Aug. 21, 1928.

1,681,652

L. K. ALDRICH

DUPLICATING MACHINE DRIVE AND FEED

Filed Jan. 5, 1927

4 Sheets-Sheet 1

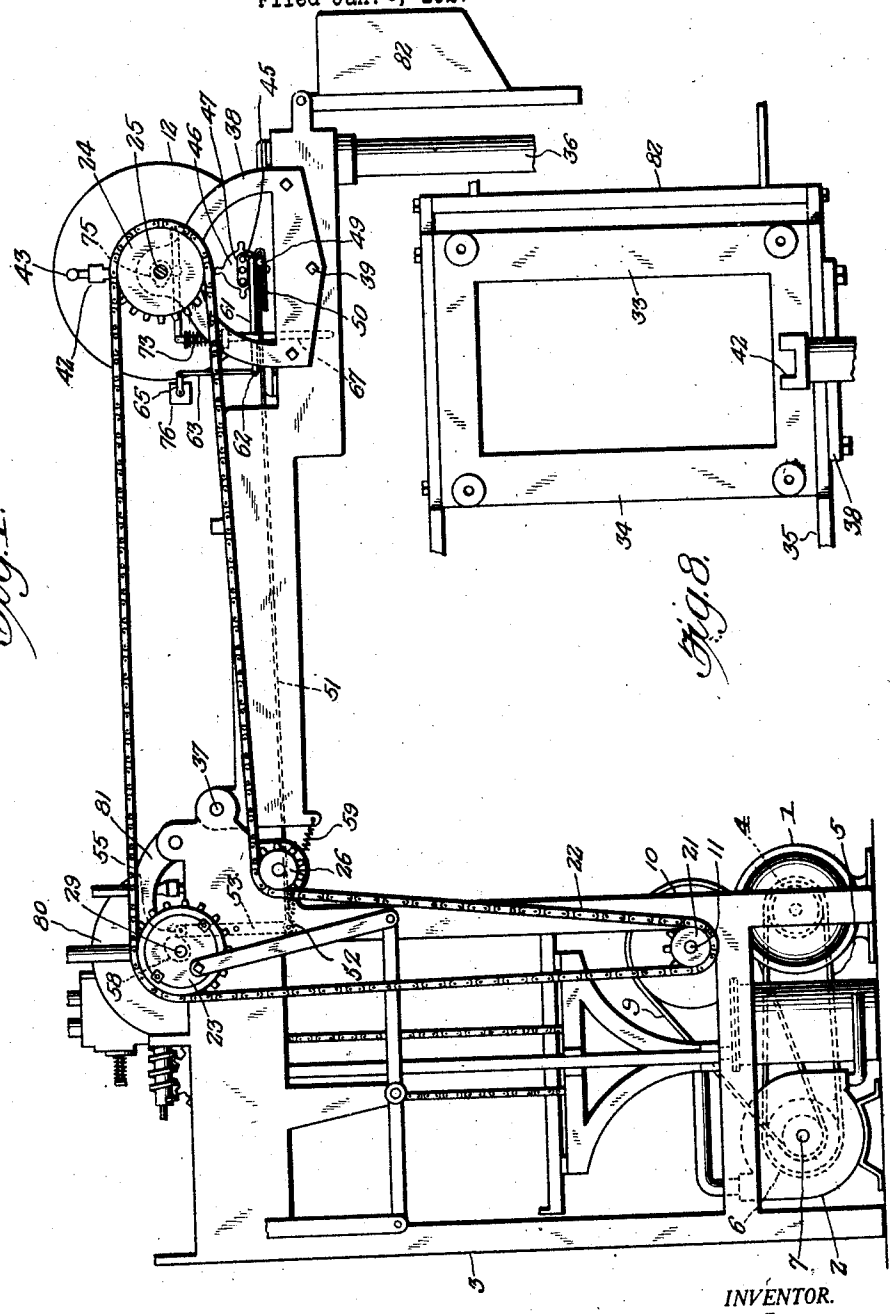


Fig. 1.

Fig. 8.

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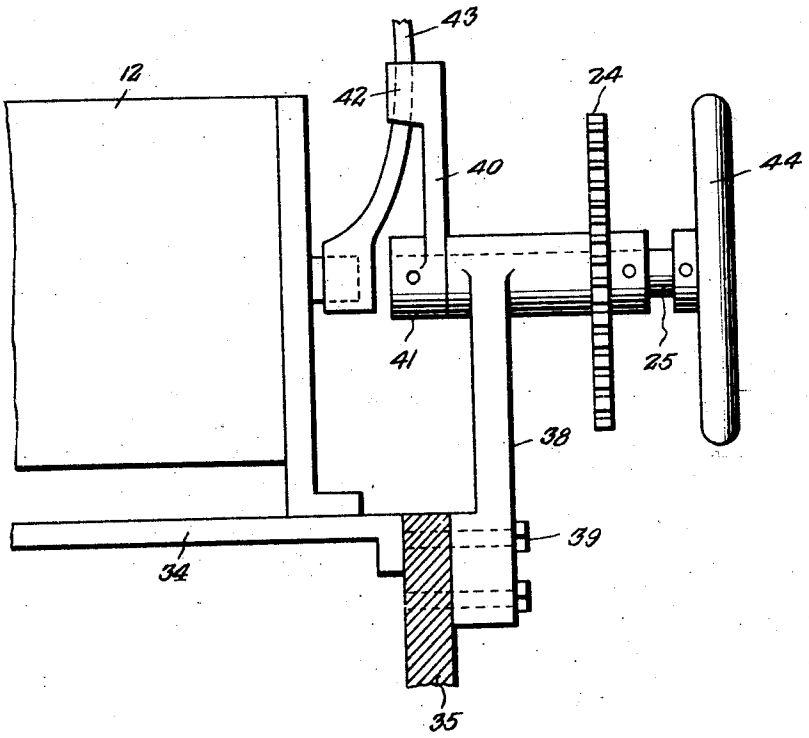
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DUPLICATING MACHINE DRIVE AND FEED

Filed Jan. 5, 1927 4 Sheets-Sheet 2

Fig. 2.



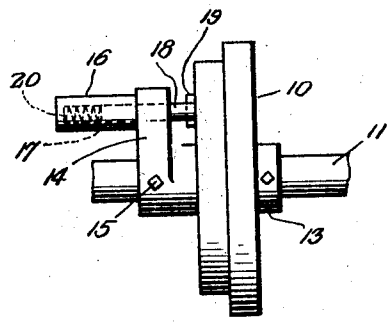


Fig. 5.

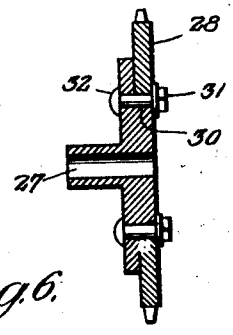


Fig. 6.

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DUPLICATING MACHINE DRIVE AND FEED

Filed Jan. 5, 1927 4 Sheets-Sheet 3

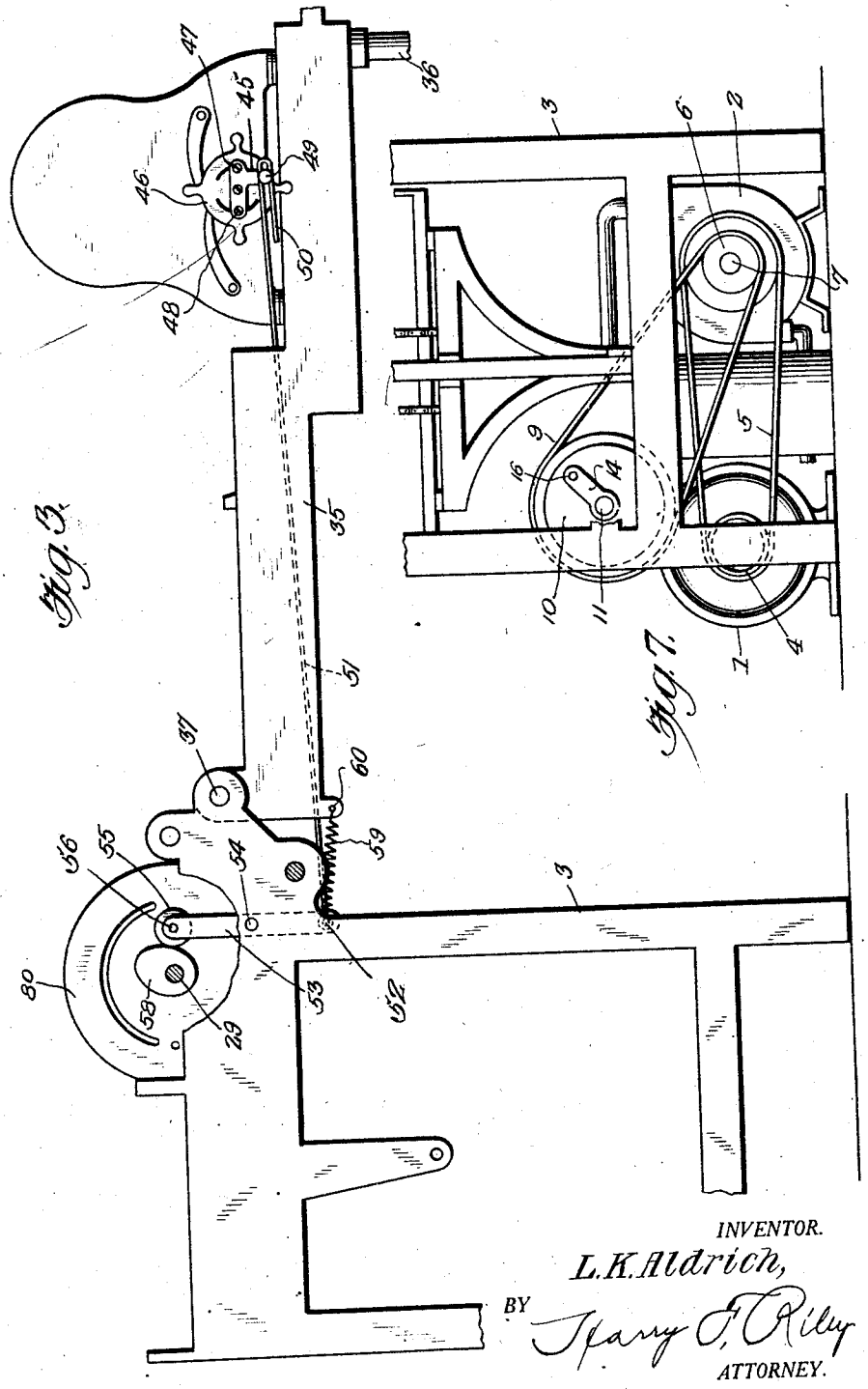


Fig. 3.

Fig. 7.

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DUPLICATING MACHINE DRIVE AND FEED

Filed Jan. 5, 1927 4 Sheets-Sheet 4

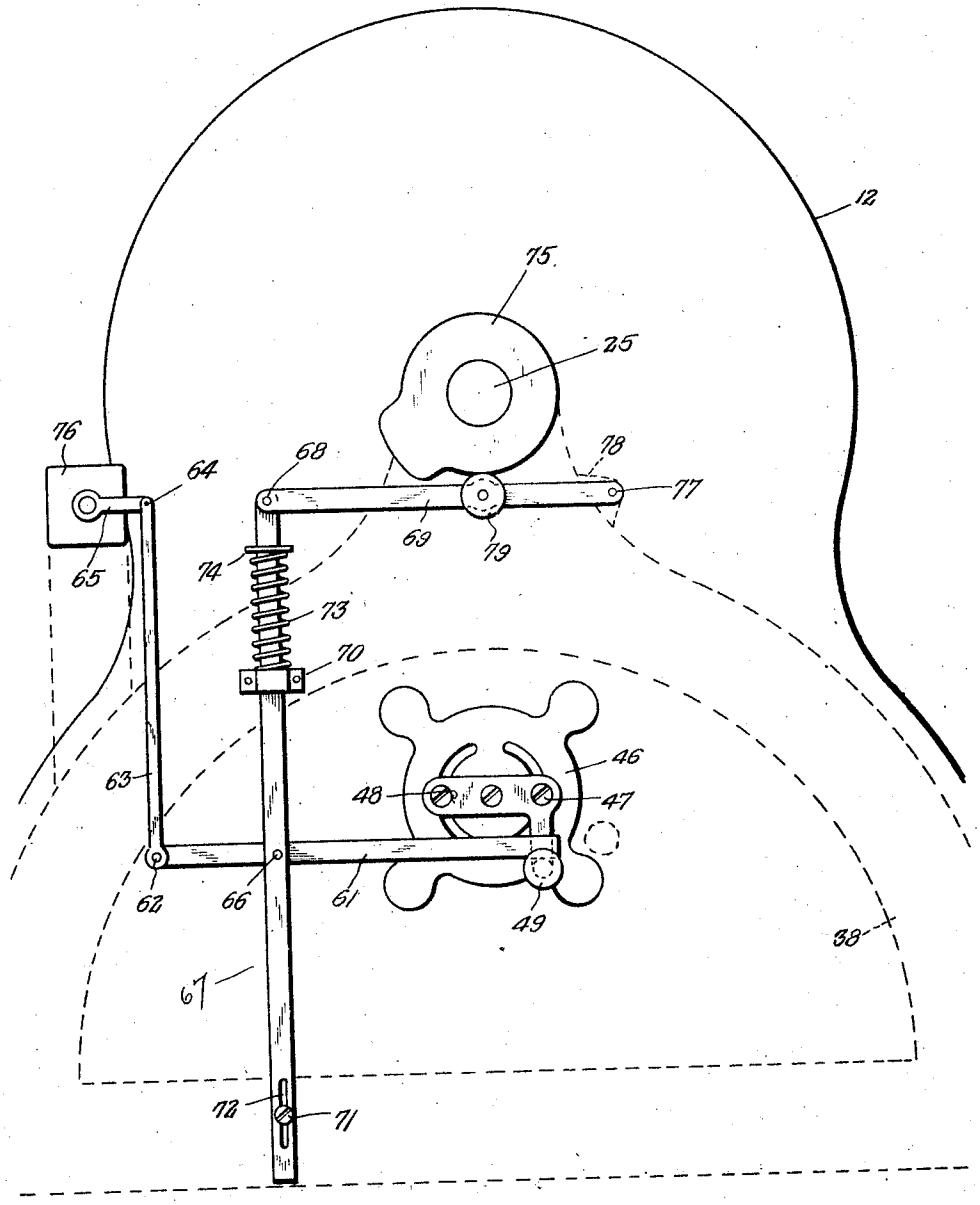


Fig 4.

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Patented Aug. 21, 1928. 1,681,652

UNITED STATES PATENT OFFICE.

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DUPLICATING-MACHINE DRIVE AND FEED.

Application filed January 5, 1927. Serial No. 159,137.

The invention relates to mechanism for driving and feeding a duplicating machine and for counting the printed sheets.

The object of the present invention is to enable an ordinary duplicating machine to be associated with a feeder and to be fed by the same and to be driven by the motor for driving the feeder and to provide simple, practical and efficient mechanism of strong, durable and comparatively inexpensive construction adapted for automatically operating the throw off mechanism of the duplicating machine for returning the impression or platen roller to its printing position after the throw off mechanism has operated and moved the impression or platen roller to its inoperative position.

A further object of the invention is to provide simple, practical and efficient mechanism cooperating with and controlled by the throw on mechanism for actuating a counter for counting the printed sheets.

Another object of the invention is to provide counter actuating mechanism which will be automatically thrown into and out of operation by the throw off and throw on mechanism whereby the counter will be operated only when a sheet is printed so that the number of printed sheets will be accurately counted.

Another object of the invention is to relieve the duplicating machine of the slight disturbances and wear on the gears thereof incident to driving the duplicating machine by intermeshing a gear of the driving mechanism with a gear of the duplicating machine and thereby afford better printing.

With these and other objects in view, the invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings and pointed out in the claims hereto appended, it being understood that various changes in the form, proportion and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:—

Figure 1 is a side elevation of a feeder provided with duplicating machine driving and throw on and counter actuating mechanism constructed in accordance with this invention, parts of the feeder being removed for convenience of illustrating the devices of the present invention.

Fig. 2 is an enlarged detail transverse sectional view partly in elevation illustrating the construction for connecting the driving mechanism with the ordinary operating handle of a duplicating machine.

Fig. 3 is a side elevation partly in section illustrating the construction of the throw on mechanism for returning the rotary platen to its operative position.

Fig. 4 is an enlarged detail side view illustrating the construction of the counter actuating mechanism.

Fig. 5 is a detail sectional view illustrating the construction of the ratchet device for connecting the driving shaft with its pulley.

Fig. 6 is a detail sectional view illustrating the construction of the sectional sprocket wheel of the duplicating machine drive.

Fig. 7 is a partial side elevation of the opposite side of the machine from that illustrated in Figure 1.

Fig. 8 is a plan view of the duplicating machine receiving portion of the extension frame.

In the accompanying drawing in which is illustrated the preferred embodiment of the invention 1 designates an electric motor for driving the feeder and for operating the vacuum pump 2 thereof and for also actuating the duplicating machine drive forming a part of the present invention. The feeder is preferably of the continuous rotary suction nozzle type such as is illustrated and described in my co-pending application No. 146,499. As the particular construction of the feeder is not claimed in the present invention only so much of the construction thereof as is necessary to a full and complete understanding of the present invention will be shown and described.

The motor 1 which may be of any preferred construction is mounted upon the frame 3 of the feeder at the bottom thereof as clearly illustrated in Fig. 1 of the drawing and it has mounted on its motor shaft a pulley 4 which is connected by a belt 5 with a pulley 6 fixed to the vacuum pump shaft 7. The pulley 6 is a two step cone pulley which is connected by a belt 9 with a two step cone pulley 10 of a transverse drive shaft 11 journaled in suitable bearings of the frame of the feeder and located above the motor. The pulley 4 is of less diameter than the pulley 6 and the pulley 6 is

of less diameter than the pulley 10. The diameter of these pulleys may, of course, be varied to secure the desired reduction of the speed and a proper application of the power of the motor to the drive shaft.

The drive shaft 11 is connected by a ratchet device with the pulley 10 to permit turning the duplicating machine 12 without turning the pump and the motor. The pulley 10 is loose on a drive shaft and is arranged between a set collar 13 and an arm 14 secured to the drive shaft by a set screw 15 or other suitable means and provided at its outer portion with a lateral extension 16 having a bore or opening 17 in which is mounted a spring actuated dog 18 adapted to engage a ratchet tooth 19 of the pulley 10. The dog preferably consists of a pin mounted in the bore or opening 17 and a spring 20 is interposed between the inner end of the pin and the end wall of the bore or opening 17. The bore or opening 17 extends from the inner face of the arm 14 outwardly to within a short distance of the outer end of the lateral extension 16 and it terminates short of the outer end thereof to provide a seat or abutment for the coiled spring 20. One or more of the teeth 19 may be provided and they form a shoulder at one end and are beveled to the opposite end to permit the dog to ratchet over the teeth when the drive shaft is rotated in one direction independently of the pulley 10. The rotation of the pulley 10 by the motor engages the tooth 19 with the dog and actuates the drive shaft. The ratchet device will permit an adjustment of the press in the feeder without turning the motor and the pump.

The drive shaft 11 has mounted on it a sprocket pinion 21 which drives a roller sprocket chain 22 which extends upwardly from the drive shaft to a sprocket wheel 23 of the suction disk shaft of the feeder and the said sprocket chain extends horizontally from the sprocket wheel 23 to a sprocket wheel 24 of a short transversely disposed shaft 25 which carries means hereinafter described for actuating the duplicating machine 12. The sprocket chain after passing around the sprocket wheel 24 extends horizontally from the underside thereof to an idler sprocket pinion 26 mounted upon the frame of the feeder and located above the sprocket pinion 21 of the drive shaft. The sprocket wheels 23 and 24 are of the same diameter and in order to enable the time of the feeder to be changed to correspond with any change or adjustment of the duplicating machine the sprocket wheel 23 is composed of a hub section 27 and a rim section 28. The hub section which is suitably secured to the section disk shaft 29 is provided with a circumferential recess 30 in its outer face and the rim section 28 is clamped in the recess by means of nuts 31 engaging the threaded ends of screws 32 mounted on the hub section of the sprocket wheel 23 and projecting from the front face thereof as clearly illustrated in Fig. 6 of the drawings. In practice the hub section of the sprocket wheel 23 constitutes the crank element for operating the mechanism for raising the platform upon which the stack of paper is placed. When any change in the time of the duplicating machine is made in the usual well known manner it is only necessary to loosen the two nuts 31 and change the time of the feeder to correspond with the change in the time of the duplicating machine press. When the rim section is removed the disk or hub section may be rotated independently of the rim section and in practice suitable time markings will be provided on the disk. This adjustment will enable the duplicating machine to print on different portions of the sheet according to the margins desired and when the rim section is replaced the starting of the sheets on the two machines will be in unison.

The duplicating machine is rigidly mounted upon cross bars or members 33 and 34 or frame members of an extension frame 35 forming an extension of the feeder frame and preferably composed of side members and transverse connecting members. The side members are provided with suitable supporting legs 36 located at the outer or rear end of the extension frame. The extension frame which in practice will be provided with suitable register mechanism may be of any desired construction and is secured at its inner end of the upper portion of the feeder frame by bolts 37 or other suitable fastening devices but the extension frame may be connected with the feeder frame in any other desired manner as will be readily understood. The construction shown and described is advantageous in manufacturing, assembling and handling the feeder and the mechanism for driving and operating the duplicating machine.

The short transverse shaft 25 is journaled in a suitable bearing of a bracket 38 secured by bolts 39 to one of the side members 35 of the extension frame. The shaft 25 is provided at its inner end with an arm 40 preferably consisting of a casing provided at its inner end with a sleeve 41 to fit on the shaft 25 and having spaced flanges or ears 42 at its outer end forming an intervening recess to receive the hand crank 43 of the duplicating machine 12 whereby the drive mechanism is connected with the duplicating machine and is adapted to rotate the same. For convenience of adjustment and in order to enable the duplicating machine to be turned by hand the shaft 25 is equipped at its outer end with a hand wheel 44. The hand wheel, the sprocket wheel and the driving arm 40 are suitably clamped to the shaft 25 and the bearing of the bracket which is extended laterally as shown is equipped with oil passages for

enabling the bearing to be lubricated. The duplicating machine is readily mounted upon the extension or register frame and its crank handle which is detachably interlocked with the driving arm may be readily engaged with and disengaged from the same. When the motor of the feeder is operated motion will be transmitted through sprocket gearing to the short transverse shaft and the duplicating machine will be positively driven without the use of round belts or gearing meshing with the gears of the duplicating machine with the resilient disadvantages of such a drive connection where there is more or less disturbances particularly when the gears begin to wear. Any wear or looseness of the gears will affect the printing and all of this is eliminated by the sprocket drive of the present invention.

The duplicating machine 12 is equipped with the usual construction for moving the rotary platen or impression roller to an inoperative position to prevent it from coming in contact with the ribbon or ink covered type when the feeder fails to feed a sheet of paper to the duplicating machine. As this is the ordinary construction with which the duplicating machine is equipped a specific description and illustration of the same is unnecessary. The present invention contemplates means for returning the platen automatically to its operative position after it has been moved to an inoperative position by the duplicating machine when there is a failure to feed a sheet to the duplicating machine. This throw on mechanism comprises in its construction a throw on arm 45 consisting of a plate of cast metal or other suitable material secured to the throw off disk 46 of the duplicating machine by the screws 47 which are employed in the duplicating machine for securing the said throw off disk to the ratchet disk of the duplicating machine. The throw on arm is adapted to be readily applied to the throw off disk by simply removing the screws 47 from the throw off disk and then passing the screws through suitable perforations 48 of the throw on arm. The throw on arm which is rigidly connected with the throw off disk by the said fastening devices 47 extends downwardly and rearwardly therefrom and is provided at its lower end with a laterally extending headed stud 49 which is arranged in a longitudinal opening 50 of an operating rod 51 extending longitudinally of the machine and pivoted at its front end by a pin or bolt 52 to the lower end of an upright lever 53. The lever 53 which is fulcrumed intermediate of its ends on a suitable pivot 54 of the feeder frame has upper and lower arms and the upper arm carries a roller 55 mounted on a suitable pivot 56 of the lever and engaged by a rotary cam 58 mounted on the suction disk shaft 29. The roller 55 of the cam actuated lever is maintained in engagement with the cam 58 by a coiled spring 59 connected at one end to the lower end of the lever and at its other end to one of the side members 35 of the extension or register frame. The spring is preferably secured to the pin or bolt 52 and to a cross shaft 60 of the extension frame. When the feeder is in operation the cam 58 rotates continuously and oscillates the lever 53 which reciprocates the operating rod 51. When the rotary platen of the duplicating machine is in operative position and the operating rod 51 is at the limit of its rearward movement as illustrated in Fig. 3 of the drawing the stud 49 is spaced a short distance from the rear end of the longitudinal opening 50 of the operating rod to permit the necessary movement of the throw on arm and the throw off mechanism and the operating rod 51 reciprocates without affecting the operation of the throw off mechanism by the duplicating machine mechanism. When, however, the throw off mechanism is operated by the mechanism of the duplicating machine through failure to feed a sheet to the duplicating machine the stud 49 will be carried from the position illustrated in full lines in Fig. 4 of the drawing to the position illustrated in dotted lines in the said figure, the opening formed by the loop of the rear end of the operating rod permitting such movement and when a sheet is fed to the duplicating machine by the feeder the throw on mechanism will be operated by the feeder and will move the platen of the duplicating machine to its operative position. As the particular construction of the duplicating machine and the operation of the throw off mechanism is well understood in the art, specific description and illustration thereof are unnecessary. The operating rod is pivotally connected at its front end to the lower end of the cam actuated lever and its rear portion is adapted to move up and down with the stud 49 in the arcuate movement thereof to and from the dotted line position illustrated in Fig. 4. While the longitudinal opening 50 is shown in the accompanying drawing as formed by a bend or loop of the rod 51 such a slot or opening may of course be provided in any other desired manner as will be readily understood.

The headed stud 49 of the throw on plate when in its normal operative position forms a fulcrum for the rear end of the lever 61 arranged approximately in a horizontal position and extending longitudinally of the machine and pivotally connected by a bolt 62 or other suitable pivot to the lower end of a rod 63 and the latter extends upwardly from the lever 61 and is pivotally connected at 64 to an arm of a counter 65 adapted to count the number of sheets printed by the duplicating machine. The lever is pivotally connected intermediate of its ends by a bolt 66 or other

suitable form of pivot to a vertically reciprocating rod 67 pivotally connected at its upper end at 68 to an approximately horizontal cam actuated lever 69. The vertically reciprocating rod 67 is mounted at its upper portion in a guide 70 and is guided at its lower portion by a screw 71 operating in a slot 72 extending longitudinally of the rod 67. The rod 67 which may be guided in any other suitable manner is urged upwardly by a coiled spring 73 disposed on the upper portion of the rod and interposed between the guide 70 and a pin 74 or other suitable device carried by the vertical reciprocating rod 67. The spring 73 maintains the lever 69 in engagement with a cam 75 mounted on the shaft 25 and rotating with the duplicating machine so that the counter will be operated at each rotation of the printing drum of the press. When the platen is in its normal operative position the lever 69 is moved downwardly by the cam 75 during each rotation of the printing drum and the downward movement of the cam actuated lever moves the rod 67 downwardly and the latter transmits movement to the lever 61 which is fulcrumed on the stud 49. This operates the counter 76. The cam actuated lever is moved upwardly by the spring which returns the parts of the counter actuating mechanism to their initial position ready for a second operation of the counting mechanism. The cam actuated lever 69 which extends longitudinally of the machine is pivoted at its rear end at 77 to an ear 78 of the bracket 38 by a bolt or other suitable pivot and the said lever 69 is provided intermediate of its ends with a roller 79 arranged to bear against the cam and adapted to be actuated by the same to swing the lever 69 downwardly for operating the counter. Should the feeder fail to feed a sheet to the duplicating machine the throw off mechanism of the latter will swing the arm 47 rearwardly beyond the rear end of the lever 61 and the latter will then fulcrum on the pivot 62 and idle without operating the counter. The counter which may be of any desired construction will be operated only when the stud is beneath the rear end of the lever 61 and the latter will its normal operative position. By this construction an accurate counting of the printed sheets is obtained and operation of the counter is prevented when a sheet is not being printed.

In the operation of the duplicating machine feed and drive, when the motor is operated motion is communicated through the drive shaft 11 to the sprocket wheels 23 and 24 and the sheet feeding mechanism of the feeder and the duplicating machine will be operated in timed relation. The sheet feeding mchanism of the feeder comprises the rotary suction nozzle 80 and the oscillatory winding arm 81 which as explained in the aforesaid application picks up a sheet from the stack, winds the same as explained in the aforesaid application and delivers the sheet to the rotary suction nozzle 80 which pulls off the sheet from the stack and feeds the same forward to the duplicating machine. The duplicating machine operates in the usual manner and the throw off mechanism thereof will be unaffected by the throw on mechanism of the present invention during the ordinary operation of the duplicating machine as the opening in the rear end of the operating rod 51 permits the necessary play or movement of the throw off plate in the ordinary operation of the duplicating machine. Should, however, the duplicating machine miss a sheet the throw off plate will move backwardly and rearwardly to the dotted line position shown in Fig. 4 and will be returned automatically to its operative position by the throw on mechanism as soon as a sheet is fed to the duplicating machine. It will also be clear that only the sheets actually printed will be counted by the counter as the operation thereof depends on the operative position of the throw off mechanism of the duplicating machine. The extension frame which may be readily attached to the main frame of the feeder is equipped at its outer end with a folding table 82. The folding table 82 which is adapted to be swung downwardly out of the way as shown is equipped with suitable means for supporting it in a horizontal position for use to receive the printed sheets from the duplicating machine. The duplicating machine is firmly held in position on the extension frame of the feeder by any suitable fastening means.

What is claimed is:

1. In a duplicating machine drive and feed, the combination of a feeder having a motor and sheet feeding mechanism, a duplicating machine supported by the feeder, and a duplicating machine drive actuated by the motor of the feeder and including a shaft having a driving arm located at one side of the duplicating machine and provided with means for engaging the hand crank of the duplicating machine.

2. In a duplicating machine drive and feed, the combination of a feeder having a motor and sheet feeding mechanism, a duplicating machine supported by the feeder, a duplicating machine drive actuated by the motor of the feeder and including a shaft having a driving arm located at one side of the duplicating machine and provided with spaced lugs forming a recess to receive the hand crank of the duplicating machine.

3. In a duplicating machine drive and feed, the combination of a feeder having a motor and sheet feeding mechanism, a duplicating machine supported by the feeder, a duplicating machine drive actuated by the motor of the feeder and including a shaft located at one side of the duplicating machine and provided at its inner end with a driving arm having means for engaging the hand

crank of the duplicating machine, a hand operated device mounted on the shaft at the outer end thereof and a gear on the shaft between the driving arm and the hand operated device for rotating the shaft.

4. In a duplicating machine drive and feed, the combination of a feeder having a motor and sheet feeding mechanism, a duplicating machine supported by the feeder, a duplicating machine drive actuated by the motor of the feeder and including a bearing bracket located at one side of the duplicating machine, a shaft journaled in the bearing bracket and provided at the inner side thereof with an arm having means for engaging the hand crank of the duplicating machine, and a gear mounted on the shaft at the outer side of the bracket for rotating the shaft.

5. In a duplicating machine drive and feed, the combination of a feeder having a motor and sheet feeding mechanism, a duplicating machine supported by the feeder, a duplicating machine drive actuated by the motor of the feeder and including a bearing bracket located at one side of the duplicating machine, a short transverse shaft mounted in the bracket in alignment with the shaft of the printing drum of the duplicating machine, a driving arm mounted on the inner end of the shaft and provided with means for engaging the hand crank of the duplicating machine, a hand operated device mounted on the outer end of the short transverse shaft, and a gear mounted on the short shaft and located between the driving arm and the hand operated device for rotating the short transverse shaft.

6. In a duplicating machine drive and feed, the combination of a feeder having a motor and sheet feeding mechanism, an extension frame, a duplicating machine mounted on the extension frame, a bearing bracket secured to the extension frame and located at one side of the duplicating machine, a short transverse shaft journaled in the bearing bracket and provided with means for connecting it with the duplicating machine, and a gear connecting the short transverse shaft with the sheet feeding mechanism of the feeder.

7. In a duplicating machine drive and feed, the combination of a feeder having a motor and sheet feeding mechanism, a duplicating machine supported by the feeder, and a duplicating machine drive including a short transverse shaft located at one side of the duplicating machine, means carried by the inner end of the shaft for connecting the same with the duplicating machine, and a gear mounted on the shaft for rotating the latter.

8. In a duplicating machine drive and feed, the combination of a feeder having a motor and sheet feeding mechanism, a duplicating machine mounted on the feeder, a short transverse shaft located at one side of the duplicating machine, means for connecting the said shaft with the duplicating machine, and sprocket gearing actuated by the motor and connected with the sheet feeding mechanism of the feeder and the short transverse shaft for driving the duplicating machine in timed relation with the sheet feeding mechanism of the feeder.

9. In a duplicating machine drive and feed, the combination of a feeder including a motor, a drive shaft, a pulley mounted on the drive shaft and actuated by the motor, a ratchet device connecting the drive shaft with the pulley and arranged to permit independent movement of the drive shaft, a duplicating machine supported by the feeder and a duplicating machine drive connecting the duplicating machine and the sheet feeding mechanism of the feeder with the drive shaft.

10. In a duplicating machine drive and feed, the combination of a feeder including a motor, a drive shaft actuated by the motor and sheet feeding mechanism, a duplicating machine mounted on the feeder and a duplicating machine drive including sprocket wheels connected with the sheet feeding mechanism and the duplicating machine, a sprocket gear mounted on the drive shaft, and a sprocket chain meshing with the sprocket gear of the drive shaft and with the said sprocket wheels for driving the duplicating machine in timed relation with the sheet feeding mechanism of the feeder.

11. In a duplicating machine drive and feed, the combination of a feeder including ing a motor located at the bottom of the feeder, sheet feeding mechanism, and a drive shaft located below the sheet feeding mechanism and actuated by the motor, a duplicating machine mounted on the feeder, a short transverse shaft located at one side of the duplicating machine, sprocket wheels connected with the sheet feeding mechanism and with the transverse shaft, a sprocket gear mounted on the drive shaft and a sprocket chain meshing with the gear of the drive shaft and with the said sprocket wheels, and an idler sprocket gear located above the drive shaft and receiving the said sprocket chain.

12. In a duplicating machine drive and feed, the combination of a feeder including a drive shaft and sheet feeding mechanism, a duplicating machine mounted on the feeder, a short transverse shaft located at one end of the duplicating machine and provided with means for connecting it with the same, sprocket wheels of uniform size connected with the sheet feeding mechanism and with the short transverse shaft, a sprocket gear connected with the drive shaft, and a sprocket chain meshing with the sprocket wheels and with the said sprocket gear for driving the duplicating machine in timed relation with the sheet feeding mechanism.

13. In a duplicating machine drive and feed, the combination of a feeder including

sheet feeding mechanism, a duplicating machine having throw off mechanism and mounted on the feeder, a duplicating machine drive connecting the duplicating machine with the sheet feeding mechanism and throw on mechanism actuated simultaneously with the sheet feeding mechanism and having a reciprocating member associated with the throw off mechanism and having means for engaging the same to return the platen to its operative position after it has moved to an inoperative position.

14. In a duplicating machine drive and feed, the combination of a feeder, a duplicating machine having throw off mechanism, a duplicating machine drive actuated by the feeder and throw on mechanism also actuated by the feeder and including a continuously reciprocating member provided with means for engaging the throw off mechanism for returning the platen to its operative position after it has moved to an inoperative position.

15. In a duplicating machine drive and feed, the combination of a feeder, a duplicating machine having throw off mechanism and throw on mechanism actuated by the feeder and comprising a throw on plate connected with the throw off mechanism and a continuously reciprocating member having means for engaging with the throw on plate to return the platen to an operative position after it has moved to an inoperative position.

16. In a duplicating machine drive and feed, the combination of a feeder, a duplicating machine having throw off mechanism, a throw on plate mounted on the throw off mechanism and having a stud and a continuously reciprocating member actuated by the feeder and having an opening receiving the said stud and permitting a limited movement therein incident to the operation of the duplicating machine, said operating rod being arranged to engage the stud and automatically actuate the throw on plate to return the platen to its operative position after it has moved to an inoperative position.

17. In a duplicating machine drive and feed, the combination of a feeder, a duplicating machine having throw off mechanism, a throw on mechanism comprising a throw on plate secured to the throw off mechanism of the duplicating machine, a reciprocating member provided at one end with means for engaging with the throw on plate for returning the platen automatically to its operative position, a rotary cam actuated by the feeder and a lever engaged by the cam and connected with the reciprocating member for actuating the same.

18. In a duplicating machine drive and feed, the combination of a feeder, a duplicating machine having throw off mechanism, a throw on mechanism comprising a rotary cam actuated by the feeder, a lever engaged by the cam, a reciprocating rod connected at one end with the lever, and means located at the other end of the rod and cooperating with the throw off mechanism for automatically returning the same after the platen has moved to an inoperative position.

19. In a duplicating machine drive and feed, the combination of a feeder, a duplicating machine having throw off mechanism a throw on mechanism comprising a rotary cam actuated by the feeder, a lever engaged by the cam, a reciprocating operating rod pivoted at one end to the lever and provided at its other end with a longitudinal opening, and a throw on plate secured to the throw off mechanism and having a stud operating in the said opening, said operating rod being arranged to return the platen to its operative position after the throw off mechanism has been operated.

20. In a duplicating machine drive and feed, the combination of feeder having sheet feeding mechanism, a duplicating machine, a duplicating machine drive connected with the sheet feeding mechanism and with the duplicating machine for operating the latter in timed relation with the feeder, said duplicating machine having throw off mechanism, a throw on mechanism comprising a continuously rotating cam connected with the sheet feeding mechanism, a lever engaged by the cam, a spring for maintaining the lever in such engagement an operating rod pivoted at one end to the lever and provided at its other end with a longitudinal opening and a throw on plate secured to the throw off mechanism of the duplicating machine and provided with a stud operating in the opening of the operating rod, the latter being continuously reciprocated for automatically returning the platen to its operative position after the throw off mechanism has been operated.

21. In a duplicating machine drive and feed, the combination of a feeder, having sheet feeding mechanism, a duplicating machine supported by the feeder, and a duplicating machine drive connecting the duplicating machine with the sheet feeding mechanism of the feeder and including a sprocket gear actuating the sheet feeding mechanism and provided with a removable rim section adapted to be replaced by a rim section of a different size to enable it to correspond with changes and adjustments of the duplicating machine.

22. The combination of a duplicating machine having a throw off device, a counter, a counter operating mechanism actuated by the duplicating machine and including a lever, and a movable fulcrum carried by the throw off device and arranged to be moved away from the lever to permit the latter to idle when the duplicating machine is operated, and a sheet is not fed to the same.

23. The combination of a duplicating machine having a throw off device, a counter, a counter operating mechanism comprising a lever connected with the counter, a movable fulcrum carried by the throw off device and normally receiving the said lever and arranged to be carried beyond the same by the throw off device in the operation thereof, a rotary cam actuated by the duplicating machine and means for transmitting motion from the rotary cam to the said lever.

24. The combination of a duplicating machine having a throw off device, a counter, a counter operating mechanism comprising a lever connected with the counter, a movable fulcrum carried by the throw off device and normally receiving the said lever and arranged to be carried beyond the same by the throw off device in the operation thereof, a rotary cam actuated by the duplicating machine, a reciprocating rod connected with the said lever and cam actuated lever connected with the said rod and arranged to be engaged by the cam.

25. The combination of a duplicating machine having a throw off device, a counter, a counter operating mechanism comprising a lever connected with the counter, a movable fulcrum carried by the throw off device and normally receiving the said lever and arranged to be carried beyond the same by the throw off device in the operation thereof, a reciprocating rod connected with the said lever, a cam actuated rod located below the said cam and engaged by the same and connected with the reciprocating rod, and a coiled spring disposed on the rod and arranged to maintain the cam actuated lever in engagement with the cam.

26. The combination of a duplicating machine having a throw off device, a rotary cam mounted on the shaft of the printing drum of the duplicating machine, a cam actuated lever engaged by the cam and pivoted at one end, a vertically reciprocating rod pivotally connected with the other end of the said lever, means for yieldably maintaining the lever in engagement with the cam, a counter, an approximately horizontal counter actuating lever connected at one end with the counter and at a point intermediate of its ends with the reciprocating rod, and a movable fulcrum supporting the other end of the counter actuating lever and carried by the throw off device and movable therewith to a point beyond the counter actuating lever.

27. In a duplicating machine drive and feed, the combination of a feeder, a duplicating machine having a throw off device, a throw on element carried by the throw off device, throw on mechanism operated by the feeder for automatically returning the throw off device for an operation thereof, a counter, a counter operating mechanism actuated by the duplicating machine and controlled by the movement of the throw on element for throwing the counting mechanism into and out of operation.

28. In a duplicating machine drive and feed, the combination of a feeder, a duplicating machine having a throw off device, a throw on element carried by the throw off device, throw on mechanism operated by the feeder for automatically returning the throw off device for an operation thereof, a counter, a counter operating mechanism actuated by the duplicating machine and including a lever normally fulcrumed on the throw on element, the latter being carried beyond the said lever by the throw off device in the operation thereof for throwing the counting mechanism out of operation.

In testimony whereof I affix my signature.

LESTER KYLE ALDRICH.