected by wire 135 to the stationary contact 136 of microswitch 83. The stationary contact 137 of microswitch 82 is connected by wire 138 to the movable contact 139 of by-pass switch 84 and by wire 140 to a prong 141 of the block B. One terminal of the feed solenoid 48 is connected by wire 142 to the prong socket 142a in the connector block F. The second terminal of solenoid 48 is connected by wire 143 to one terminal of the cutting solenoid coil 66 whose other terminal is connected by wire 144 to the prong socket 145 which mates with a prong terminal 146 in block B. Prong 146 is connected by wire 147 to the fixed contact 148 of microswitch 81. Wire 143 is connected by wire 149 to a terminal 1 of a power source M. Wire 149a is connected to a prong socket 150 and to one terminal of a normally open microswitch 152. The other terminal 153 of switch 152 is connected by wire 154 to one terminal of a normally closed manually operable switch N whose other terminal is connected by wire 154a to one terminal 1 of the power source M. The switch N may be opened at will by the operator to compensate for sheets withdrawn during counting for inspection or other purposes. A prong 155 of the block B which mates with prong socket 150 is connected by a wire 156 with one terminal of the ratchet wheel operating solenoid coil 101 whose other terminal is connected by a wire 157 with the wire 121. A prong socket 158 which mates with prong 120 is connected by wire 159 with the second terminal 2 of the power source M.

The normally open microswitch 152 is secured to the press R adjacent an arm 160 or other moving part thereof which moves to a given position once for each sheet delivered to the pile P. The operating lever 152a of the switch 152 is positioned in proximity to the given position of arm 160. This arm once during each delivery of a sheet to pile P momentarily engages and operates member 152a to close an electrical circuit through the switch 152 for a purpose to be described. Except when arm 160 engages switch lever 152a, the switch 152 remains open. Switch 152 and arm 160 may be replaced by any other circuit closing arrangement, for example, an electric eye arrangement that will close the circuit from terminal 1 of the power source to wire 149a once for each delivery of a sheet by the press to the pile P. Switch 152 and arm 160 and wires to be described are the only physical end electrical connection needed between the press R and the portable mechanism.

For convenience, the casing supporting the microswitches 80, 81, 82, 83 is attached to the press. When this is done, the switch 152 can be secured to the casing supporting the other microswitches 80, 81, 82 and 83 and the latter secured to the press so that operating lever 152a of switch 152 will lie in needed and above described proximity to arm 160 of the press R.

Operation (fifty count)

Assuming a condition where no sheets are present on the platform S, the by-pass switches 84 and 85 both close, thus short circuiting out microswitches 82 and 83, microswitches 80, 81, 82 and 83 all being open with the notch on switch control disc 90 just beyond and clear of the operating arm 80a of switch 80 in the direction of rotation of said disc 90 and the notch 115 of disc 113 just beyond and clear of operating arm 83a of switch 83 and one of the notches 114 of disc 112 just beyond and clear of the operating arm 82a of switch 82, and arm 160 clear of the notch lever 152a of microswitch 152 on the press so that microswitch 152 is open; and that prongs of the block R are inserted into the mating prong sockets on the female connector F and that wires 154 and 159 are connected to the respective terminals 1 and 2 of the power source M. At this time, the knife 43 is in inoperative condition and tape feed rollers 24 and 29 are stationary.

When a sheet is delivered to press pile P, the arm 160 moves to the switch closing position of microswitch 152. Electric current then flows from the terminal 1 of power source M via wire 154, switch contacts 153 and 151 of the switch 152, wire 149, a prong socket 150, prong 155, wire 156, through coil 101, wire 157, wire 121, prong 120, prong socket 158 and wire 159 to the terminal 2 of the power source M. This energizes coil 101 and draws in its plunger 100 thereby drawing lever 95 away from the teeth of ratchet wheel 91 against the action of spring 105. For the next fifty delivery sheets to the pile, the arm or lever 160, closes switch 152 momentarily once during each delivery operation. Each such switch closing momentarily energizes solenoid coil 101 and during each such energization arm 95 is drawn away from ratchet wheel 91. As soon as switch 152 opens as arm 160 moves away from switch lever 152, the coil 101 is deenergized and feeding arm 95 is drawn upwardly by spring 105 to advance ratchet wheel 91 one tooth 91a. In fifty deliveries of sheets to the pile P, ratchet wheel 91 is advanced fifty teeth or one complete revolution with one corresponding complete revolution of shaft 86 and with it switch control disc 90. Just as disc 90 completes its single revolution, its notch 90a becomes alined with switch

lever 80a so that microswitch 80 closes. At the same time because of the one to ten ratio between worm 89 and worm gear 111, the latter, its shaft 109 and discs 112 and 113 completes only one-tenth of a revolution so that none of the notches 114 or 115 are then alined with switch lever 82a or 83a. Since both these switches 82 and 83 are short circuited out or by-passed by closed switches 84 and 85, this is immaterial. However, because switch 80 has been closed electric current flows from the terminal 1 of power source M via wire 149, wire 143, through feed solenoid coil 48, wire 142, prong socket 142a, prong 141, wire 140, terminals 139 and 132 of closed by-pass switch 84, wire 131, terminals 130 and 129 of closed by-pass switch 85, wire 123, terminal 127 of microswitch 83, wire 126, closed contacts 125 and 122 of closed microswitch 80, wire 121, prong 120, prong socket 158 and wire 159 to the terminal 2 of power source M. This energizes feed solenoid coil 48 drawing its plunger in a feeding stroke to pull chain 60 against the action of its spring 62 and thereby rotate feed roller 24 in a feeding direction, and simultaneously through gears 33 and 34 also to rotate feed roll 29 in feeding direction. This advances tape 16a forwardly over the fiftieth sheet in the pile P. This same cycle repeats itself for every fifty operations of press arm 160, e. g., one hundredth, one hundred and fiftieth, two hundredth, etc. On the fifty-first operation of arm 160, and each fifty revolutions thereafter the ratchet wheel 91 is advanced one fiftieth of a revolution causing recess 90a to become misalined with lever 80a of switch 80, opening the latter switch and thus deenergizing solenoid coil 48 since its power circuit just described is broken at the contacts 122, 125 of said microswitch 80. Spring 62 then retracts solenoid plunger 49, without further feed movement of rollers 24 and 29 because of the one-way clutch 54, 58, 57 hereinbefore described. On the seventy-fifth operation of press arm 160, the ratchet wheel 91 has rotated the disc 90 and its recess 90a so that the latter is alined with switch operating lever 81a of microswitch 81 permitting the latter to close. Microswitches 80, 82 and 83 are open at this time because their levers are misalined with any of the recesses 90a, 114 or 115. With microswitch 81 closed, current flows from the terminal 1 of the power source M via wire 149, wire 143, through cut-off solenoid coil 66, wire 144, prong socket 145, prong 146, wire 147, contacts 148 and 124 of closed microswitch 81, wire 121, prong 120, prong socket 158 and wire 159 to the terminal 2 of power source M. Solenoid coil 66 thus is energized and actuates its plunger 69 to operate knife 43 in a cutting direction severing the portion of the tape 16a deposited on top of the fiftieth sheet from the tape on the platform 36 at the forward edge of the latter, leaving a projecting tab T lying on the fiftieth sheet and projecting outwardly of the pile P at one side thereof as seen in Fig. 1. This same circuit is established every fifty further operations of press arm 160, namely, at the one hundred and twenty-fifth, one hundred and seventy-fifth, etc., operations of the latter. On the seventy-sixth operation of the press arm 160 and each fifty operations thereafter, ratchet wheel 91 is rotated one fiftieth of a revolution, misalining disc recess 90a with switch lever 81a causing microswitch 81 to open and to thus deenergize cutting off solenoid coil 66 so that knife 43 is restored to its non-cutting position by action of the biasing spring 74.

Thus a tab T is deposited in the pile P over every fifty sheets so that visual and physical indicia of fifty sheet counts is available in the pile.

Operation (one hundred count)

In order to vary the count so that a tab T will lie deposited on each one hundredth sheet delivered to the pile P instead of to each fiftieth sheet as just described, the same initial settings are assumed except that by-pass switch 84 is opened while by-pass switch 85 remains closed, short-circuiting out microswitch 83. The opening of by-pass switch 84 places microswitch 82 in the electric circuit of feed solenoid coil 48 and in series with microswitch 80. In consequence, feed solenoid coil 48 will not be energized unless both microswitches 80 and 82 are closed simultaneously. Because recesses 114 on switch control disc 112 are 72° apart, and the gearing ratio between worm 89 and worm gear 111 is one to ten, a recess 114 and the recess 90a will only become simultaneously alined with the respective switch levers 82a and 80a at each one hundred operations of press arm 160 to then permit switches 82 and 80 to close simultaneously. For example, at the completion of the one hundredth operation of press arm 160, a closed electric circuit from the terminal 1 of source M is established via wire 149, wire 143 through feed coil 48, wire 142, prong socket 142a, prong 141, wire 140, contact 139, wire 138, closed contacts 137, 134 of microswitch 82, wire 133, wire 131, contacts 130, 129 of closed by-pass switch 85, wire 128, contact 127, wire 126, closed contacts 125, 122 of closed microswitch 80, wire 121, prong 120, prong socket 158, and wire 159 to the terminal 2 of the power source M. Thus, solenoid coil 48 is energized for feeding at each one hundred operations of press arm 160 as previously described. On the one hundred and first operation of press arm 160 and each one hundred operations thereafter, the recess 90a moves to a position to open switch 80 and thereby deenergize feed coil 48. As with the fifty count operation, the knife 43 is operated to cut-off position on the twenty-fifth, seventy-fifth, one hundred and twenty-fifth, etc., operations of press arm 160 and each fifty operations thereafter as hereinbefore described. It is only effective, however, to cut off tape 16a at the one hundred and twenty-fifth and each one hundred operations thereafter because tape is fed forwardly only at one hundred operation intervals of press arm 160.

Operation (five hundred count)

In order to vary the count further so that a tab T will be deposited on each five hundredths sheet delivered to the pile P instead of each fiftieth or one hundredth sheet as described above, the same initial settings of the fifty count operation are assumed except that by-pass switch 85 is opened while by-pass switch 84 is again closed short-circuiting out microswitch 82. The opening of by-pass switch 85 places microswitch 83 in the circuit of the feed solenoid coil and in series electrical connection with microswitch 80. In consequence, feed solenoid coil 48 will not be energized unless both microswitches 80 and 83 are closed simultaneously. Because there is only one recess 115 on switch control disc 113, and the gearing ratio between worm 89 and worm gear 111 is one to ten, the recess 115 on disc 113 and the recess 90a on disc 90 will only become

alined simultaneously with the respective switch levers 83a and 80a at each five hundred operations of press arm 160 to then permit simultaneous closing of switches 83 and 80. For example, at the completion of the five hundredth operation of press arm 160 a closed electric circuit is established from the terminal 1 of source M via wire 149, wire 143, through feed coil 48, wire 142, prong socket 142a, prong 141, wire 140, closed contacts 139, 132 of closed by-pass switch 84, wire 133, wire 135, closed contacts 136, 127 of closed microswitch 83, wire 126, closed contacts 125, 122 of closed microswitch 80, wire 121, prong 120, prong socket 158 and wire 159 to the terminal 2 of power source M. Thus, solenoid coil 48 is energized for feeding at each five hundredth operation of press arm 160 as previously described. On the five hundred and first operation and each five hundred operations thereafter of press arm 160, the recess 90a moves to a position to open switch 80 and thereby to deenergize feed coil 48. As with the fifty count operation, the knife 43 is operated to cut-off position on the twenty-fifth, seventy-fifth, etc., operation of press arm 160 and each fifty operations thereafter as hereinabove described. It is only effective, however, to cut off tape 16a at the one thousand and twenty-fifth and each five hundred operations thereafter, because tape is fed forwardly only at five hundred operation intervals of press arm 160.

The use of the three microswitches 80, 82 and 83 and the two by-pass switches 84 and 85 thereby provides a simple adjustable means for varying the count of paper delivered to pile P. While fifty, one hundred and five hundred count operations are described, it is obvious that other count operations may be provided by changing the number of teeth on the ratchet wheel 91, or by changing the gear ratio between worm 89 and worm gear 111 and the number of recesses on disc 112. For example, with a one to five gear ratio, and with by-pass switch 85 open and with by-pass switch 84 closed, the count will be two hundred and fifty because shaft 109 and with it disc 113 will complete a single revolution for every two hundred and fifty operations of press arm 160. Other variations are also possible.

The construction hereinbefore described thus provides a portable device readily installed in connection with existing printing presses without any material modification thereof and which may be moved from press to press to provide automatic tallying count of determined numbers of printed sheets, together with automatic insertion of visual tabs in the pile at the location of the final sheet of each determined count of delivered sheets in the pile. It eliminates entirely the tedious manual handling and manual counting heretofore practiced and the inaccuracies inherent in such manual procedure as well as dangers of offset and spoilage.

While the device is described in conjunction with sheets delivered from a printing press, it is obvious, however, that it may be utilized with any machine delivering sheet-like articles to a pile for similar purposes.

While a specific embodiment of the invention has been described and illustrated, variations in structural detail within the scope of the claims are possible and are contemplated. There is no intention, therefore, of limitation to the exact details shown and described.

What is claimed is:

1. For use with a machine arranged to pile sheets individually at a reception point and having a movable part whose movement is synchronized with the delivery of individual sheets to said point, an electric switch positioned relative to said movable part to be operated once for each sheet delivery movement of said part, a rotatable shaft, an electric circuit including said switch, a step by step electrically operated rotating mechanism connected in said circuit for rotating said shaft one step each time said step by step mechanism is actuated by operation of said switch, switch operating means connected to said shaft, a pair of electric switches in said circuit adapted each to be operated by said switch operating means in sequence and at different times relative to each other once for each complete rotation of said shaft, a tab strip feeding mechanism, means for electrically operating said mechanism, a cutting-off mechanism for severing tabs from said strip, an electric means for operating said cutting-off mechanism, one of said pair of electric switches being connected in series with said means for operating said tab strip feeding mechanism and the other switch being connected in series with said electric means for operating the cutting-off mechanism, a second rotatable shaft geared to said first-mentioned shaft with a determined gear ratio, a switch operating disc secured to said second shaft for rotation therewith and having a recess in its periphery, an additional switch in series connection with the first-mentoned of said pair of switches and adapted to be operated by said last-named disc and said last-named switch having an operating lever in contact with the periphery of said disc and positioned to maintain said last-named switch in open circuit except when its operating lever engages in the recess of said disc.

2. The combination of claim 1 including an additional switch operating disc secured to said second shaft for rotation therewith and having a plurality of recesses in its periphery, and an additional switch in electrical series connection with the first-mentioned of said pair of switches and adapted to be operated by said last-named additional switch operating disc and having an operating lever in contact with said last-named periphery and positioned to maintain said last-named switch in open circuit except when its operating lever engages in one of the recesses of said last-named additional disc.

3. The combination of claim 1, wherein said second rotary shaft has a worm gear secured thereto and said first-named shaft has a worm secured thereto, the gear ratio between the worm and said worm gear being one to ten.

4. The combination of claim 1 including a by-pass switch for short-circuiting out said additional switch as desired.

5. The combination of claim 1, wherein said step-by-step rotating mechanism includes a toothed ratchet wheel on said shaft, a solenoid coil, a solenoid plunger, a pivotally supported tooth engaging lever connected to said plunger, and biasing means for drawing said lever into feeding engagement with the teeth of said ratchet wheel.

6. The combination of claim 5, wherein said ratchet wheel has fifty teeth.

7. For use with a machine arranged to pile sheets at a reception point and having a movable part whose movement is synchronized with the delivery of individual sheets to said point, an electric switch adapted to open and close once for each delivery movement of said part, mecha-

nism for feeding a tab strip to said pile, electric means for actuating said feeding mechanism, mechanism for cutting a tab from said strip, electric means for operating said cutting mechanism at different times relative to said tab strip feeding mechanism, an electric circuit in which said switch and electric means for actuating the tab strip feeding and tab cutting mechanisms are connected, a second switch, in series with said electric means for actuating said tab strip feeding mechanism, a third switch, in series with said electric means for actuating said tab cutting mechanism, automatic means for periodically closing said second and third switches at different times, said second and third switches being adapted to normally remain in open position, a fourth switch, in series with said second switch and adapted to normally remain in open position, means for periodically closing said fourth switch in synchronism with but at less frequent intervals than said second switch, a by-pass circuit around said fourth switch, and manually controlled means for electrically connecting said fourth switch in series with said second switch and opening said by-pass circuit.

8. The combination in accordance with claim 7 including a fifth switch, adapted to normally remain in open position, said switch being connected in the circuit so that it can be either by-passed or connected in series with switch two, automatic means for periodically closing the fifth switch in synchronism with but at less frequent intervals than said second switch and at different intervals from said fourth switch, and manually controlled means for electrically connecting said fifth switch in series with said second and fourth switches.

9. The combination in accordance with claim 8 in which the means for closing said fourth switch is adapted to close it at less frequent intervals than said fourth switch.

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