Jan. 2, 1951 H. JAGGER 2,536,606

MASTER SHEET ADVANCING MEANS FOR DUPLICATING MACHINES

Filed March 15, 1948 3 Sheets-Sheet 1

Fig. 1.

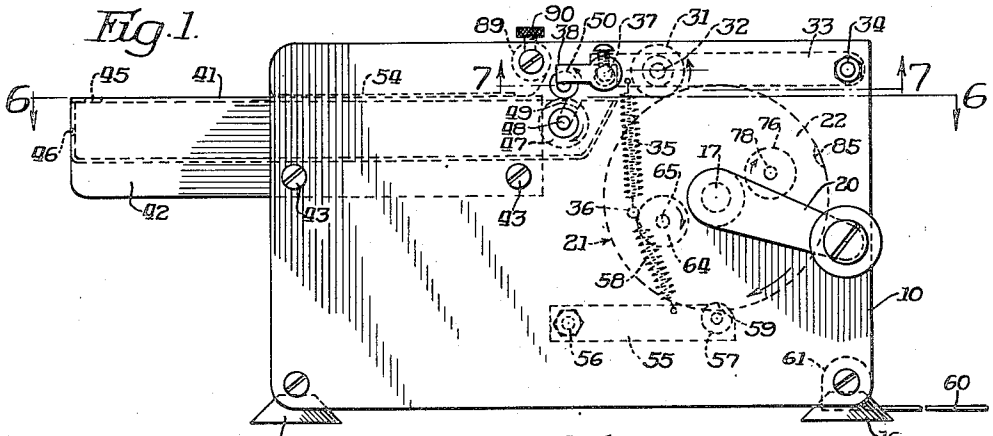


Fig. 2.

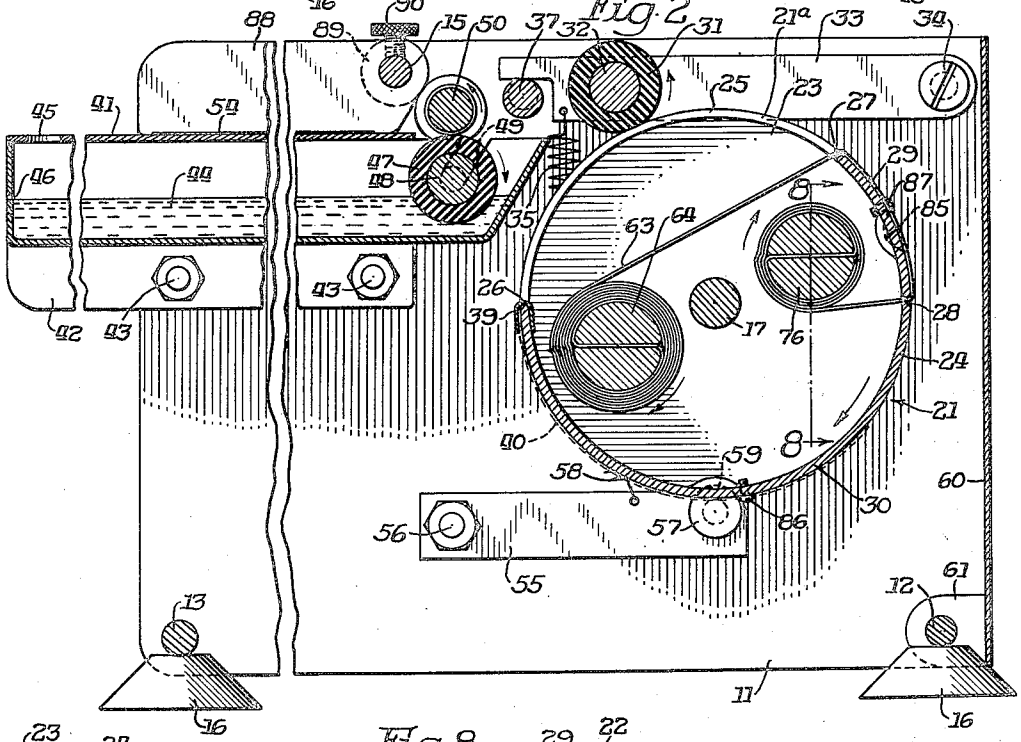
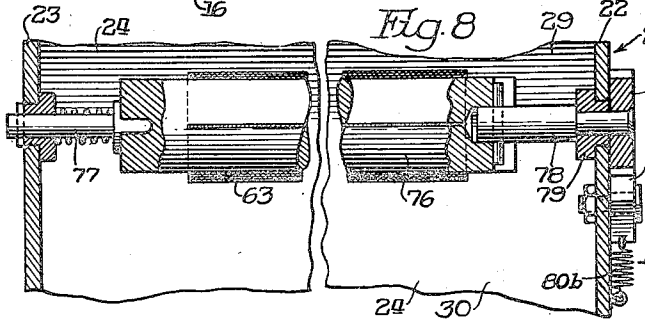


Fig. 8



INVENTOR.
Hubert Jagger.

By Sheridan, Davis and Cargill.
Attys

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MASTER SHEET ADVANCING MEANS FOR DUPLICATING MACHINES

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Fig. 3.

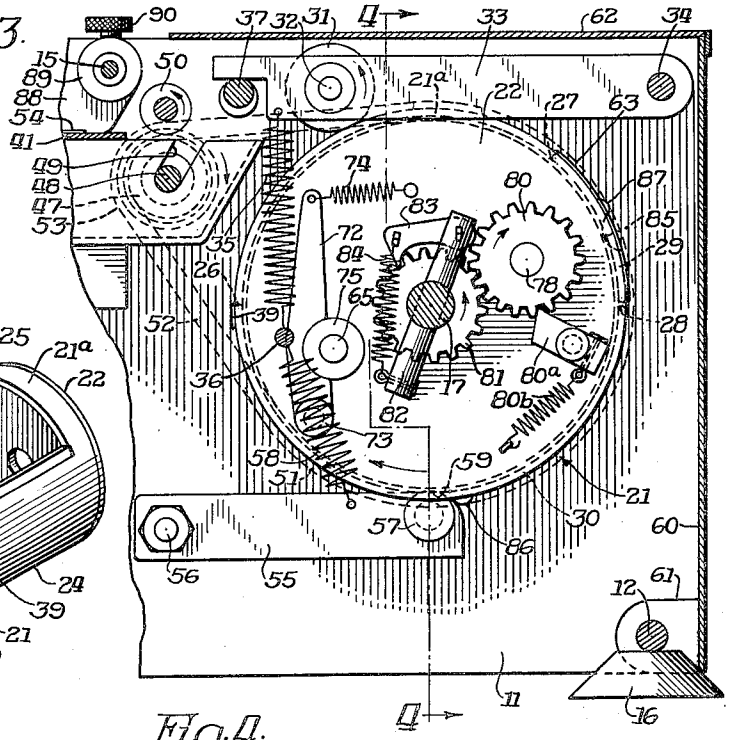


Fig. 5.

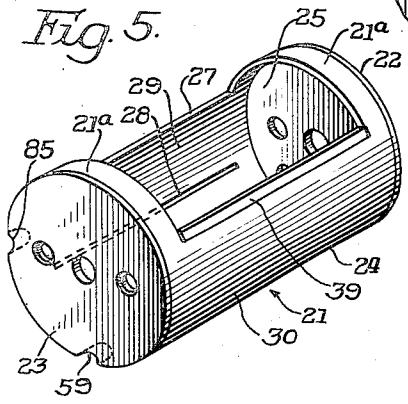
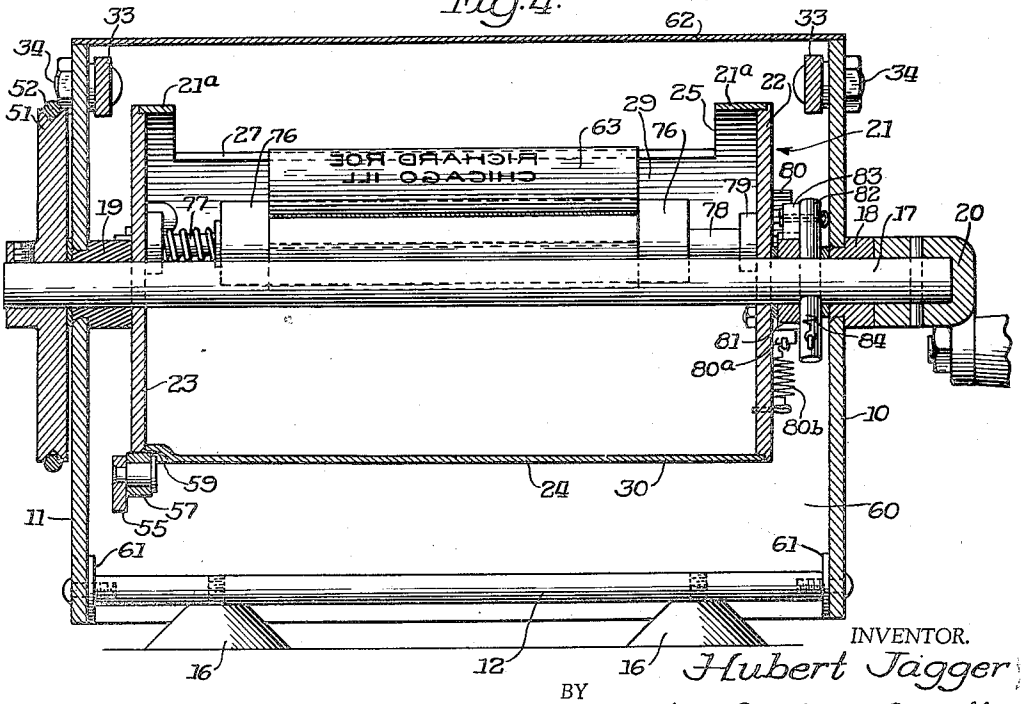


Fig. 4.



INVENTOR.
Hubert Jagger

BY
Sheridan, Davis and Cargill
Attys.

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MASTER SHEET ADVANCING MEANS FOR DUPLICATING MACHINES

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Fig. 6.

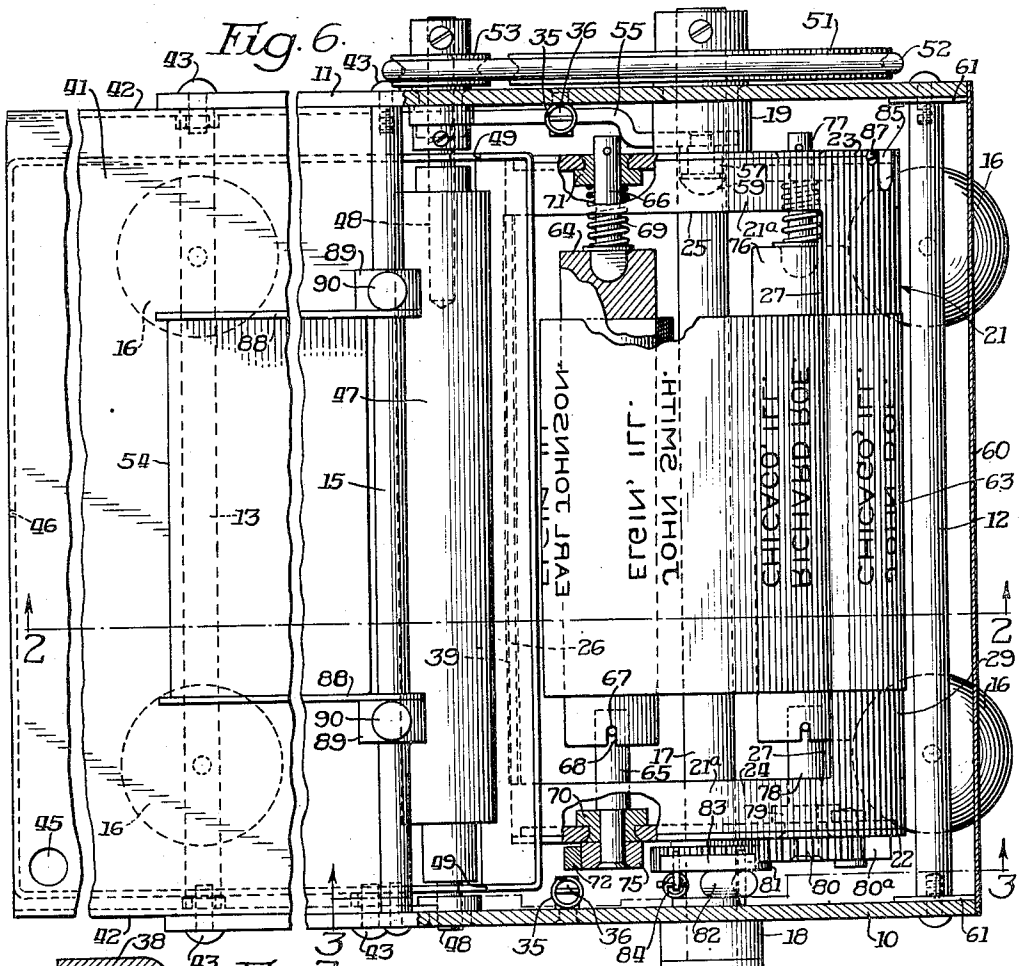
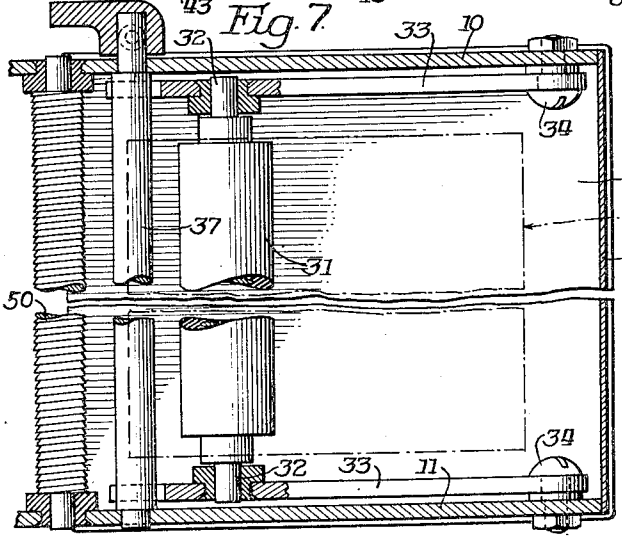


Fig. 7.



INVENTOR.
Hubert Jagger
BY
Sheridan, Davis and Cargill.
Attys

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UNITED STATES PATENT OFFICE

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MASTER SHEET ADVANCING MEANS FOR DUPLICATING MACHINES

Hubert Jagger, Redwood City, Calif.

Application March 15, 1948, Serial No. 15,003

2 Claims. (Cl. 101—132)

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This invention relates to improvements in duplicating machines.

One object of the invention is to provide a duplicating machine adapted for use in making copies of written or typewritten matter on letter or other paper sheets, or on cards such as postal cards, and also for use in addressing envelopes for the copies of the sheets, or in placing addresses upon the cards. For the purpose of simplicity of description in this specification, the written matter, that is, the matter either written or typewritten or printed in copying or hectograph ink in mirror type or script upon a master, will be referred to as a message and may comprise letters, forms, notices, tabulations or other information. The master, employed in the particular form of the invention shown and described herein, will be designated as a message master to distinguish it from a second master hereinafter termed an address master. The address master referred to is one that is employed for reproducing addresses upon envelopes or cards. The above statement that the message master comprises a sheet is particularly apt as to the masters used on so-called spirit or liquid type machines, but it will be apparent from the following disclosure that the machine may be arranged to employ a gelatin-type duplicating pad or sheet and hence the term master sheet is to be construed as including a gelatin master where the machine is of the gelatin band type.

Another object of the invention is to provide a duplicating machine of the rotary drum type adapted for use in making copies of messages from a message master sheet on the drum, and also for impressing or printing upon cards or envelopes successive addresses from an address master that may be carried within the drum.

Another object of the invention is to provide a duplicating machine having a rotary drum operable in making copies of a message upon successive sheets or cards fed into the machine, and operable also in reproducing upon successive cards or envelopes fed into the machine the successive addresses provided upon an elongated address master of roll form carried by the drum.

A further object of the invention is to provide an improved duplicating machine of the rotary drum type having means for advancing in succession to a copying position on a portion of the drum surface, the copyable addresses on an elongated addresses master within the drum for use in duplicating or copying the addresses in succession upon successive sheets, envelopes or cards fed to the machine.

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An additional object of the invention is to provide a rotary drum duplicator which carries within the drum an elongated address master trained over a portion of the drum, and means actuable by reverse operation of the drum through a limited arc for effecting the advance of successive address portions of the address master into operative positions upon the drum.

Other objects of the invention relating to various features of construction and arrangement of parts will be apparent from a consideration of the following specification and accompanying drawings wherein:

Figure 1 is a side elevation of a duplicating machine of a structure that is illustrative of the present improvements;

Fig. 2 is a sectional view taken along the plane indicated by line 2—2 of Fig. 6;

Fig. 3 is a broken sectional view taken along line 3—3 of Fig. 6;

Fig. 4 is a sectional view taken on line 4—4 of Fig. 3;

Fig. 5 is a detached perspective view of the rotary drum of the machine;

Fig. 6 is a broken top plan view of the machine with a portion shown in section along the line 6—6 of Fig. 1;

Fig. 7 is a broken sectional view taken on the line 7—7 of Fig. 1; and

Fig. 8 is a broken sectional view taken on the line 8—8 of Fig. 2.

Referring to Figs. 1 and 4 of the drawing, the duplicating machine therein illustrated is shown as provided with a pair of side frame members 10 and 11 of plate form which are connected together in spaced relation by means of a pair of lower spacing bars 12 and 13, and an upper bar 15. Rubber feet 16 are shown attached to the bars 12 and 13 for supporting the machine upon a flat surface such as a desk or table, for example, and may be of the suction-cup type. A main shaft 17 extends transversely the machine and is journalled in bushings 18 and 19 provided in the said plates 10 and 11, respectively. A crank or handle 20 is attached to one end of the shaft 17 for operating the machine. Mounted on the shaft 17 is a drum indicated generally by the numeral 21. The drum is not fixed to the shaft, but means are provided, as hereinafter described, whereby the drum may be rotated with the shaft during the duplicating operations.

The drum illustrated comprises an end plate 22 of disc form and a similar end plate 23 having axial openings through which the shaft 17 extends. A cylindrical shell 24 is mounted on the

end plates 22 and 23 and secured thereto as by welding or other approved means. The shell 24 is provided with a recess or aperture 25 which is defined by longitudinal edges 26 and 27. Parallel with the edge 27, the shell is provided with an aperture 28 in the form of a slot between which edge and slot is an address section of the drum designated by the reference character 29. The portion of the cylindrical drum surface lying between the edge 26 and the slot 28 is designated by the numeral 30 and constitutes a portion of the drum which carries the message master when the latter is in use.

Above the drum is a platen roller 31 mounted for rotation on a shaft 32 which is journalled adjacent its end in a pair of arms, each designated by the numeral 33. Each arm is pivotally mounted on a stud, or the like 34, carried by one of the side plates 10 or 11, as shown in Fig. 4. Springs 35 are secured to each of the arms 33 and are anchored at the opposite ends to studs 36 which project inwardly from the side plates 10 and 11 for pressing the platen 31 normally against the cylindrical surface of the drum. The platen 31 is of greater length than the length of the openings or apertures 25 of the drum, and hence is prevented from entering the aperture during rotation of the drum by the arcuate portions 21*a* at the ends of the aperture. Each of the arms 33 which support the platen contacts a shaft 37 which is eccentrically mounted adjacent its ends in the plates 10 and 11 to provide adequate cam throw for lifting the arms 33 from the position shown in Fig. 3 for moving the platen 31 out of contact with the drum. The shaft 37 projects through the side plate 10, as shown in Fig. 7, and is provided with a knob or handle 38 whereby the shaft may be rotated for raising the platen out of contact with the drum when the machine is not to be used for a period of time or for lowering the platen into contact with the drum prior to use of the machine. The elevation of the platen from contact with the drum during periods of non-use is desirable in avoiding the formation of flat spots upon the platen which generally is of rubber or rubber-composition material.

A message master sheet may be attached to section 30 of the drum by any suitable means. Where the message master comprises a sheet having the message typed or otherwise impressed thereon in copyable ink with the characters in reverse or mirror form, a simple U-shaped clip 39 may be provided for attaching the advancing or forward end of a sheet over the edge 26 of the drum portion 30. The bottom or rear edge of the sheet may be left free. The clip 39 may be of thin sheet metal corresponding in length approximately to the length of the edge 26 and may readily be removed from the drum after the completion of a run of messages or in substituting one message master for another. Any other suitable clip or fastening means may be employed, as will be obvious.

In Fig. 2 of the drawing, numeral 40 indicates in dotted lines the portion of a message master upon the drum, but as will be pointed out hereinafter, the message master preferably is removed from the drum when the address master is in the operative position shown in Fig. 2. The machine illustrated is provided with a feed table 41 extending between the side plates 10 and 11. The feed table is shown as having depending flanges 42 which are secured by screws 43 to the side walls. This construction gives further rigidity to the frame of the machine. Where the machine is of the spirit or liquid type, a tank is provided for holding a supply of moistening fluid. In the form of the invention shown, the tank may be constructed as a part of the feed table. For example, in Fig. 2, the tank is shown as disposed between the flanges 42 and is secured thereto by any approved means, such as welding. The tank is thus disposed immediately beneath the feed table 41 and is adapted to carry a supply of liquid 44 which usually is a mixture of ethyl alcohol and water. Liquid may be placed in the tank through a filling opening 45 which is provided in the table 41 until the level thereof reaches an overflow port 46 provided in the frame end of the tank.

Disposed within the tank is a moistener roll 47 usually of rubber composition. The moistener roll is mounted upon a shaft 48 (shown, actually, as consisting of two stub shafts) which extends through slots 49 provided in the side wall of the tank and which is journalled at its ends in the side plates 10 and 11. As shown in Fig. 3, the upper surface of the feed table 41 is disposed in a plane substantially tangent to the upper arc of the moistener roll, the feed table terminating short of the roll, as indicated in said figure. Above the moistener roll is located a feed roll 50 which is journalled at its ends at the side plates 10 and 11 and contacts the surface of the moistener roll and is driven thereby by friction as the moistener roll is rotated. The moistener roll itself constitutes a feed roll also since it cooperates with the feed roll 50 for advancing copy sheets successively into the bight between the drum 21 and the platen 31. The copy sheets are fed manually along the table 41 into the bight between the moistener roll 47 and the feed roll 50, in the machine illustrated, but an automatic feeding device may be employed if desired. The feed roll 50 may be of metal and preferably has its surface area provided with circumferential grooves, or it may be threaded for the purpose of reducing its superficial area and thus reducing the amount of liquid that it may pick up from the moistener roll 47. The shaft 17 at the end opposite the handle 20 is provided with a pulley 51 which, by means of a belt 52, drives a pulley 53 secured on the shaft of the moistener roll 47 for rotating the latter within the liquid and applying moisture to the lower surface of the copy sheets, cards or envelopes, as the latter are advanced between the moistener roll and feed roll 50 into copying contact with the drum.

It will be seen that by rotating the shaft 17 by means of crank or handle 20 (it being assumed that the shaft and drum are operatively connected), the drum will be rotated in the direction of rotation of the handle which normally is clockwise during duplicating operations. The rotation of the drum effects rotation of the moistener roll 47 in the same direction. As a copy sheet upon the table 41 is advanced into the bight between the moistener roll 47 and the feed roll 50, it will be engaged by said rolls and fed horizontally into the bight between the drum 21 and the platen 31. As the copy sheet advances over the moistener roll 47, it will be given a light application of moistening liquid.

Referring to Fig. 2, it will be seen that if a copy sheet 54 on the table 41 is fed into the bight between rolls 47 and 50 before the rotation of the drum 21 is started from the position shown in said figure, the forward end of the copy sheet 54 will move into the bight between the drum and the platen substantially concurrently with

the movement into that position of the advancing end of the message master 40. As the drum is further rotated, the moistened lower surface of the copy sheet will be pressed into contact with the upper or outer surface of the message master 40 and there will be imprinted on the copy sheet the message carried by the master.

For the purpose of effecting the desired uniform disposition of successive copy sheets upon a master, means are provided which tend to arrest the drum upon each rotation thereof in the proper position for effectuating such registration or margin-bar effect. The means referred to comprises an arm 55 pivotally mounted at 56 to the wall 11 of the machine and carrying a roller 57, the arrangement constituting an arresting pawl. The arm 55 is held by a spring 58 upwardly against the adjacent cylindrical end portion of the drum whereby the roller 57 tends to seat in a detent or recess 59 provided in said portion of the drum. This detent is indicated most clearly in Fig. 5. Hence, a user can rotate the drum without difficulty after a little practice to the position where by reason of the entrance of the pawl or roller 57 into the recess 59, the drum tends to come to a stop. With the drum in that position, a copy sheet is fed from the table into the stop provided by the bight of the rolls 47 and 50 whereupon rotation of the drum through 360° of arc will effect feeding of the copy sheet into and through duplicating relation with the master, thus making a copy. As each sheet moves from beneath the platen 31, it will be deposited by gravity upon a tray 60 which is shown pivotally attached by means of ears 61 to the tie rod 12. This tray may be swung to the vertical position shown in Figs. 2 and 3 to form a closure for the end portion of the machine when the machine is not in use, and can be releasably held in such position by a removable flanged cover 62 shown in Fig. 3. In the use of the machine, the cover 62 is removed and the tray 60 is lowered to the horizontal position indicated in Fig. 1 to provide a receiving tray for the copies that issue from the machine.

When the machine is to be used for addressing cards or envelopes, the message master 40 and the holding clip 39 therefor, preferably are removed from the drum. An address master is then inserted in the drum, if not already therein, the master comprising an elongate sheet 63 carrying in spaced relation thereon, the addresses desired. These addresses are printed, typed or written upon the address master in reverse, that is, in mirror characters. The address master initially is wound upon a spindle 64 having a diametrical slot through the central portion thereof through which the first end of the master may be inserted for anchoring that end of the master for winding purposes. The ends of the spindle are mounted upon rotatable studs 65 and 66 as shown in Fig. 6. Stud 65 is provided with a cross pin 67, the ends of which engage in a diametrical slot 68 provided in the adjacent end of the spindle. The stud 66 is provided with a spring 69 which tends to force the stud inwardly while permitting it to be pressed manually in an outward direction preparatory to inserting or removing the spindle from operative position. The studs referred to are mounted in bushings 70 and 71 provided in the opposite ends of the drum.

For the purpose of preventing the spindle 64 from unwinding undesirably, a suitable brake or friction device may be provided such as the member 72 which is pivotally mounted at 73 on the end 22 of the drum and is provided at an opposite end with a spring 74 which holds the brake against a collar 75 which is secured to the end of the stud 65. Upon inserting a spindle 64 in the drum through the aperture 25, and mounting the same upon the studs 65 and 66, above described, the free end of the address master is passed outwardly of the drum through the aperture 25, over the section 29 of the drum, and inwardly through the slot 28 where it is attached to a second or wind-up spindle 76. Spindle 76 is similar to spindle 64 and is mounted at one end upon one stud 77 corresponding to the stud 66 and at the other end the spindle is mounted upon a stud 78 journalled in a bushing 79 carried by the end wall 22 of the drum and having attached to the outer end thereof a gear 80. Rotation of the gear 80 in clockwise direction, as viewed in Fig. 3, will rotate the spindle 76 in the same direction and cause a feeding of the elongated address master from the spindle 64 over the surface 29 of the drum to the wind-up spindle, as will be seen.

The gear 80 constitutes a portion of the means by means of which the address master may be advanced for locating addresses thereon in succession upon section 29 of the drum, and likewise constitutes a portion of the means by means of which rotation of the shaft 17 effects rotation of the drum 21 in a clockwise direction during duplicating operations. As shown in Fig. 3, a second gear 81 is provided between the drum end 22 and the adjacent wall 10 of the casing and is mounted upon the shaft 17 for rotation thereon. Extending through the shaft 17 is a relatively fixed pin 82 which pivotally carries at one end a pawl 83 arranged for engagement with the teeth of the gear 81 and having attached at its other end a spring 84 which is secured to the pawl 83 and tends to hold the same in engagement with the teeth of the gear 81. In the relative position of the parts shown in Fig. 3, the rear or pivoted end of the pawl 83 is in abutting contact with the gear 80 and hence rotation of the shaft 17 in a clockwise direction beyond the position shown in Fig. 3, will produce rotary movement of the drum in the same direction. The drum driving relation of the parts just referred to is the relation occupied by them when the drum is rotated in a clockwise direction during duplicating operations.

During the duplication of successive addresses upon cards or envelopes, it is necessary that the address master be advanced to bring a new address into duplicating position upon section 29 of the drum prior to each duplication operation. For accomplishing the advancement of the address master, the drum is moved to the position shown in Fig. 3, that is, with the roller 57 located within the recess or detent 59 of the drum. The handle 20 is then moved in a counterclockwise direction (as viewed in Fig. 3) which, by reason of the engagement of the pawl 83 with a tooth of the gear 81, will cause the gear 81 to rotate counterclockwise. The drum is retained against rotation during this counterclockwise movement by the holding action of the pawl roller 57. The extent of the counterclockwise movement is limited by engagement of the forward end of the pawl 83 with the collar 75. During such counterclockwise movement of the gear 81, it effects clockwise movement of the gear 80 by reason of the meshing of the teeth of said gears. A holding pawl 80*a*, pivotally attached to the end 22 of the drum and retained in engage-

ment with the gear 80 by a spring 80b, permits such clockwise movement of the gear but prevents counterclockwise movement thereof. Clockwise movement of the gear 80 rotates windup spindle 76 clockwise, as viewed in Figs. 2 and 3, and thus advances the address master to bring a succeeding address thereon into duplicating position upon the portion 29 of the drum. When such new address has been brought to the position stated, the handle 20 and thus the shaft 17 is rotated clockwise. During such clockwise rotation, the gears 81 and 80 are not rotated by reason of the action of the holding pawl 80a and hence the pawl 83 clicks along the teeth of the gear 81 until the pivoted end thereof abuts the gear 80 whereupon the drum is driven clockwise by further movement of the handle in that direction. The succeeding movement of the drum by the operator should be, in the preferred operation of the machine illustrated, through a limited arc only or until a second detent 85 in the cylindrical end of the drum is engaged by the roller 57. When the drum is in the position thus described, the duplicating portion 29 of the drum will be arcuately removed in a clockwise direction from the bight between platen 31 and the drum a distance such that a card or envelope previously fed into the bight between the rollers 47 and 50 will be brought into proper registration upon resumption of the clockwise rotation of the drum. In other words, the arrangement just described is preferred since it enables the address to be placed not upon the forward or advancing edge of a card or envelope, but more nearly in the middle thereof, as is conventional. Adjacent each of the recesses or detents 59 and 85, an enlargement 86 and 87, respectively, may be provided in the form of a pin head, or the like, which enables the operator better to feel the respective positions indicated by the detents and thus not to advance the drum beyond the position desired.

The approved machine is particularly useful in clubs, associations or the like where messages are to be mailed to the memberships, since the address master may have provided thereon the addresses of the membership, and prior to, or, if preferred after, the messages have been duplicated upon the cards, the cards may be again run through the machine with the address side lowermost for receiving the addresses. Envelopes, likewise, may be run through the machine for receiving the addresses in which messages imprinted on copy sheets are to be placed.

If desired, the forward end of the address master that is initially attached to the spindle 76, may be blank through a sufficient distance so that a blank portion of the address master will overlie the drum section 29. With such arrangement, the address master may remain in the drum as the messages are being printed after which the clip 39 and the message master 40 are removed and the address master thereafter advanced to bring the first address upon the address master into duplicating position upon section 29 of the drum. The advancing of the address master, as just mentioned, is effected by the counterclockwise rotation of the shaft, as above described. It will be seen that as the addresses are being imprinted on cards, envelopes or the like, the address master in being wound up by successive increments on the spindle 76, increases the effective diameter of the wind-up spindle 76, and that the counterclockwise movement of the shaft 17 necessary for advancing each succeeding address into printing position upon section 29 will

be less than the full counterclockwise movement, above described. However, with the pawl roller 57 located within the detent 59, the section 29 of the drum is disposed in a position where it is clearly visible to the operator during such reverse or counterclockwise movement of the shaft and hence only the arcuate movement of the shaft that is required to bring a succeeding address into proper position upon section 29 of the drum need be effected which, as stated, will become progressively smaller as more and more of the address master becomes wound upon the spindle 76. When the entire list of addresses has been run, the spindles 64 and 76 may be removed from the drum by pressing the same axially against the respective spings on the spindles 66 and 77 to enable disengagement of the other ends of the spindles from the studs 65 and 78, respectively, for rewinding the address master upon the unwind spindle 64 for preparing the master for subsequent use.

The location of the drum section 29 in a position where it is clearly visible to the operator when the address master is being advanced to bring a succeeding address into imprinting position is of distinct advantage since should one or more addresses on the master become obsolete, they may be so indicated on the master and the master may be advanced to bring the next address into position on section 29 of the drum. This result can be accomplished by merely rocking the handle 20 arcuately for ratcheting the gear 81 counterclockwise by means of the pawl 83 while the drum is retained against movement by the pawl 57. Hence only selected addresses on the address master may be used if desired since those not to be used may be caused to move over the section 29 of the stationary drum to windup spindle by merely rocking the handle through an arc defined by the position of the pawl shown in Fig. 3 wherein the pivoted end therein abuts gear 80 and the position wherein the other end of the pawl abuts the collar 75. This arc of movement is approximately 55 degrees in the machine illustrated in the drawings.

The feed table 41 preferably is provided with laterally adjustable guides between which the cards, envelopes or copy sheets that are fed in succession into the machine are guided for the desired lateral alignment with respect to the message master or address master then in use. Suitable guides in the form of upright blades of plates 88 are illustrated in Fig. 6. The guides are shown each provided with a bushing 89 slidably mounted on the tie rod 15 and having knurled finger operated set screws 90 by means of which the guides can be adjustably secured to the rod in positions spaced apart for guiding successive copy sheets, cards or envelopes into the bight of the rolls 47 and 50 whence they are advanced into proper registration with the master on the drum.

The improvements provide a duplicating machine adapted for making copies from a message master but also one that is adaped to copy successively the addresses from an elongated address master thereby embodying in a single machine mechanism for performing functions heretofore generally requiring two separate machines. While I have shown and described the machine that at present represents the preferred embodiment of the invention, changes in the details thereof may be resorted to within the scope and spirit of the invention to which the following claims are directed.

I claim:

1. In a duplicating machine, a drum rotatable in one direction during duplicating operations, an operable shaft upon which said drum is mounted for relative rotary movement with respect thereto, a wind-up spindle shaft in the drum extending through one end of the drum, a gear on the exterior portion of said spindle shaft, a gear relatively rotatably mounted on said operable shaft in constant meshing engagement with said first mentioned gear, means on said operable shaft for abutting said first gear for limiting relative movement of the operable shaft with respect to the drum in one direction for effecting rotation of the latter in said direction during duplicating operations, said means comprising a pawl adapted to engage said second gear when said operable shaft is rotated in the opposite direction for effecting operation of said first and second gears and rotation of said wind-up spindle, means for releasably holding said drum against rotation during said rotation of said wind-up spindle, and means cooperating with said wind-up spindle for supporting an elongate master for movement over a portion of the drum surface upon rotation of said spindle.

2. A duplicating machine comprising a rotatable drum, an operable shaft upon which said drum is relatively rotatably mounted, a rotatable spindle supporting stub shaft journalled in one end of the drum, a drive pinion on said operable shaft for oscillating movement relative thereto and in

meshing relation with said first pinion, and a member extending from said operable shaft adjacent said second pinion and provided with a pawl engaging the teeth of said second pinion for rotating the same upon movement of said operable shaft in one direction relative to the drum and thereby effecting the operation of said first-mentioned pinion in a direction for rotating said spindle stub shaft in a wind-up direction, means for releasably holding the drum against rotation on said operable shaft during said wind-up rotation of said spindle, said pawl being arranged to abut said second-mentioned pinion upon rotation of said operable shaft in the other direction for entraining said drum for movement with the operable shaft in said other direction and releasing the drum from said holding means.

HUBERT JAGGER.

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