

Nov. 29, 1938.

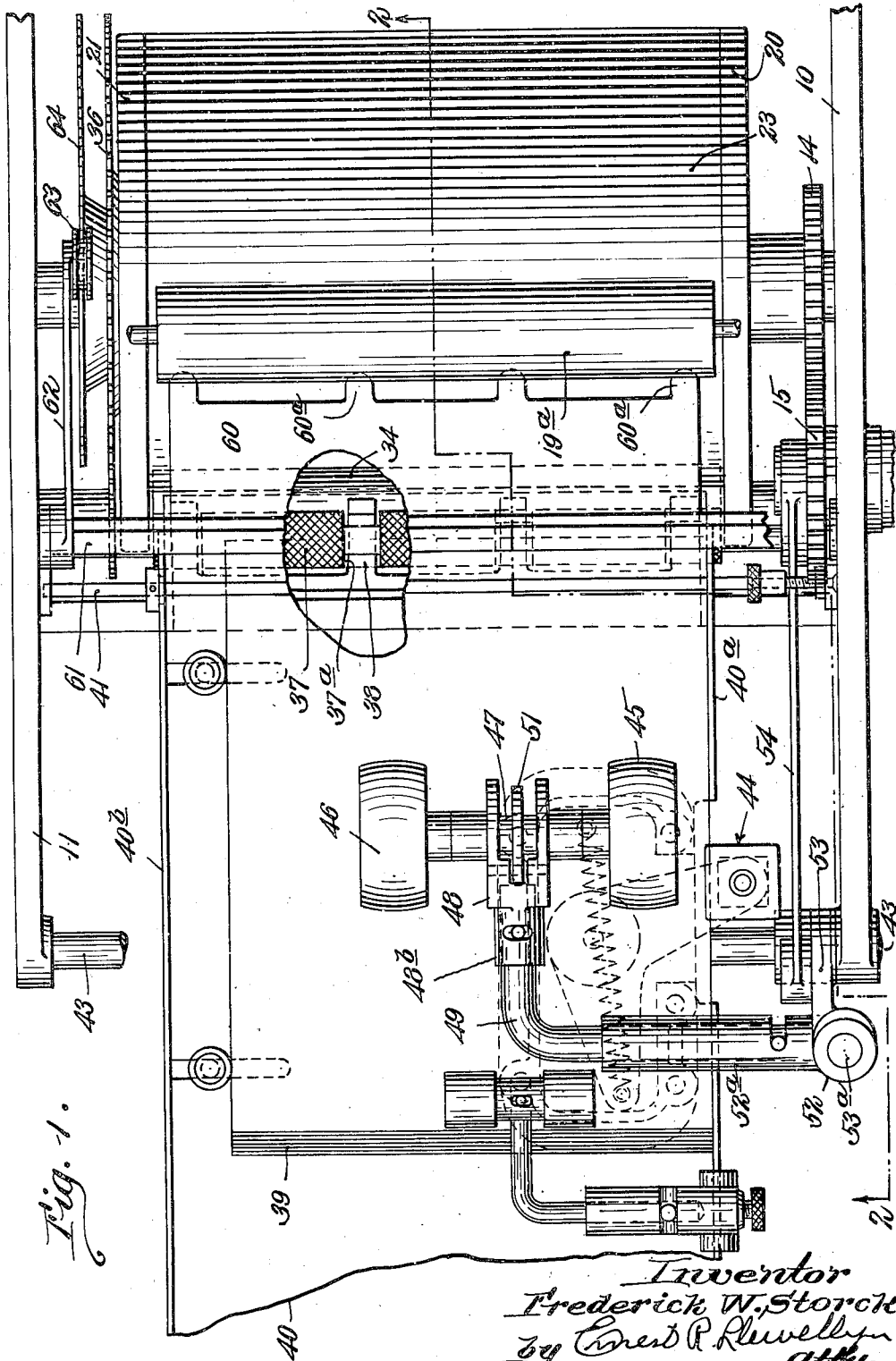
F. W. STORCK

2,138,682

SHEET MARGIN STOP FOR DUPLICATORS

Filed Sept. 16, 1937

5 Sheets-Sheet 1



Nov. 29, 1938.

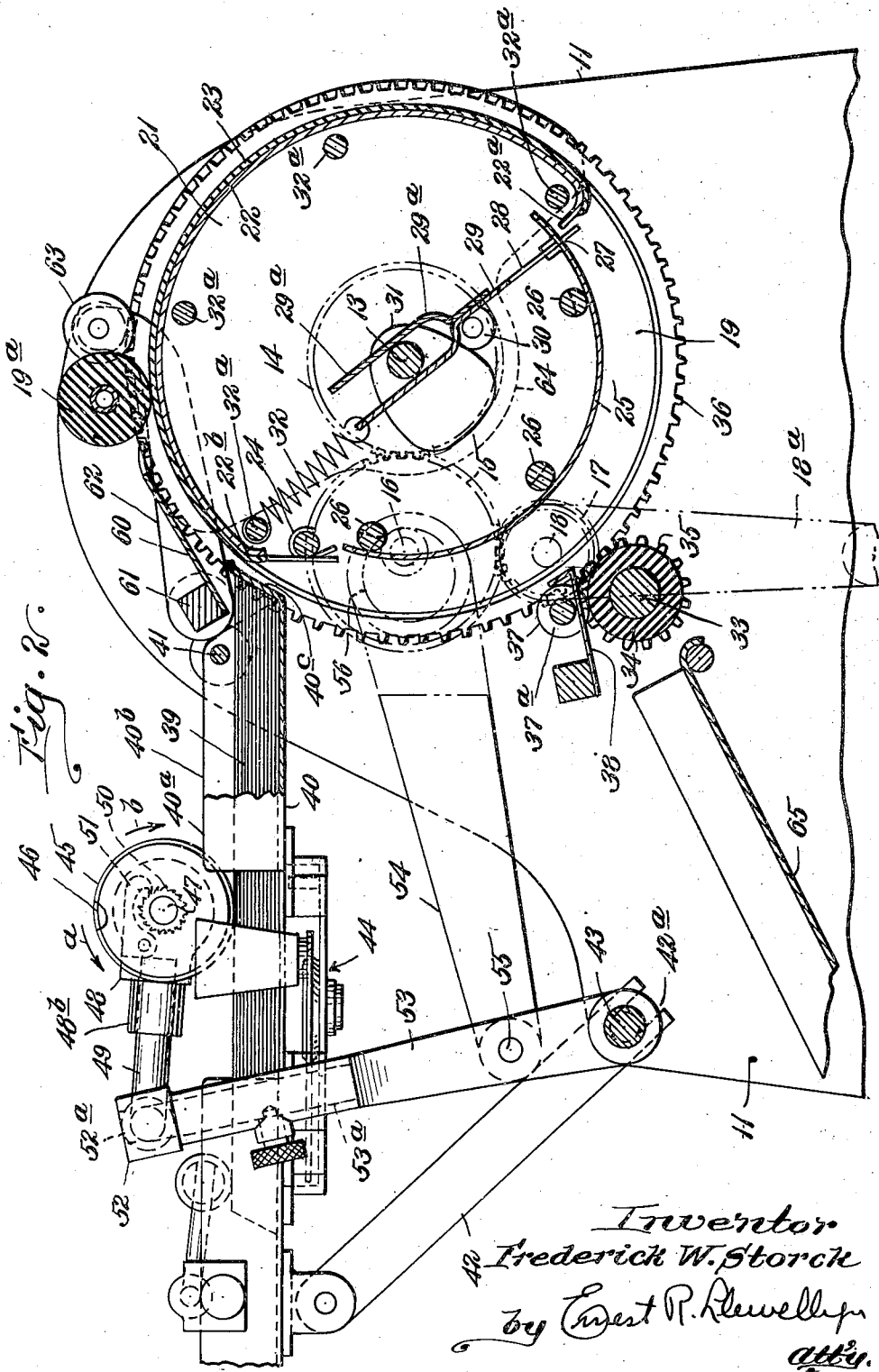
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2,138,682

SHEET MARGIN STOP FOR DUPLICATORS

Filed Sept. 16, 1937

5 Sheets-Sheet 2



Nov. 29, 1938.

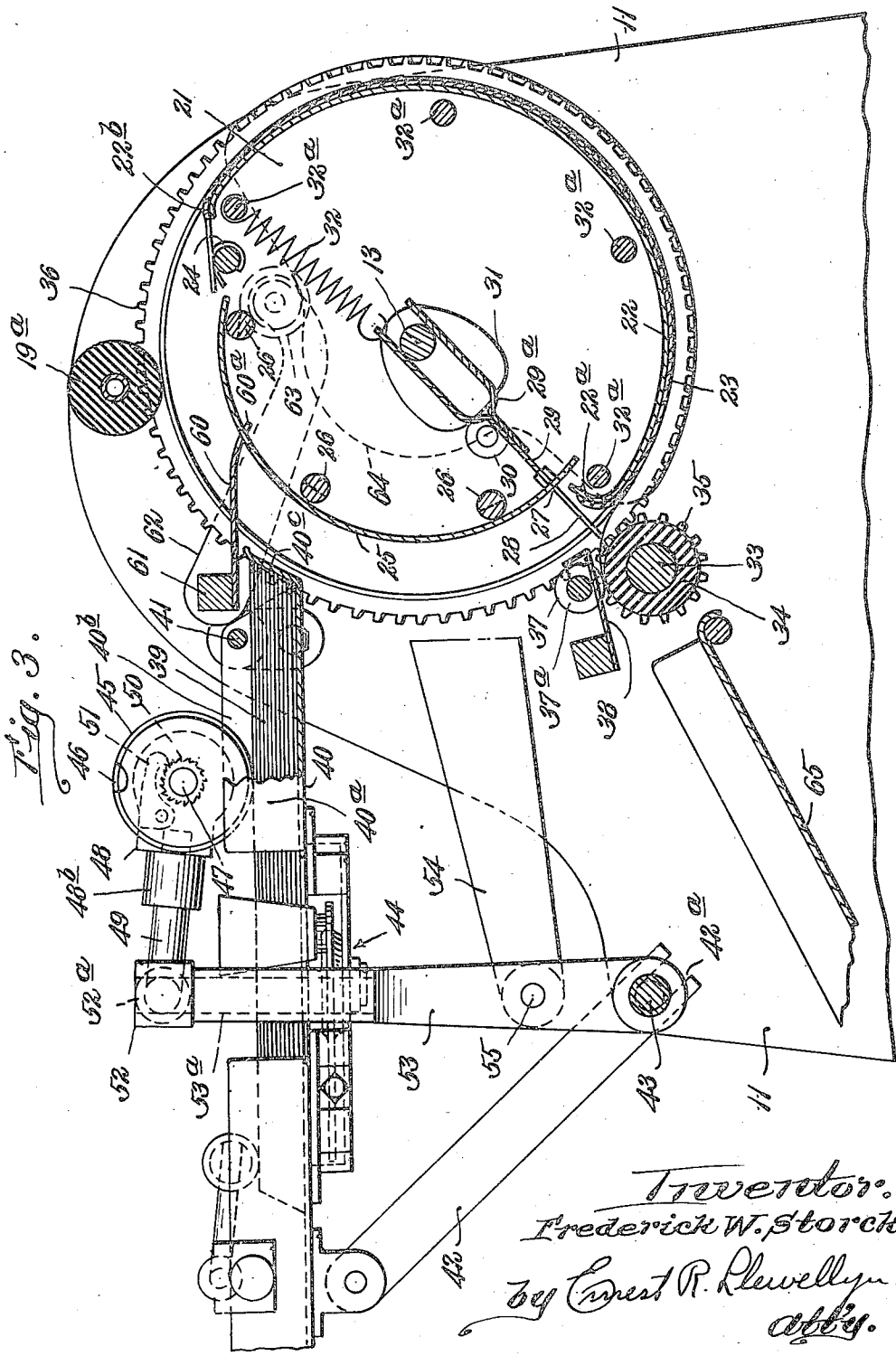
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2,138,682

SHEET MARGIN STOP FOR DUPLICATORS

Filed Sept. 16, 1937

5 Sheets-Sheet 3



Nov. 29, 1938.

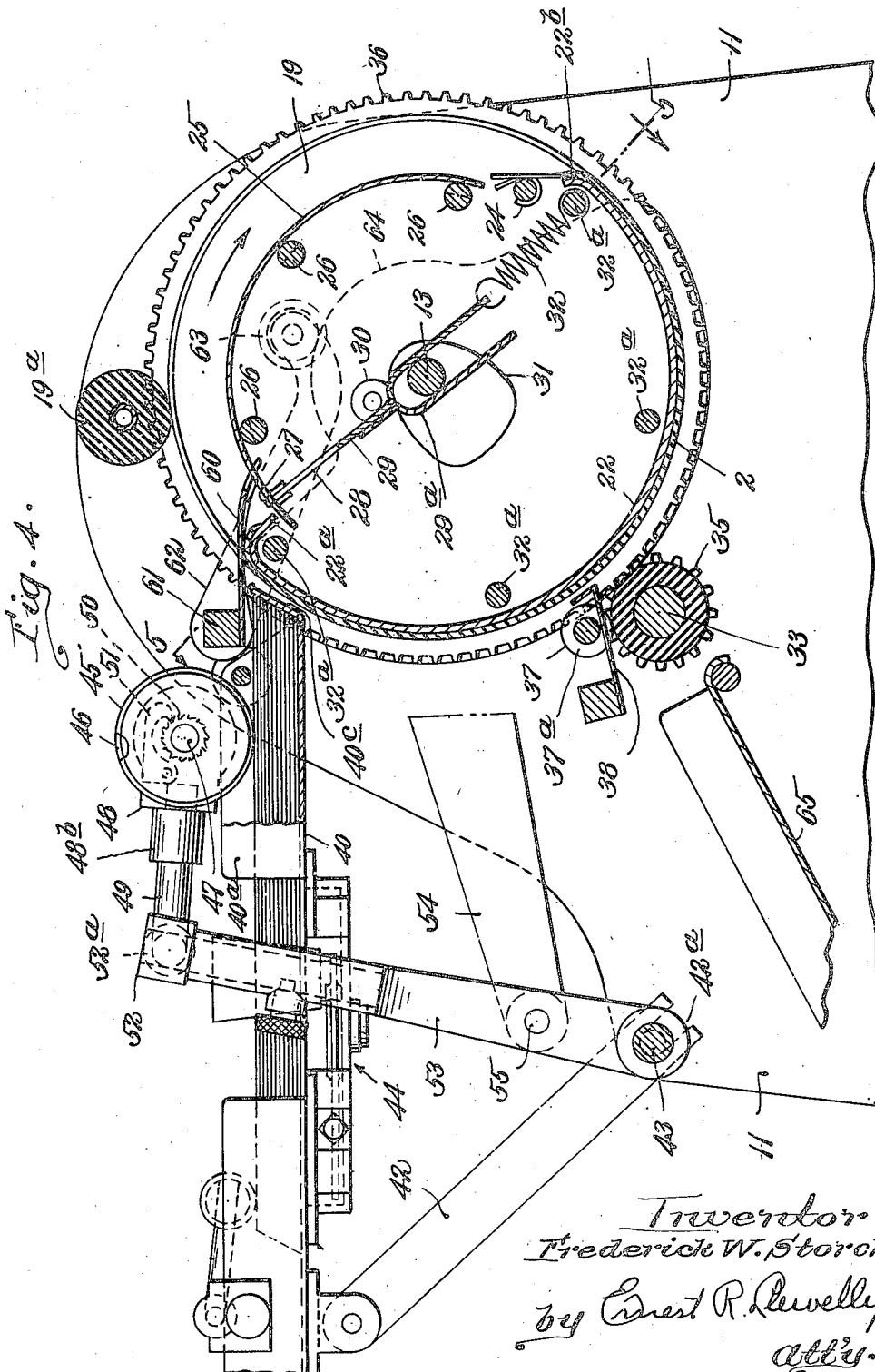
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5 Sheets-Sheet 4



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Filed Sept. 16, 1937

5 Sheets-Sheet 5

Fig. 5.

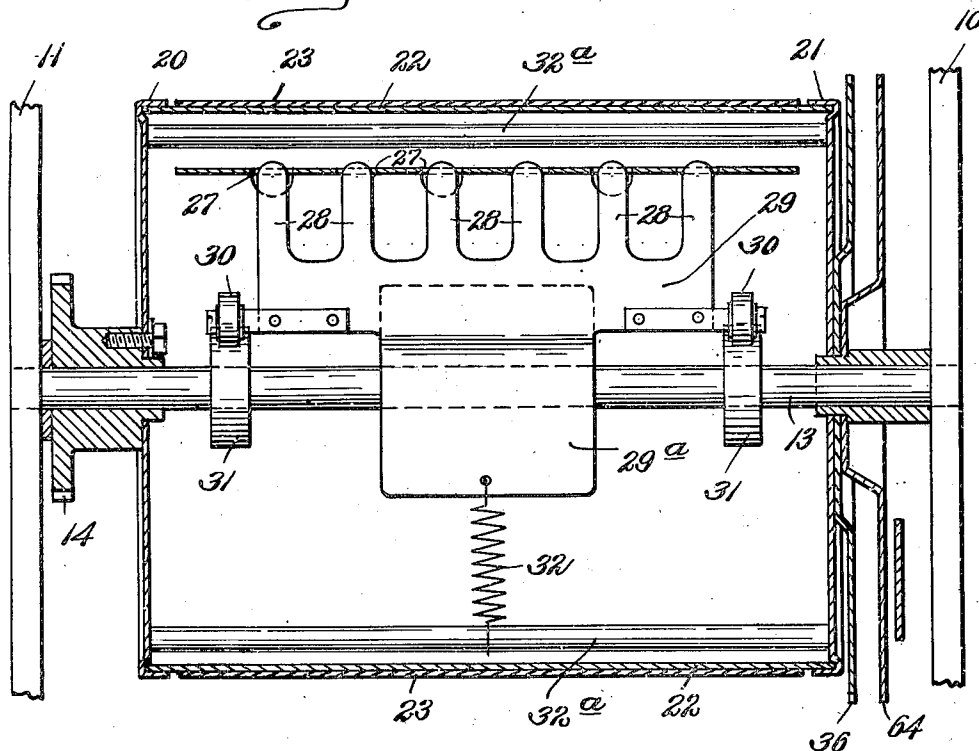
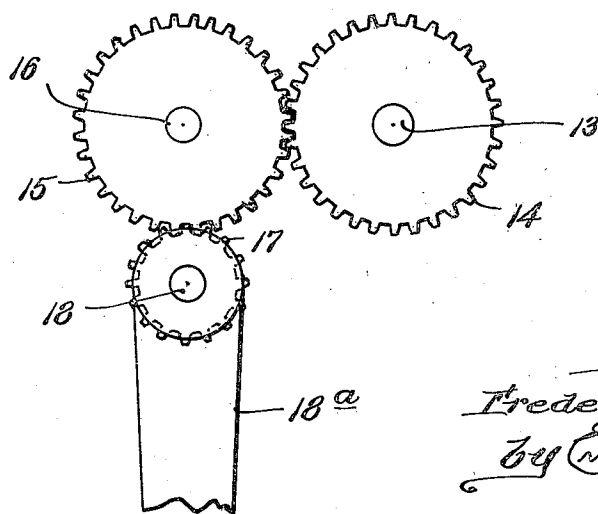


Fig. 6.



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UNITED STATES PATENT OFFICE

2,138,682

SHEET MARGIN STOP FOR DUPLICATORS

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Application September 16, 1937, Serial No. 164,194

8 Claims. (Cl. 101—132)

This invention relates to duplicating machines and is particularly adapted to be associated with rotary duplicators of a character in which adhesive gelatin bands are provided to receive impressions from a master copy and wherein these impressions are subsequently duplicated on blank sheets of paper, or the like, that are brought into contact under pressure with the gelatin medium, and the present invention specifically relates to a margin stop and sheet positioning device that is adapted to position the advance end of the sheet in a manner that provides a free marginal advance end when the sheet is operatively engaged with the adhesive gelatin duplicating medium.

The use of a gelatin medium adapted to receive an impression in reverse, or negative, of matter to be copied and a positive duplicate copy made therefrom by bringing the sheets of paper, or the like, into contact therewith is common and well-known in the duplicating art.

A rotary duplicator of the herein referred to character is shown and described in my United States Letters Patent No. 1,926,317. The duplicator disclosed in this patent, as in the present instance, is provided with an opening or space in the peripheral face of the drum that permits positioning the advance end portion of the sheet so that it will be free from operative engagement when the adhesive gelatin film engages with the sheet. This free end of the sheet is essential to permit of the sheet being subsequently stripped from the gelatin after the duplicating operation has been completed.

Since the disclosure contained in my Patent No. 1,926,317 it has become well known that the required free end of a sheet may be effected by providing an opening in the peripheral face of the drum and utilizing a shoulder of the gelatin, closely adjacent the drum opening, to engage with the sheet, beyond the free margin thereof, for the purpose of advancing the sheet for operative engagement with the duplicator film or band.

I am aware that various devices have been provided for feeding a sheet singly from a stack to a duplicator, and a feeding device of this character that is particularly well adapted to be substantially associated with the present invention is shown and described in the co-pending application of Frederick W. Storck and Carl V. Fran-
son, Serial No. 115,548.

A special object of my present invention is to provide a duplicating machine in which the printing drum or platen may be continuously rotated and a sheet automatically advanced and posi-

tioned for registering engagement with the duplicating medium during the continuous rotation of the printing drum and wherein the advance marginal end of the sheet will be free when the sheet is engaged with and further advanced in operative engagement with the duplicating medium.

Another particular object of the invention is to provide a novel sheet guiding means actuated in a timed relation with the rotation of the drum to direct the leading edge of a sheet into a positioned relation and to further press a portion of the sheet into operative engagement with the duplicating medium.

A further object is to provide a combined sheet guiding, positioning and pressing device of a simple construction with few working parts that will positively position the advance end of the sheet so that the sheet will register for engagement with the duplicating medium.

With the above and various other objects in view, the invention may consist of certain novel features of construction and operation as will be more fully described and particularly pointed out in the specification, drawings and claims appended hereto and forming a part hereof.

In the drawings, I have illustrated a preferred embodiment of my invention sufficient to enable those skilled in the art to understand the construction and operation thereof with reference to the following description in which like reference characters are used to designate like parts.

Referring to the drawings:

Fig. 1 is a plan view of a rotary duplicating machine having my improvements embodied therewith.

Fig. 2 is a sectional elevation taken substantially along line 2—2, Fig. 1.

Fig. 3 is a view corresponding to Fig. 2, but shows some of the parts in a different position.

Fig. 4 is another sectional elevation corresponding substantially to Figs. 2 and 3, but shows some of the parts in still another position.

Fig. 5 is a transverse section taken substantially along line 5—5, Fig. 4, and

Fig. 6 is a detail of the machine drive gearing.

The duplicating machine

As illustrated by the drawings, the machine is provided with opposed side frames 10, 11 that are retained in spaced relation by suitable tie rods. The supporting shaft 13 is rotatably mounted in suitable bearings in the opposed side frames and

has a gear 14 secured thereto. This gear 14 meshes with and is rotated by an intermediate gear 15 which is rotatably supported on a stud 16 secured in the side frame 10. The intermediate gear 15 meshes with a driving gear 17 secured on a stud shaft 18 rotatably supported in the side frame 10. In this instance the outer end of the stud shaft 18 has an operating crank 18a secured thereto and by which the driving mechanism may be actuated, but it is obvious that other means may be employed as a prime mover.

The printing platen or drum indicated generally at 19 is provided with opposed end walls 20, 21 that are adapted to engage with and support the segmental face plate 22 of the drum, the drum being retained in assembled relation by suitable tie rods. This segmental face plate 22 effects an opening in the peripheral face of the drum and the longitudinal edges of the plate 22 are bent inwardly, the edge 22a being provided with suitable means for engaging with one end of a fabric strip 23 that supports the gelatin or like duplicating medium. One end of the fabric strip having been attached to the shoulder edge 22a, the strip is then passed over the face plate 22 and the other end of the strip is attached over the shoulder edge 22b by a suitable tensioning device 24 and by which the strip 23 is drawn tightly into engagement with the face plate 22.

It will be observed from the drawings that the face plate 22 in this instance covers slightly more than one-half of a full circumference, although this may be varied without substantially affecting the purpose of the opening, as will be hereinafter more fully pointed out. This opening in the drum is, however, closed by a substantially inset curved plate 25, the radius of curvature of which is less than the radius of curvature of the face plate 22. This curved plate 25 is secured to the drum tie rods 26 in any suitable manner. Adjacent one end of the plate 25 is a row of slots or recesses 27 through which slots or recesses extend the stripping guide fingers 28 that, in this instance, are integral parts of a plate 29. This plate 29 is provided with a U-shaped portion 29a that engages with the shaft 13 and the opposed side edges of the plate 29 are each provided with a cam roller 30 that engages with the peripheral face of actuating cams 31 secured to the shaft 13. The cam rollers 30 are retained in engagement with the face of the cams 31 by means of a pull spring 32 having one end secured to the U-shaped portion 29a, of the plate 29, and its opposed end fixed to one of the drum tie rods 32a.

Sheet stripping device

Extending transversely between the side frames and rotatably mounted therein is a shaft 33 which has attached thereto a suitable roller 34. This shaft 33 is also provided with a gear 35 that meshes with and is driven by a gear 36 rotated with the printing platen or drum 19. Coacting with the roller 34 is a second rotatable roller 37 which is preferably provided with a knurled peripheral face and spaced apart grooves 37a adapted to permit the guide fingers 38 to extend inwardly between the stripper rollers 34, 37 and adjacent the bight formed between these rollers 34, 37.

Sheet feeding device

Associated with the duplicating machine is a stack of sheets 39 supported upon a base 40 that

is provided with opposed upwardly extending flanges 40a, 40b and a front stop 40c that is preferably disposed at an angle of substantially 30° from the end face plane of the stack or at an angle so disposed that sheets having advance ends inclined to curl downwardly will not buckle against this stop 40c as the sheet is advanced from the stack. The flanges 40a, 40b are adapted to engage with a transverse rod 41 that acts as a support for the front end of the base 40. Pivotaly secured to the base 40 is a knee brace 42 having its lower end provided with a U-shaped slot 42a that engages with one of the frame tie rods 43 in a manner to support the rear end of the base. These supports for the base 40 may obviously be constructed so as to permit a ready removal of the base from the machine. One of the side flanges 40a is cut away so as to permit the side friction device generally indicated at 44 to contact with the side edge of the stack 39. The illustrated mechanism for advancing a sheet from the stack 39 includes a pair of rollers 45, 46 formed of a suitable frictional material. These rollers 45, 46 are secured on a shaft 47 that is rotatably supported in a suitable bracket 48 which, in turn, has its bearing 48b mounted with a limited rotative movement upon one end of an angle rod 49.

The roller shaft 47 has a ratchet wheel 50 also secured thereto which is adapted for engagement with a ratchet dog 51 pivoted in the roller shaft bracket 48. This ratchet wheel 50 and its coacting dog 51 are of a conventional design and are adapted to permit free rotative movement of the roller shaft 47 and its attached elements in the direction of arrow a, Fig. 2 and to arrest rotative movement of these elements in the direction of arrow b.

The opposite end of the angle rod 49 is mounted with a limited rotative movement in a bearing 52a of a member 52 which, in turn, is adjustably secured on a trunnion 53a forming a part of the feed oscillating lever 53. The lower end of the lever 53 is pivotally mounted on one of the frame cross rods 43 and this lever 53 is oscillated by means of a pitman 54 having one end pivoted at 55 to the lever 53 and its opposed end engaging with a crank disc 56 that is associated with the intermediate driving gear 15.

Various forms of sheet feeding devices may be utilized with the present invention and such devices are now known and used and a sheet feeding device corresponding substantially to the above is completely shown and described in the previously referred to co-pending application, therefore, detailed description of the means for advancing a sheet singly from the stack of sheets is thought to be unnecessary.

Sheet guiding and positioning device

To guide the advance marginal end of a sheet to its registering position, I have provided a guide plate 60 that is attached to a transverse bar 61 rockably mounted in suitable supports in the opposed side frames. This bar 61 has a cam lever 62 secured thereto that is provided with a cam roller 63 adapted for continued engagement with an actuating cam 64 secured to the drum shaft 13.

The guide plate 60 is provided with fingers 60a adapted to engage in and extend through suitable circumferential openings in the stop plate 25, see Fig. 3, the stop plate supporting rods being notched so as to permit the fingers 60a to remain in operative position during a rotative movement of the drum.

Operation

When the opening in the drum 19 is rotated to operative position, the cam 64 permits the guide plate 60 to engage in the drum opening with its fingers in operative engagement as illustrated at Fig. 3. As the guide plate 60 is positioned, the sheet feeding mechanism advances a single sheet from the stack 39, the advance end of the sheet engaging with the guide plate 60 and by which it is directed so that its front edge engages with the stop plate 25. The fingers 60a of the guide plate retain the front edge of the sheet in positioned engagement between the guide plate 60 and the stop plate 25 during rotative movement of the drum.

It is to be noted that in Fig. 4, the front end of the sheet is shown in its positioned relation, but in this view the front end is spaced from the inner face of the guide plate 60 merely for illustrative purposes, as normally the sheet end will follow the contour of and engage with the inner face of the guide plate 60.

The guide plate 60 remains in operative position as the drum shoulder 22a advances, in the direction of the arrow, and the adhesive shoulder of the gelatin band engages with the positioned sheet, see Fig. 4, the plate 60 acting to press a margin of the sheet into operative engagement with the gelatin and after which the cam 64 actuates the guide plate 60 and fingers 60a to their inoperative position as shown at Fig. 2.

After a margin of the sheet has been engaged with the gelatin shoulder 22a, the sheet is further withdrawn thereby as the drum 19 continues its rotative movement and, as the sheet becomes engaged between the drum 19 and its coacting pressure roller 19a, it is pressed into operative engagement with the gelatin duplicating medium and with an advance end portion of the sheet free.

As the drum continues its rotative movement, the stripping guide fingers 28 are actuated to engage with the free end of the sheet and direct this end into the bight of the stripping rollers 34, 37 and by which the sheet is stripped from the duplicating medium, during continued rotation of the drum 19, and directed into a suitable receptacle 65.

While the machine functions have been described separately, it is to be understood that the present machine is so adapted that these functions are performed in sequence during a continuous rotation of the printing platen or drum 19.

Having thus described my invention, what I claim is:

1. In a duplicating machine, a printing drum, means for rotating said drum, an opening in the peripheral face of said drum and extending longitudinally therein, a member carried by said drum and disposed in said opening and in a radially spaced relation to the printing surface of said drum, a guide member adapted to coact with said first member with means for rocking said guide member into and out of said drum opening in a timed relation to the rotative movement of said drum, a pressure roller adapted for engagement with the peripheral face of said drum, a copy sheet support with means for advancing the forward end of a sheet on said support into said drum opening and against said first member during a continuous rotation of said drum and whereby said first member and said guide member coact to form a margin stop for the advance

end of said sheet and position said sheet for operative engagement with said printing drum.

2. In a duplicating machine having a printing drum and a pressure roller coacting with said drum and means for rotating said drum and roller, together with means for advancing a sheet to be duplicated upon to said printing drum; a marginal stop for the advance end of said sheet that includes an opening in the peripheral face of said drum and extending longitudinally therein, an arcuate member carried by said drum and disposed in said drum opening and in a spaced relation to the normal peripheral face of said drum, a guide member pivotally associated with said drum and adapted to coact with said arcuate member and direct the forward edge of an advancing sheet thereagainst, means to actuate said guide relative to said drum opening and said arcuate member.

3. In a duplicating machine having a printing drum and a pressure roller coacting with said drum and means for rotating said drum and roller, together with means for advancing a sheet to be duplicated upon to said printing drum; a marginal stop for the advance end of said sheet that includes an opening in the peripheral face of the drum and extending longitudinally therein, a fixed member disposed in said drum and relative to said opening, a guide member normally disposed beyond the periphery of said drum and, when in operative position, associated with said fixed member whereby the forward end of an advancing sheet is positioned against said fixed member with means for moving said guide member into and out of operative position relative to the rotative cycle of said printing drum.

4. In a duplicating machine, a rotatable drum having an opening in its peripheral face and extending longitudinally therein, a duplicating band secured on the face of said drum and extending into said opening, means for advancing a sheet into said opening for engagement with said duplicating band, a marginal stop for the advance end of said sheet, said stop being operatively positioned in said opening and including a member fixed within said drum in spaced relation to said opening, a guide member adapted to cooperate with said fixed member with means for moving said guide member into and out of operative position and in a timed relation to the rotative movement of said drum and whereby the advancing edge of a sheet is guided to engage with said stop and retained in its positioned relation during a rotative movement of said drum, said guide, when operatively positioned, being effective to cause a portion of the positioned sheet to engage with and be further advanced for operative engagement by said duplicating band and with a free advance marginal end.

5. In a duplicating machine, a rotatable drum having an opening in its peripheral face and extending longitudinally therein, a duplicating band secured to the face of said drum and extending into said opening, means for rotating said drum, a support for sheets to be duplicated upon with means associated with said support for advancing a sheet therefrom into said drum opening and to urge the foremost edge thereof against a margin stop associated with said drum, said margin stop including a gauge member disposed in said drum opening, a guide for the advancing end of a sheet with means for actuating said guide into and out of its operative position in a timed relation to the rotative movement of

said drum, said guide being adapted to cooperate with said gauge member and retain the foremost edge of said sheet in its positioned engagement with said gauge during a portion of the rotative cycle of said drum, with means including said guide whereby a portion of the positioned sheet, beyond the margin thereof, is pressed into engagement with said duplicating band adjacent the drum opening whereby said sheet is further advanced for operative engagement with said duplicating band and with a free advance marginal end.

6. In a duplicating machine, a frame, a printing drum rotatably mounted in the frame, an opening in the peripheral face of said drum with means for advancing a forward marginal end of a sheet into said drum opening, a rockable juxtapositioned margin guide for the forward end of said sheet with means for actuating said guide into and out of said drum opening with means cooperating with said guide to position the advance end of said sheet, said guide being disposed to operatively engage a portion of the positioned sheet with said drum as said drum is rotated.

7. In a duplicating machine, a frame, a printing drum rotatably mounted in the frame and having an opening in the peripheral face thereof, a support for a stack of sheets to be duplicated

upon and having its front end portion disposed adjacent the periphery of said drum, and means for advancing a sheet from said stack with a forward marginal end of said sheet engaging in said drum opening, a rockable margin guide juxtapositioned relative to the front end of said stack, with cam means for actuating said guide to its functionally operative and inoperative positions and, when in operative position, said guide being disposed to operatively engage a portion of the sheet with said drum as said drum is rotated.

8. In a duplicating machine, a frame, a printing cylinder rotatably mounted in said frame and provided with a gelatin duplicating medium, an opening in the peripheral face of said cylinder, means to advance the forward end portion of a sheet into said drum opening, a margin guide juxtapositioned relative to said sheet advancing means and adapted to engage with and direct the forward end of the sheet to registering position in said drum with means for actuating said guide to its functionally operative and inoperative positions and, when in operative position, said guide being disposed to operatively engage a portion of said sheet with said cylinder as said cylinder is rotated.

FREDERICK W. STORCK.