Oct. 21, 1941. A. J. LEVENHAGEN ET AL 2,260,040

DUPLICATING MECHANISM

Filed Sept. 26, 1940 4 Sheets-Sheet 1

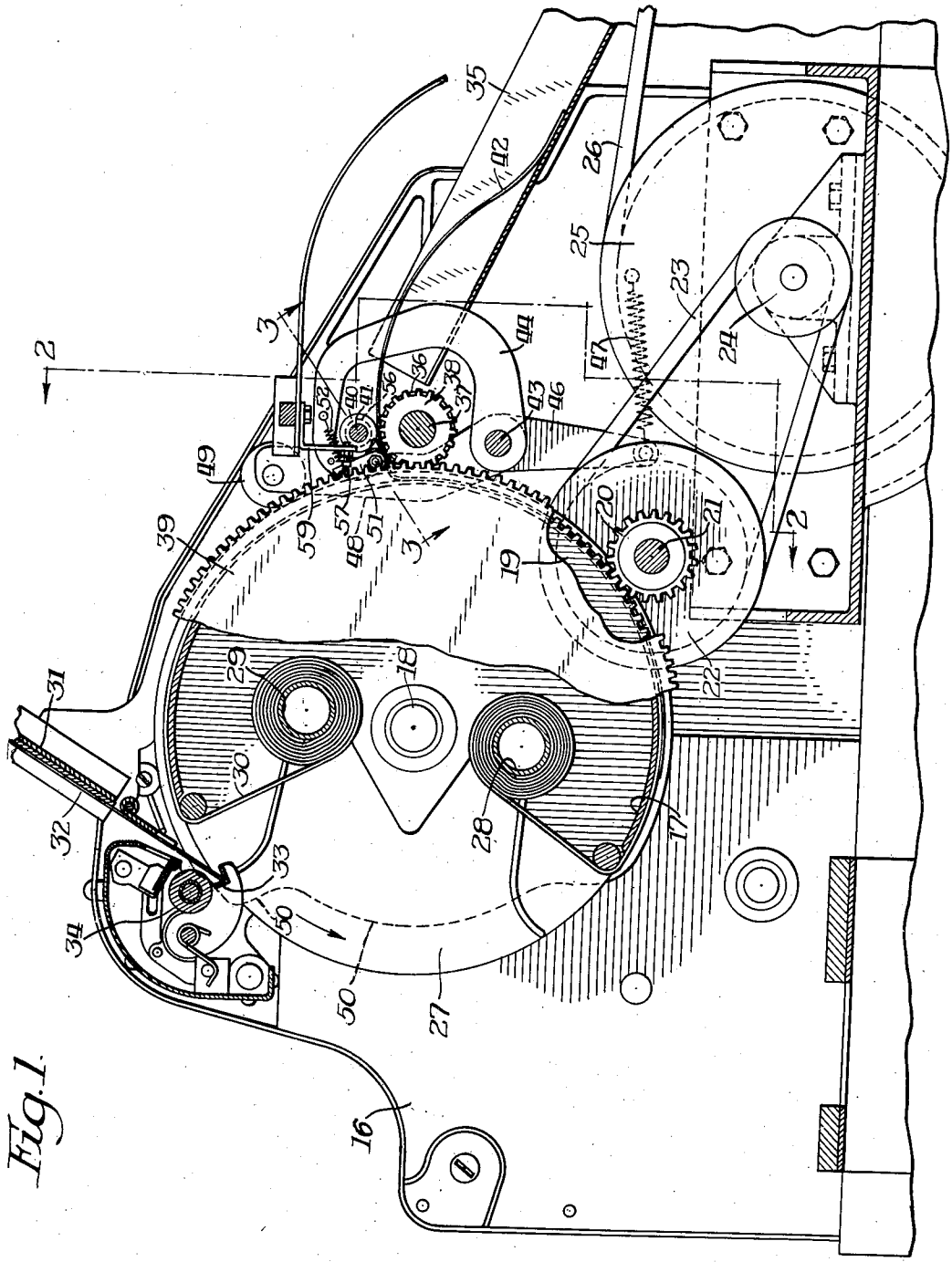


Fig. 1.

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DUPLICATING MECHANISM

Filed Sept. 26, 1940 4 Sheets-Sheet 2

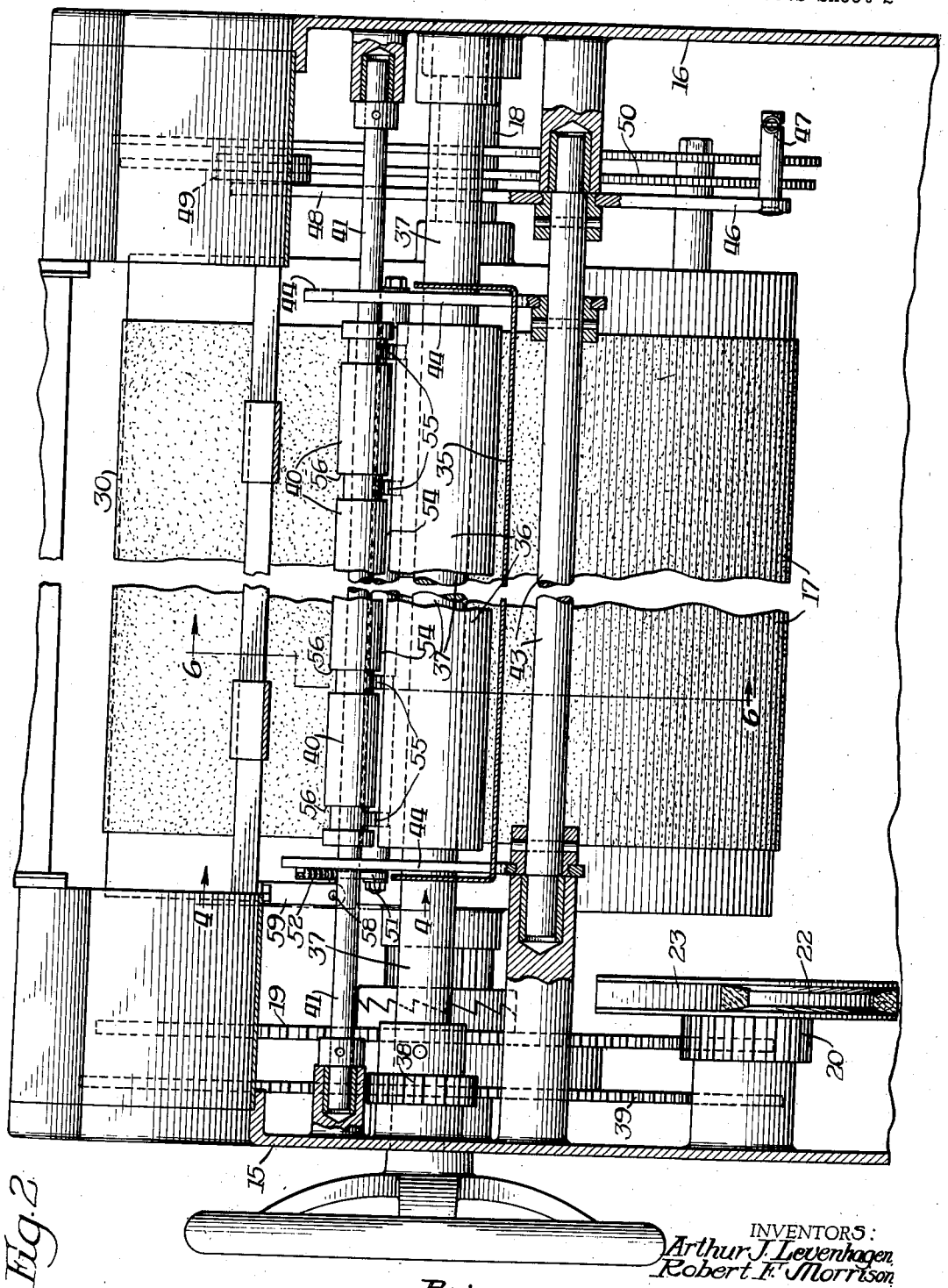


Fig. 2

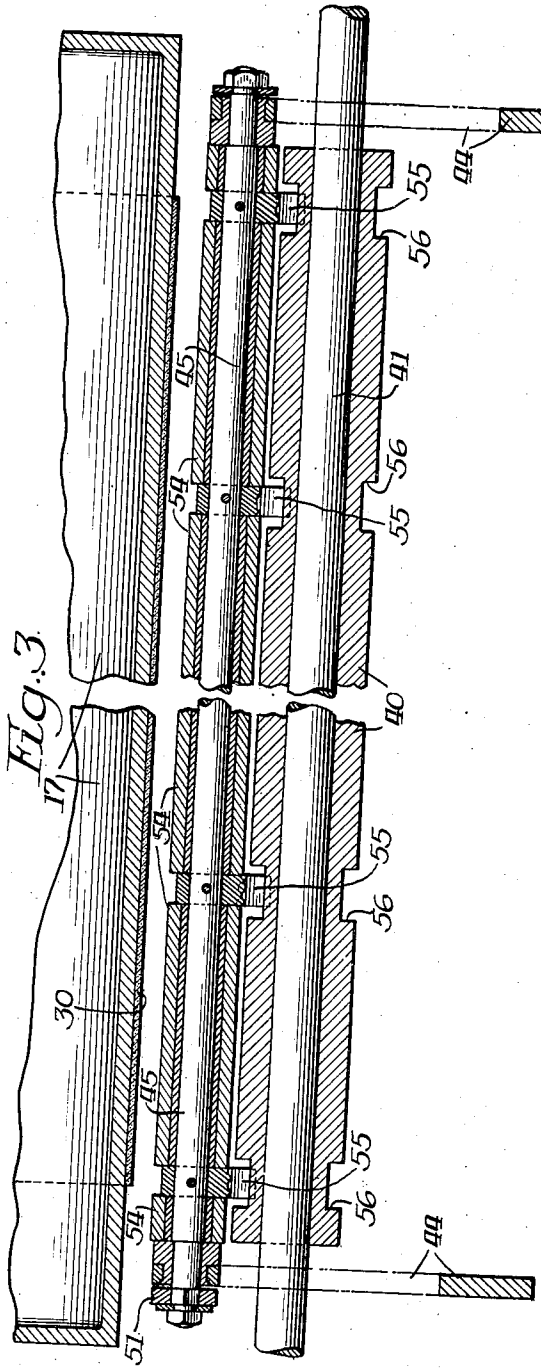
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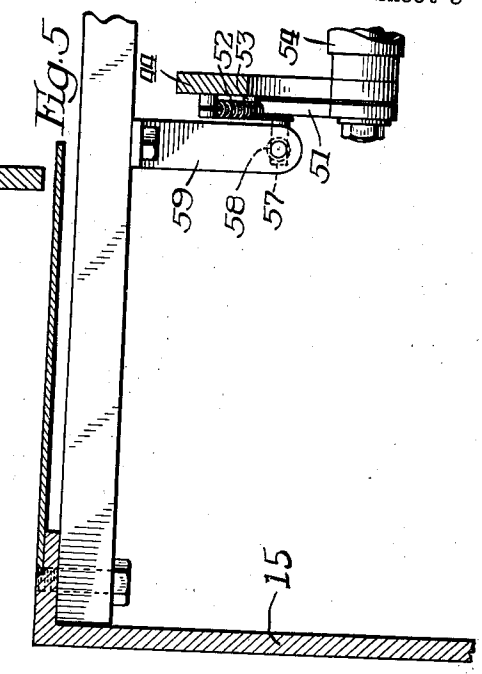
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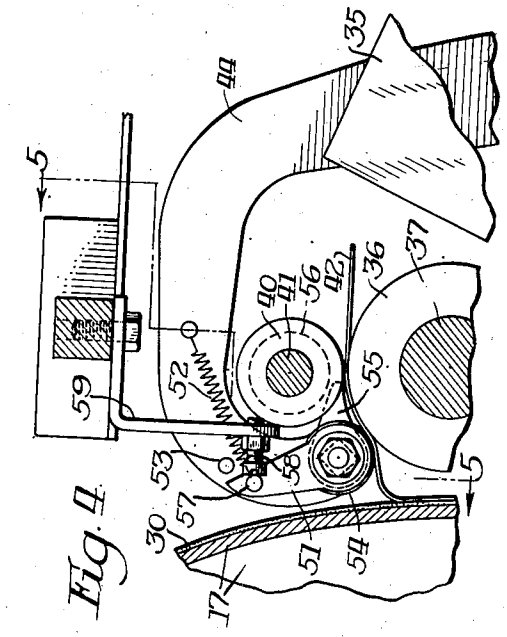
Oct. 21, 1941. A. J. LEVENHAGEN ET AL 2,260,040

DUPLICATING MECHANISM

Filed Sept. 26, 1940 4 Sheets-Sheet 3







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Oct. 21, 1941. A. J. LEVENHAGEN ET AL 2,260,040

DUPLICATING MECHANISM

Filed Sept. 26, 1940 4 Sheets-Sheet 4

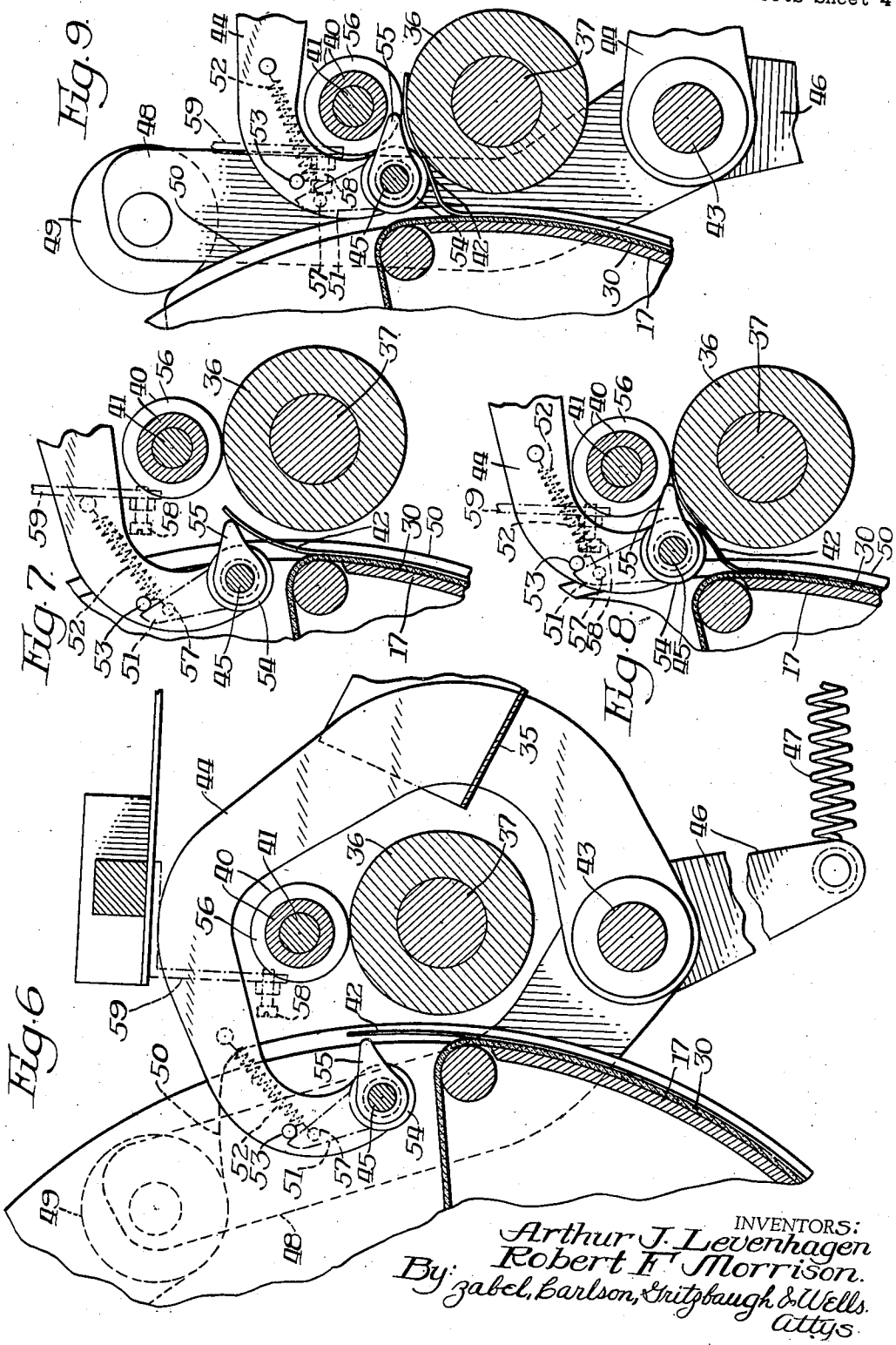


Fig. 9.

Fig. 7.

Fig. 8.

Fig. 6.

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Patented Oct. 21, 1941 2,260,040

UNITED STATES PATENT OFFICE

2,260,040

DUPLICATING MECHANISM

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Application September 26, 1940, Serial No. 358,406

19 Claims. (Cl. 101—132)

This invention relates to duplicating mechanism and particularly to the mechanism for stripping copy sheets successively from the gelatin pad carried by the drum of a rotary gelatin duplicating machine, and it has for its object the provision of a new and improved form and arrangement of parts by which improved stripping of the copy sheets shall be attained.

In gelatin machines of this type heretofore, a driven roller has been provided in slightly spaced relation to the face of the drum, with cooperating means actuated in timed relation for pushing the forward edge portion of a copy sheet outwardly from the drum into operative engagement with the driven roller for pulling the copy sheet loose from the gelatin pad for delivery to a tray. This cooperating means for pushing the end of the copy sheet outwardly has been of various forms, comprising a non-rotary pusher member, as shown by Hernlund, Marchev and Morrison Patent No. 2,034,903, or a roller as shown by Whitehead Patent No. 2,094,628. The non-rotary pusher member has been found preferable in some respects, in that it may be made of comparatively small size so as to be capable of entering the space between two forwarding rollers into close proximity to the bite of the rollers for pushing the end of a copy sheet definitely into the grip of the rollers. Great care has been necessary, however, in connection with arrangements of this type for preventing smearing of the copy sheets by pressure of the pusher member or members on the sheet after the sheet has been gripped by the cooperating stripping rollers.

For enabling us to use a non-rotary type of pusher member and still to avoid the danger of smearing the copy sheets, we have provided a form of mechanism comprising a plurality of spaced fingers carried by two swingingly mounted arms so as to be movable to the bite of the stripping rollers for carrying the end of the copy sheet into the desired operative position, together with means for giving the fingers an auxiliary movement with respect to said arms out of engagement with the copy sheet at just the moment when the sheet reaches the position at which it is gripped. In the improved arrangement illustrated, the fingers are mounted on a rock shaft carried by said arms so that, upon a slight rocking movement of the shaft, the fingers are swung in unison away from the copy sheet, one of the cooperating stripping rollers being cut away opposite to the fingers for permitting such swinging movement of the fingers.

In the preferred form of the invention, the shaft by which the pusher fingers are carried is provided with a plurality of cylindrical body portions rotatably mounted thereon so as to act as a roller member for pressing the copy sheet against the driven roller for assisting in the stripping operation. By the use of two rollers pressing the copy sheet into engagement with the driven roller at slightly spaced points thereabout, the grip on the copy sheet is greatly strengthened and the effectiveness of the stripping mechanism is correspondingly increased.

It is another object of this invention to improve mechanisms of this type in sundry details hereinafter pointed out. The preferred means by which the several objects have been attained are illustrated in the accompanying drawings, in which—

Fig. 1 is a longitudinal vertical sectional view through the preferred form of mechanism embodying the invention;

Fig. 2 is a transverse vertical sectional view through the machine taken substantially at the line 2—2 of Fig. 1;

Fig. 3 is an enlarged detail view, being substantially a section taken at the line 3—3 of Fig. 1;

Fig. 4 is a vertical sectional view taken substantially at the line 4—4 of Fig. 2;

Fig. 5 is a horizontal sectional view taken substantially at the line 5—5 of Fig. 4;

Fig. 6 is a vertical sectional view taken substantially at the line 6—6 of Fig. 2; and

Figs. 7, 8 and 9 are views similar to a portion of Fig. 6, but showing changed positions of certain of the parts.

Referring now to the several figures of the drawings, in which corresponding parts are indicated by the same reference characters, 15 and 16 indicate standards at opposite sides of the machine rigidly connected together for supporting a drum 17 by means of a supporting and driving shaft 18. In the arrangement shown, the shaft 18 is provided with a large gear 19 fixedly mounted thereon, which meshes with a pinion 20 rotatably mounted upon a stud 21 carried by the frame member 15. The pinion 20 is rigidly connected with a pulley 22 which is driven by a belt 23 from a pulley 24 which in turn is driven by a pulley 25 and a belt 26 from any suitable source of power.

As is best shown in Fig. 1, the drum 17 is cut away at one side to provide a recess in its

wall at one side, as indicated at 27. Spindles 28 and 29 are provided in the drum 27 for supporting a gelatin band 30 wrapped about the circular wall portion of the drum, as shown in said Fig. 1.

Above the drum 17, a table or tray 31 is provided for supporting a copy sheet 32 in position for delivery to the drum, as is well understood in machines of this type. A margin bar 33 is provided below the tray 31 in position for engaging the lower end of the copy sheet 32 for holding it in position to be applied to the gelatin band 30 for making the desired copy thereon. As usual in machines of this type, the copy sheet 32 is pressed against the band 30 by a platen roller 34 for insuring the production of the desired impression upon the sheet.

Inasmuch as the parts so far described form in and of themselves no part of the present invention, it is believed to be unnecessary to describe such parts further in detail.

In connection with the machine, stripping mechanism is provided for engaging a copy sheet carried around by the gelatin band and pulling the sheet off the drum for delivery into a tray 35 adjacent to the drum. This means comprises a stripping roller 36 rotatably mounted between the standards 15 and 16 by means of a shaft 37, which is continuously driven by means of a pinion 38 meshing with a large gear 39 mounted to rotate with the drum 17. The arrangement is such that as the drum rotates in counterclockwise direction in Fig. 6, the stripping roller 36 rotates in clockwise direction in said figure. Above the roller 36, an auxiliary stripping roller 40 is provided, rotatably supported in position by means of a shaft 41 mounted in the standards 15 and 16, the roller 40 being in constant engagement with the roller 36.

Means is provided actuated in timed relation to the rotation of the drum 17 for engaging the leading end of a copy sheet 42 carried by the drum for moving the end of the sheet outwardly into the bite of the rollers 36 and 40. This means comprises a heavy shaft 43 rotatably mounted between the standards 15 and 16, having arms 44 fixedly mounted thereon at opposite ends of the drum, such arms being provided at their free end portions with a shaft 45 rotatably mounted therebetween. The shaft 43 is provided with a downwardly extending arm 46 which is normally held swung to the limit of its outward movement by means of a heavy coiled spring 47 for holding the arms 44 moved inwardly to the limit of their motion, as shown in Fig. 6. The shaft 43 is also provided with an arm 48 provided at its free end with a roller 49 which engages a cam 50 rigidly mounted upon the drum 17, as is clearly shown in Fig. 2. The shape of the cam 50 is such as to permit the shaft 45 and the arms 44 to move inwardly into the recess 27 of the drum as soon as the drum reaches a position for permitting such movement, and is of such shape as to force the arms and the shaft outwardly again by a quick motion at the time when the wall of the drum approaches into close proximity to the shaft, as shown in Figs. 6 and 7.

In the arrangement shown, the shaft 45 is provided with an arm 51 fixedly mounted thereon, which is normally held by a spring 52 in engagement with a pin 53 carried by the arm 44, as shown in Fig. 6. The arrangement is such that upon the application of pressure upon the arm 51 toward the left in said Fig. 6, the shaft 45 is adapted to rock in counterclockwise direction in said figure for carrying the arm 51 out of engagement with the pin 53.

Upon the shaft 45, we have provided a roller member 54, formed in a plurality of sections. Between the roller sections 54, we have mounted pusher fingers 55 which are rigidly connected with the shaft so as to rotate therewith. The fingers 55 are arranged in alignment with each other, pointing directly outwardly.

In operation, when the drum 17 reaches the position as shown in Fig. 6, with the fingers 55 positioned opposite to the extending end portion of the copy sheet 42, the roller 49 reaches the end of the low portion of the cam 50. Upon continued rotation of the drum in counterclockwise direction in Fig. 6, the roller 49 and arm 48 move the shaft 43 in clockwise direction in said Fig. 6 for bringing the fingers 55 into engagment with the copy sheet 42. As rotation of the drum continues, the fingers 55 cause the end of the sheet 42 to pass directly into the bite of the rollers 36 and 40, the roller 40 being circumferentially grooved at a plurality of points therealong, as indicated at 56, for receiving the ends of the fingers 55 therein. At substantially the end of the outward movement of the fingers 55, a pin 57, carried by the arm 51, is brought into contact with a set screw 58 adjustably mounted in an arm 59 carried by the framework, so that, upon continued outward movement of the arms 44, the shaft 45 is given a slight rocking movement in counterclockwise direction against the action of the spring 52 for carrying the fingers 55 in the direction away from the roller 36, such fingers being free to move upwardly within the grooves 56 of the roller 40, as is clearly shown in Fig. 9. By this rocking movement of the shaft 45, the fingers 55 are prevented from pressing against the copy sheet 42 and the roller 36, the paper being thus protected against any tendency to be smeared or torn when gripped between the rollers 36 and 40.

The arrangement is such that the roller 54 is brought into operative engagement with the roller 36 at the end of the outward movement of the stripper parts. The roller 54 thus cooperates with the roller 40 for pressing the copy sheet against the driven roller 36, so that the danger of any slippage of the copy sheet with respect to the roller 36 is obviated, the copy sheet being held in engagement with the roller 36 through a substantial circumferential portion of the surface of said roller.

While we prefer to employ the form and arrangement of parts as illustrated and as above described, the invention is not to be limited to the arrangement shown, except so far as the claims may be so limited, it being understood that changes might well be made in the form and arrangement of parts without departing from the spirit of our invention.

We claim:

1. In a rotary duplicating mechanism, the combination of a frame, a drum rotatably mounted thereon and having a recess in its face at one side of the drum, means for supporting a copy sheet releasably on said drum with its forward end portion extending over said recess, a stripping roller rotatably mounted on said frame in slightly spaced relation to the drum, means for driving said roller, a pusher member movably mounted on said frame adapted by outward movement in timed relation to the rotation of the drum to engage the forward end portion of a copy sheet carried by the drum and to push the sheet out-

wardly into engagement with said driven roller, means for moving said pusher member outwardly, means for pressing said copy sheet against said driven roller for pulling the sheet off the drum, and means actuated in timed relation to the outward movement of the pusher member for giving the pusher member a slight rocking movement out of engagement with said copy sheet.

2. In a rotary duplicating mechanism, the combination of a frame, a drum rotatably mounted thereon and having a recess in its face at one side of the drum, means for supporting a copy sheet releasably on said drum with its forward end portion extending over said recess, a stripping roller rotatably mounted on said frame in slightly spaced relation to the drum, means for driving said roller, a pusher member movably mounted on said frame so as to be movable tangentially of said driven roller, adapted by outward movement in timed relation to the rotation of the drum to engage the forward end portion of a copy sheet carried by the drum and to push the sheet outwardly into engagement with said driven roller, means for moving said pusher member outwardly, means for pressing said forward end portion of the copy sheet against said driven roller for pulling the sheet off the drum, and means for giving said pusher member a slight rocking movement away from said driven roller as the pusher member comes to its outermost position for preventing the pusher member from pressing on said roller.

3. In a rotary duplicating mechanism, the combination of a frame, a drum rotatably mounted thereon and having a recess in its face at one side of the drum, means for supporting a copy sheet releasably on said drum with its forward end portion extending over said recess, a stripping roller rotatably mounted on said frame in slightly spaced relation to the drum, means for driving said roller, arms pivotally mounted on said frame at opposite ends of said drum, a pusher member mounted between said arms so as to have a slight rocking movement with respect to the arms and arranged so that upon outward swinging movement of the arms said pusher member moves tangentially of the roller for carrying the forward end portion of a copy sheet on the drum into engagement with said roller, means for swinging said arms outwardly, means for pressing said forward end portion of the copy sheet against said roller for pulling the sheet off the drum, and means for giving said pusher member a slight rocking movement with respect to said arms away from said driven roller as the pusher member comes to its outermost position for preventing the pusher member from pressing on said roller.

4. In a rotary duplicating mechanism, the combination of a frame, a drum rotatably mounted thereon and having a recess in its face at one side of the drum, means for supporting a copy sheet releasably on said drum with its forward end portion extending over said recess, a stripping roller rotatably mounted on said frame in slightly spaced relation to the drum, means for driving said roller, a shaft rotatably mounted on said frame adjacent to said roller, arms carried by said shaft at opposite ends of said drum so as to swing in unison about said shaft, a second shaft mounted between said arms so as to have rotary movement with respect to the arms and arranged so as to move with said arms toward and from the roller tangentially thereof, means for moving said arms in timed relation to the rotation of the drum for carrying said second shaft into and out of the recess of said drum, fingers fixedly mounted on said second shaft in position to engage the forward end portion of said copy sheet on the drum upon outward movement of said second shaft for moving said copy sheet into engagement with said roller, means for pressing said forward end portion of the copy sheet against said roller for pulling the sheet off the drum, and means for giving said second shaft a slight rocking movement for carrying said fingers away from the roller as the fingers come to their outermost positions for preventing the fingers from pressing on said roller.

5. In a rotary duplicating mechanism, the combination of a frame, a drum rotatably mounted thereon and having a recess in its face at one side of the drum, means for supporting a copy sheet releasably on said drum with its forward end portion extending over said recess, a stripping roller rotatably mounted on said frame in slightly spaced relation to the drum, means for driving said roller, a second roller rotatably mounted on said frame in engagement with said first-named roller so as to cooperate therewith for pulling a copy sheet off the drum, said roller being circumferentially grooved at a plurality of points therealong, a pusher member comprising a plurality of spaced portions movably mounted on said frame adapted by outward movement in timed relation to the rotation of the drum to engage the forward end portion of a copy sheet carried by the drum and to push the sheet outwardly into the bite of said two rollers with the several sections of the pusher member positioned opposite to the grooves in said second roller, means for moving said pusher member outwardly, and means actuated in timed relation to the outward movement of the pusher member for giving the several sections of said pusher member a slight rocking movement in the grooves of said second roller away from the first-named roller for preventing the pusher member from pressing on said first-named roller.

6. In a rotary duplicating mechanism, the combination of a frame, a drum rotatably mounted thereon and having a recess in its face at one side of the drum, means for supporting a copy sheet releasably on said drum with its forward end portion extending over said recess, a stripping roller rotatably mounted on said frame in slightly spaced relation to the drum, means for driving said roller, a second roller rotatably mounted on said frame in engagement with said first-named roller so as to cooperate therewith for pulling a copy sheet off the drum, said roller being circumferentially grooved at a plurality of points therealong, a shaft movably mounted on said frame so as to be movable toward and from the bite of said two rollers and so as to be rocked slightly with respect to its supporting means, fingers on said shaft in position to enter the grooves of said second roller adapted by outward movement in timed relation to the rotation of the drum to engage the forward end portion of a copy sheet on the drum and to push the sheet outwardly into the bite of said two rollers, means for moving said shaft and fingers outwardly, and means actuated in timed relation to the outward movement of the shaft and fingers for giving the shaft a slight rocking movement for swinging said fingers in said grooves away from the first-named roller for preventing the fingers from pressing on said first-named roller.

7. In a rotary duplicating mechanism, the

combination of a frame, a drum rotatably mounted thereon and having a recess in its face at one side of the drum, means for supporting a copy sheet releasably on said drum with its forward end portion extending over said recess, a stripping roller rotatably mounted on said frame in slightly spaced relation to the drum, means for driving said roller, a roller member movably mounted on said frame so as to be movable outwardly toward said first-named roller in substantially a tangential direction with respect to said first-named roller so as to engage said roller at the limit of its outward movement, a pusher member swingingly mounted with respect to said second roller member adapted upon the outward movement of said second roller member in timed relation to the rotation of the drum to engage the forward end portion of the copy sheet on the drum and to move it outwardly into engagement with said first-named roller into position to be engaged between said two rollers, and means for giving said pusher member a slight rocking movement away from said first-named roller at the end of the outward movement of said second roller member for preventing said pusher member from pressing on said first-named roller.

8. In a rotary duplicating mechanism, the combination of a frame, a drum rotatably mounted thereon and having a recess in its face at one side of the drum, means for supporting a copy sheet releasably on said drum with its forward end portion extending over said recess, a stripping roller rotatably mounted on said frame in slightly spaced relation to the drum, means for driving said roller, a shaft movably mounted on said frame so as to be movable outwardly toward said first-named roller in substantially a tangential direction with respect to said first-named roller, a plurality of roller sections rotatably mounted on said shaft so as to engage said first-named roller at the limit of the outward movement of said shaft, a plurality of pusher fingers fixedly mounted on said shaft between successive roller sections adapted upon the outward movement of said shaft in timed relation to the rotation of the drum to engage the forward end portion of the copy sheet on the drum and to move it outwardly into engagement with said first-named roller into position to be engaged between said two rollers, and means for giving said pusher fingers a slight swinging movement away from said first-named roller at the end of the outward movement of said shaft for preventing said fingers from pressing on said first-named roller.

9. In a rotary duplicating mechanism, the combination of a frame, a drum rotatably mounted thereon and having a recess in its face at one side of the drum, means for supporting a copy sheet releasably on said drum with its forward end portion extending over said recess, a stripping roller rotatably mounted on said frame in slightly spaced relation to the drum, means for driving said roller, arms pivotally mounted on said frame at opposite ends of said drum, a shaft mounted between said arms so as to have rotary movement with respect to the arms and arranged so as to move with said arms outwardly toward said first-named roller in substantially a tangential direction with respect to said first-named roller, a plurality of roller sections rotatably mounted on said shaft so as to engage said first-named roller at the limit of the outward movement of said shaft, a plurality of pusher fingers fixedly mounted on said shaft between successive roller sections adapted upon the outward movement of said shaft in timed relation to the rotation of the drum to engage the forward end portion of the copy sheet on the drum and to move it outwardly into engagement with said first-named roller into position to be engaged between said two rollers, means for holding said fingers normally in predetermined position with respect to said arms but adapted to yield for permitting a slight swinging movement of the fingers, an arm extending from said shaft, and adjustable means carried by said frame adapted by engagement with said last-named arm at the end of the movement of said shaft outwardly to rock said shaft and said fingers in the direction away from said first-named roller for preventing said fingers from pressing on said first-named roller.

10. In a rotary duplicating mechanism, the combination of a frame, a drum rotatably mounted thereon and having a recess in its face at one side of the drum, means for supporting a copy sheet releasably on said drum with its forward end portion extending over said recess, a stripping roller rotatably mounted on said frame in slightly spaced relation to the drum, means for driving said roller, a second roller rotatably mounted on said frame in engagement with said first-named roller so as to cooperate therewith for pulling a copy sheet off the drum, said roller being circumferentially grooved at a plurality of points therealong, a shaft movably mounted on said frame so as to be movable toward and from the bite of said two rollers and so as to be rocked slightly with respect to its supporting means, fingers on said shaft in position to enter the grooves of said second roller adapted by outward movement in timed relation to the rotation of the drum to engage the forward end portion of a copy sheet on the drum and to push the sheet outwardly into the bite of said two rollers, means for moving said shaft and fingers outwardly, roller sections rotatably mounted on said shaft between said fingers in position to engage said first-named roller at the end of the outward movement of said shaft, and means actuated in timed relation to the outward movement of said shaft and fingers for giving the shaft a slight rocking movement for swinging said fingers in said grooves away from the first-named roller for preventing the fingers from pressing on said first-named roller.

11. In a rotary duplicating mechanism, the combination of a frame, a drum rotatably mounted thereon and having a recess in its face at one side of the drum, means for supporting a copy sheet releasably on said drum with its forward end portion extending over said recess, a stripping roller rotatably mounted on said frame in slightly spaced relation to the drum, means for driving said roller, arms pivotally mounted on said frame at opposite ends of said drum, a shaft mounted between said arms so as to have rotary movement with respect to the arms and arranged so as to move with said arms outwardly toward said first-named roller in substantially a tangential direction with respect to said first-named roller, a plurality of roller sections rotatably mounted on said shaft so as to engage said first-named roller at the limit of the outward movement of said shaft, a plurality of pusher fingers fixedly mounted on said shaft between successive roller sections adapted upon the outward movement of said shaft in timed relation to the rotation of the drum to engage the

forward end portion of the copy sheet on the drum and to move it outwardly into engagement with said first-named roller into position to be engaged between said two rollers, means for holding said fingers normally in predetermined position with respect to said arms but adapted to yield for permitting a slight swinging movement of the fingers, an arm extending from said shaft, adjustable means carried by said frame adapted by engagement with said last-named arm at the end of the movement of said shaft outwardly to rock said shaft and said fingers in the direction away from said first-named roller for preventing said fingers from pressing on said first-named roller, and a third roller rotatably mounted on said frame in engagement with said first-named roller and circumferentially grooved at a plurality of points therealong opposite to said fingers so as to permit said fingers to approach into close proximity to the bite of said first-named roller and said third roller and to have the required swinging movement away from said first-named roller.

12. In a rotary duplicating mechanism, the combination of a frame, a drum rotatably mounted thereon and having a recess in its face at one side of the drum, means for supporting a copy sheet releasably on said drum with its forward end portion extending over said recess, a stripping roller rotatably mounted on said frame in slightly spaced relation to the drum, means for driving said roller, a second roller rotatably mounted on said frame in engagement with said first-named roller so as to cooperate therewith for pulling a copy sheet off the drum, said roller being circumferentially grooved at a plurality of points therealong, a shaft rotatably mounted on said frame adjacent to said roller, arms carried by said shaft at opposite ends of said drum so as to swing in unison about said shaft, a second shaft mounted between said arms so as to have rotary movement with respect to the arms and arranged so as to move with said arms toward and from the roller tangentially thereof, means for moving said arms in timed relation to the rotation of the drum for carrying said second shaft into and out of the recess of said drum, fingers fixedly mounted on said second shaft in position to engage the forward end portion of said copy sheet on the drum upon outward movement of said second shaft for moving said copy sheet into the bite of said two rollers with the fingers entering the grooves in said second roller, and means for giving said second shaft a slight rocking movement for carrying said fingers away from the first-named roller as the fingers come to their outermost positions for preventing the fingers from pressing on said first-named roller.

13. In a rotary duplicating mechanism, the combination of a frame, a drum rotatably mounted thereon and having a recess in its face at one side of the drum, means for supporting a copy sheet releasably on said drum with its forward end portion extending over said recess, a stripping roller rotatably mounted on said frame in slightly spaced relation to the drum, means for driving said roller, a shaft rotatably mounted on said frame adjacent to said roller, arms carried by said shaft at opposite ends of said drum so as to swing in unison about said shaft, a second shaft mounted between said arms so as to have rotary movement with respect to the arms and arranged so as to move with said arms toward and from the roller tangentially thereof, means for moving said arms in timed relation to the rotation of the drum for carrying said second shaft into and out of the recess of said drum, fingers fixedly mounted on said second shaft in position to engage the forward end portion of said copy sheet on the drum upon outward movement of said second shaft for moving said copy sheet into engagement with said roller, roller means rotatably mounted on said second shaft in position to have operative engagement with said first-named roller when said second shaft reaches its outermost position serving to cooperate with said first-named roller for pulling the engaged copy sheet off the drum, and means for giving said second shaft a slight rocking movement for carrying said fingers away from the first-named roller as the fingers come to their outermost positions for preventing the fingers from pressing on said first-named roller.

14. In a rotary duplicating mechanism, the combination of a frame, a drum rotatably mounted thereon and having a recess in its face at one side of the drum, means for supporting a copy sheet releasably on said drum with its forward end portion extending over said recess, a stripping roller rotatably mounted on said frame in slightly spaced relation to the drum, means for driving said roller, a second roller rotatably mounted on said frame in engagement with said first-named roller so as to cooperate therewith for pulling a copy sheet off the drum, said roller being circumfentially grooved at a plurality of points therealong, a shaft rotatably mounted on said frame adjacent to said roller, arms carried by said shaft at opposite ends of said drum so as to swing in unison about said shaft, a second shaft mounted between said arms so as to have rotary movement with respect to the arms and arranged so as to move with said arms toward and from the roller tangentially thereof, means for moving said arms in timed relation to the rotation of the drum for carrying said second shaft into and out of the recess of said drum, fingers fixedly mounted on said second shaft in position to engage the forward end portion of said copy sheet on the drum upon outward movement of said second shaft for moving said copy sheet into the bite of said two rollers with the fingers entering the grooves in said second roller, roller means rotatably mounted on said second shaft in position to have operative engagement with said first-named roller when said second shaft reaches its outermost position serving to cooperate with said first-named roller and said second roller for pulling the engaged copy sheet off the drum, and means for giving said second shaft a slight rocking movement for carrying said fingers away from the first-named roller as the fingers come to their outermost positions for preventing the fingers from pressing on said first-named roller.

15. In a rotary duplicating mechanism, the combination of a frame, a drum rotatably mounted thereon and having a recess in its face at one side of the drum, means for supporting a copy sheet releasably on said drum with its forward end portion extending over said recess, a stripping roller rotatably mounted on said frame in slightly spaced relation to the drum, means for driving said roller, a second roller rotatably mounted in engagement with said first-named roller, a pusher member movable outwardly on said frame for pushing the forward end portion of a copy sheet on the drum into the bite

of said two rollers, means for moving said pusher member outwardly in timed relation to the rotation of the drum, and a third roller movable outwardly with said pusher member adapted by pressure outwardly on said driven roller to reinforce the grip on said copy sheet for assisting in the stripping operation.

16. In a rotary duplicating mechanism, the combination of a frame, a drum rotatably mounted thereon and having a recess in its face at one side of the drum, means for supporting a copy sheet releasably on said drum with its forward end portion extending over said recess, a stripping roller rotatably mounted on said frame in slightly spaced relation to the drum, means for driving said roller, a second roller rotatably mounted in engagement with said first-named roller, pusher means comprising a plurality of outwardly extending fingers arranged in substantially spaced relation to each other longitudinally of said rollers and movable outwardly on said frame for pushing the forward end portion of a copy sheet on the drum into the bite of said rollers, means for moving said pusher means outwardly in timed relation to the rotation of the drum, and a third roller movable outwardy with said fingers in position to press the copy against said driven roller in spaced relation to said second roller when said copy sheet has passed into the bite of said first-named two rollers.

17. In a rotary duplicating mechanism, the combination of a frame, a drum rotatably mounted thereon and having a recess in its face at one side of the drum, means for supporting a copy sheet releasably on said drum with its forward end portion extending over said recess, a stripping roller rotatably mounted on said frame in slightly spaced relation to the drum, means for driving said roller, other roller means cooperating with said first-named roller to grip a copy sheet for stripping it from the drum, pusher means comprising a plurality of outwardly extending fingers movably supported on said frame independently of the drum and arranged in substantially spaced relation to each other longitudinally of said roller and movable outwardly on said frame into close proximity to the line of contact of said other roller means with said first-named roller for pushing the forward end portion of a copy sheet on the drum into engagement with said driven roller, and means for moving said pusher means outwardly in timed relation to the rotation of the drum.

18. In a rotary duplicating mechanism, the combination of a frame, a drum rotatably mounted thereon and having a recess in its face at one side of the drum, means for supporting a copy sheet releasably on said drum with its forward end portion extending over said recess, a stripping roller rotatably mounted on said frame in slightly spaced relation to the drum, means for driving said roller, a second roller rotatably mounted in engagement with said first-named roller and having a plurality of circumferential grooves thereabout in spaced relation to each other longitudinally of the roller, pusher means comprising a plurality of outwardly extending fingers movably supported on the frame independently of the drum and arranged in spaced relation to each other and movable outwardly into said groooves into close proximity to the line of contact of said two rollers for pushing the forward end portion of a copy sheet on the drum into the bite of said rollers, and means for moving said pusher means outwardly in timed relation to the rotation of the drum.

19. In a rotary duplicating mechanism, the combination of a frame, a drum rotatably mounted thereon and having a recess in its face at one side of the drum, means for supporting a copy sheet releasably on said drum with its forward end portion extending over said recess, a stripping roller rotatably mounted on said frame in slightly spaced relation to the drum, means for driving said roller, a second roller rotatably mounted in engagement with said first-named roller and having a plurality of circumferential grooves thereabout in spaced relation to each other longitudinally of the roller, pusher means comprising a plurality of outwardly extending fingers arranged in spaced relation to each other and movable outwardly into said grooves for pushing the forward end portion of a copy sheet on the drum into the bite of said rollers, means for moving said pusher means outwardly in timed relation to the rotation of the drum, and a third roller movable outwardly with said fingers in position to press the copy sheet against said driven roller in spaced relation to said grooved roller when said copy sheet has passed into the bite of said first-named two rollers.

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