Nov. 6, 1934. H. J. REARDON 1,979,811

DUPLICATING DEVICE

Filed Aug. 26, 1933 4 Sheets-Sheet 1

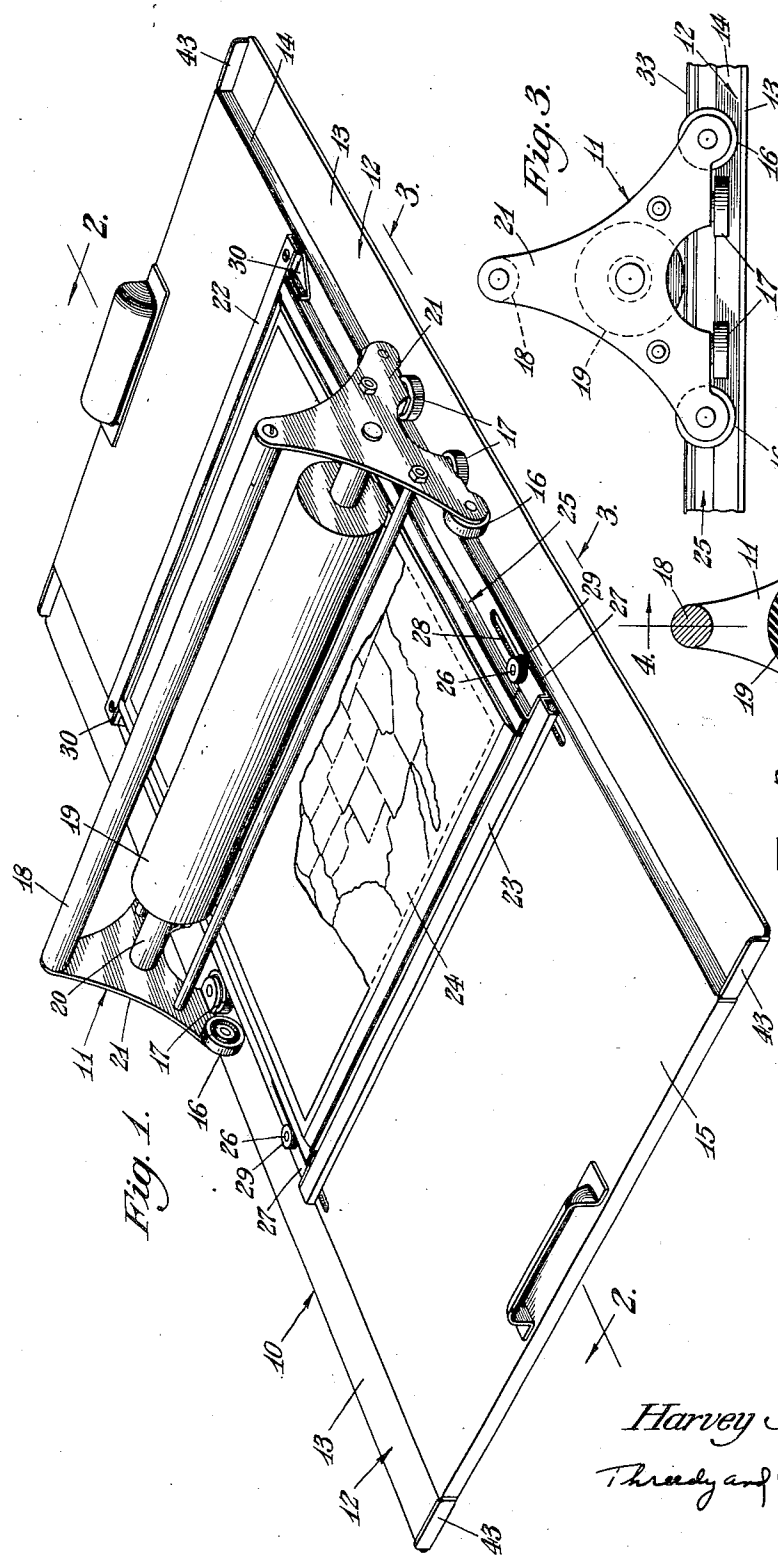


Fig. 1.

Fig. 3.

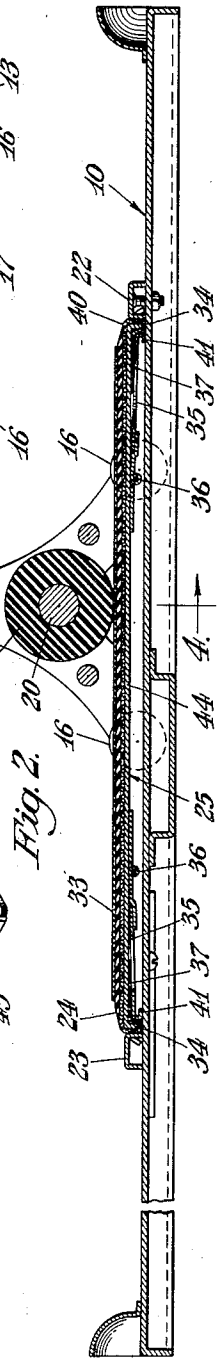


Fig. 2.

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Fig. 4.

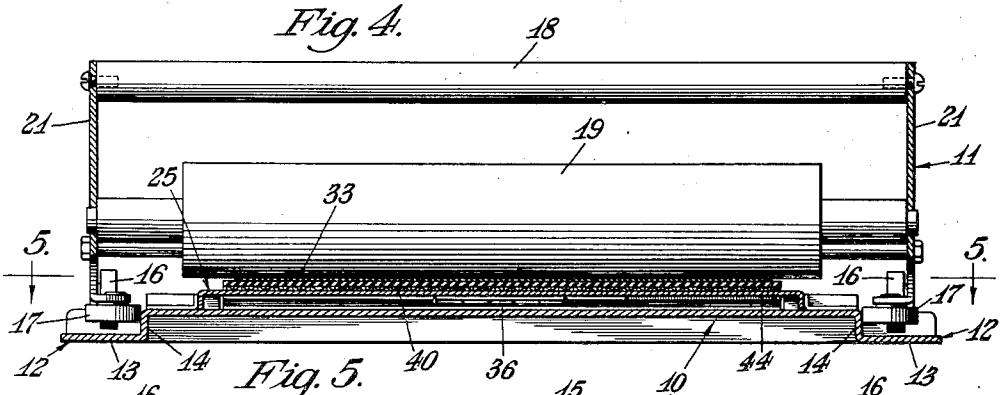


Fig. 5.

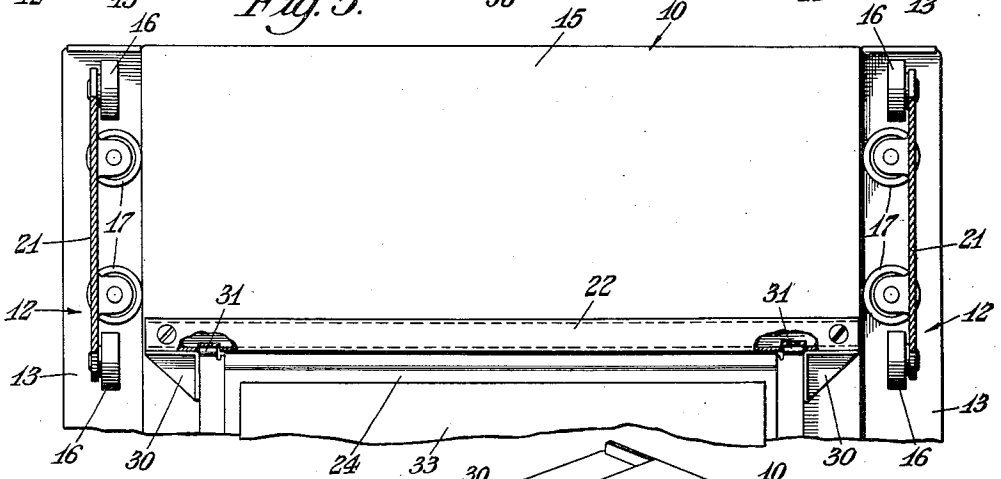
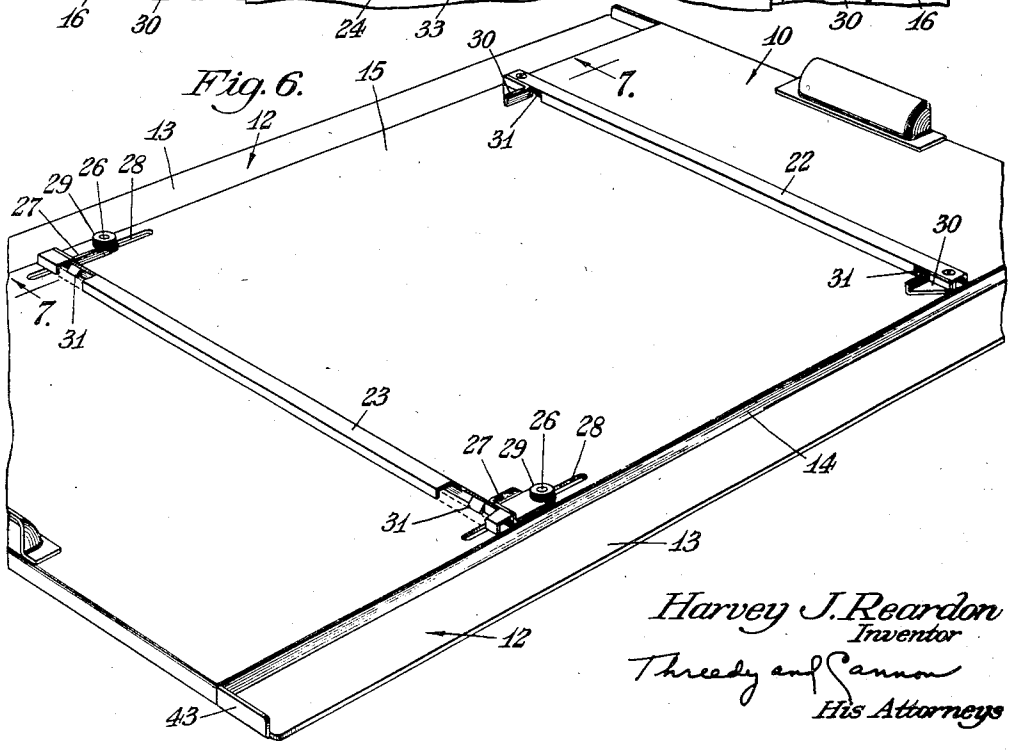


Fig. 6.



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Fig. 7.

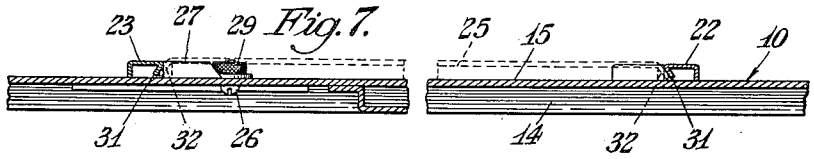


Fig. 8.

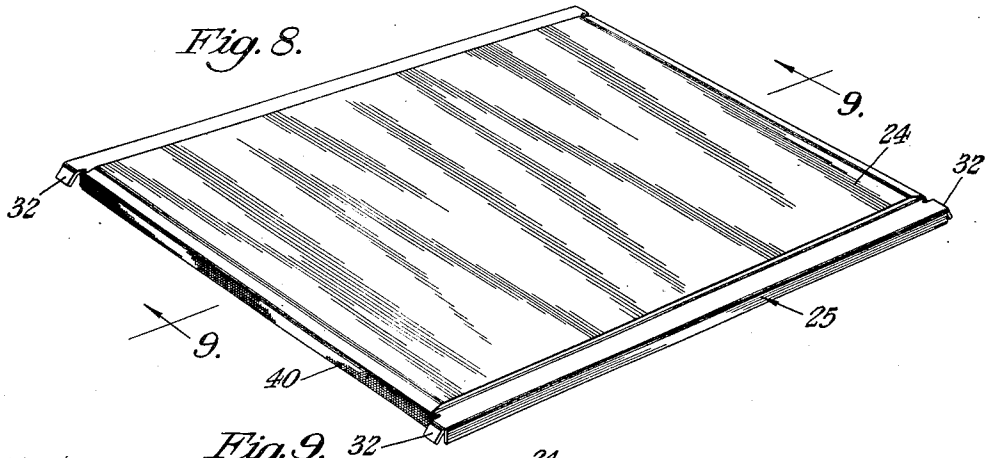


Fig. 9.

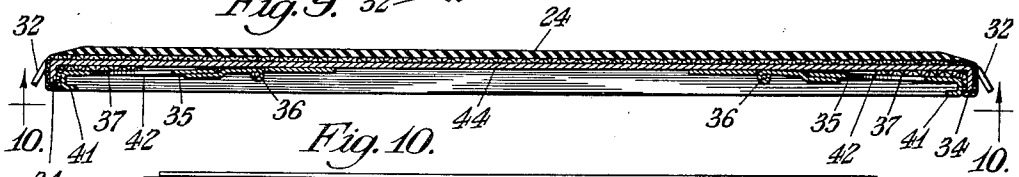
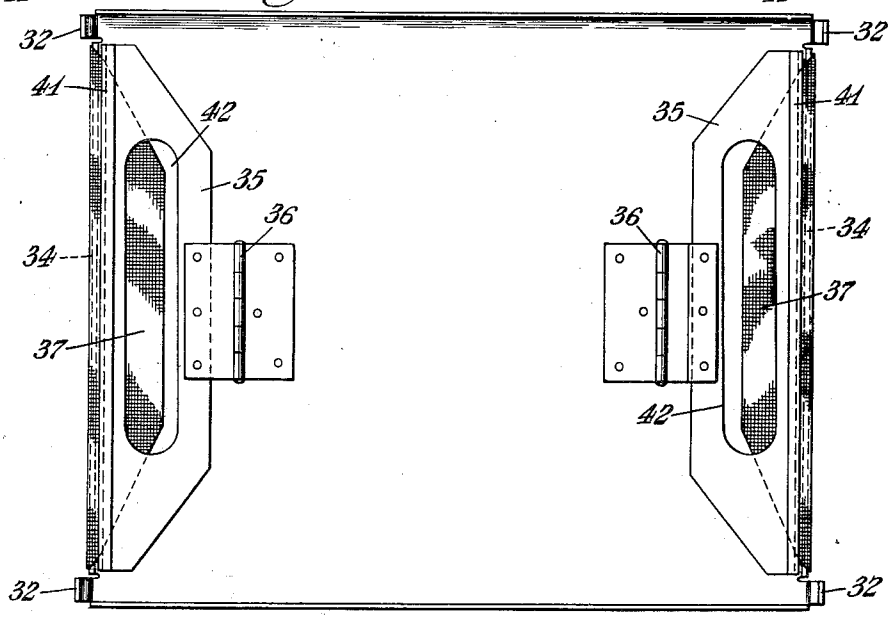


Fig. 10.



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Fig. 11.

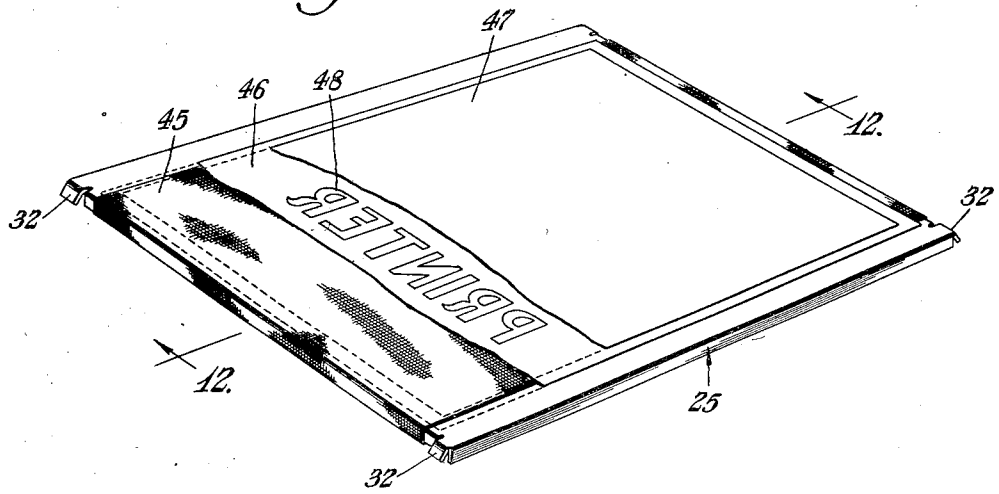
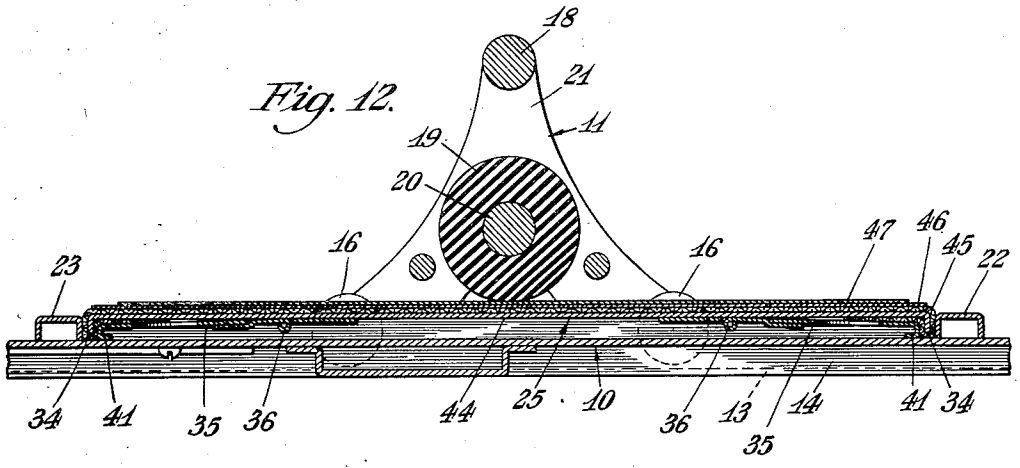


Fig. 12.



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Patented Nov. 6, 1934 1,979,811

UNITED STATES PATENT OFFICE

1,979,811

DUPLICATING DEVICE

Harvey J. Reardon, Chicago, Ill.

Application August 26, 1933, Serial No. 686,893

11 Claims. (Cl. 101—133)

This application is a continuation-in-part of my co-pending application on a Printing press, Serial No. 669,392, filed May 4, 1933, and allowed July 22, 1933, now Patent No. 1,924,288, dated August 29, 1933.

It is the primary object of this invention to adapt and modify the bed and cylinder printing press described and claimed in applicant's aforementioned patent specifically for use as a gelatin sheet duplicating device and for use as a stencil duplicating device.

An additional and essential object of the invention is to provide a new and improved gelatin sheet duplicating device, and a new and improved stencil sheet duplicating device; and, more particularly, to provide the duplicating device shown in the accompanying drawings and hereinafter described and claimed.

Other objects will appear hereinafter.

In the drawings:

Figure 1 is a perspective view of a preferred form of the new duplicating device showing a gelatin duplicating sheet assembled on the bed plate thereon in duplicating position;

Fig. 2 is a longitudinal sectional view on line 2—2 in Fig. 1;

Fig. 3 is a fragmentary end elevational view on line 3—3 in Fig. 1, showing how the impression roll or cylinder rides with its own weight and the weight of its carriage upon the gelatin duplicating sheet during the duplicating operation, causing the vertical rollers of the impression roll carriage to ride up slightly off the horizontal walls of their trackways;

Fig. 4 is a vertical sectional view on line 4—4 in Fig. 2, also illustrating the feature referred to above in the description of Fig. 3;

Fig. 5 is a fragmentary top plan view on line 5—5 in Fig. 4;

Fig. 6 is a perspective view illustrating the arrangement and construction of the bars for locating the duplicating sheet in working position upon the bed plate;

Fig. 7 is a sectional view on line 7—7 in Fig. 6, illustrating the means employed for locating and clamping the duplicating sheet and its supporting frame in working position upon the bed plate of the duplicating device and against movement relative thereto;

Fig. 8 is a perspective view illustrating the new supporting frame for the duplicating sheet and showing a gelatin duplicating sheet thereon;

Fig. 9 is a longitudinal sectional view on line 9—9 in Fig. 8 illustrating the supporting frame for the duplicating sheet and the new lock-up means for locking the duplicating sheet in duplicating position upon its supporting frame;

Fig. 10 is a bottom plan view on line 10—10 in Fig. 9 illustrating the lock-up means for locking the duplicating sheet in duplicating position upon its supporting frame;

Fig. 11 is a perspective view showing the supporting frame of Fig. 8 with an inking sheet laid thereon and a stencil sheet laid over the inking sheet; and

Fig. 12 is a composite sectional view similar to Fig. 2, including part of Fig. 2 and that section of Fig. 11 represented by the line 12—12, and showing the new duplicating device used specifically as a stencil duplicating device.

A preferred form of the new duplicating device is illustrated in the drawings and the same includes a bed or bed plate 10, and an impression roll carriage 11 movable thereover.

Formed in the bed plate 10 along the longitudinal edges thereof are parallel trackways 12 each of which includes a horizontal wall 13 and a vertical wall 14, so that the top or upper surface 15 of the bed plate 10 is disposed somewhat above the horizontal walls 13 of the trackways 12.

The impression roll carriage 11 includes vertical anti-friction elements or rollers 16 which are movable over the trackways 12 in engagement with the horizontal walls 13 thereof, and horizontal anti-friction elements or guiding rollers 17 which are movable over the trackways 12 in engagement with the vertical walls 14 thereof. The carriage 11 also includes a handle 18 and an impression roll or cylinder 19; the latter being mounted on a shaft 20 which has its ends rotatably journaled in the end plates 21 of the carriage 11. The impression roll 19 is preferably made of resilient material such, for example, as relatively hard rubber, but it may be made of wood, metal, or other substance.

Mounted on the upper or work surface 15 of the bed plate 10 are a relatively fixed work-locating bar 22 and a relatively movable slidable work-locating bar 23. These bars are designed to locate and clamp a duplicating sheet, such as the gelatin sheet 24 and its supporting frame, generally indicated at 25, (Fig. 8) in duplicating position upon the bed plate 10. The slidable work-locating bar 23 is guided for movement over the upper surface 15 of the bed plate 10 by means of bolts 26. These bolts 26 are carried by corner-locating pieces 27 and project through, and work in, slots 28 formed in the bed plate 10. The bolts 26 carry clamping nuts 29 on their upper ends and these nuts 29 project above the upper surface 15 of the bed plate 10 for movement thereover with the slidable work-locating bar 23.

To locate the corners of the supporting frame 25 for the gelatin duplicating sheet 24 in duplicating position upon the bed plate 10 two corner-locating pieces 27 are attached to the slidable work-locating bar 23 for movement therewith

over the bed 10, and two similar but relatively fixed corner-locating pieces 30 are attached to the stationary work-locating bar 22.

To lock the supporting frame 25 in position upon the bed plate 10 and against vertical movement relative thereto the work-locating bars 22 and 23 are provided adjacent their ends and on their inner and corresponding sides with undercut recesses 31 (Figs. 6 and 7) and these recesses 31 are adapted to receive correspondingly shaped lugs or projections 32 (Figs. 8, 9, and 10) formed on the base 44 of the frame 25 at the corners thereof. When the supporting frame 25 is in duplicating position on the bed plate 10 the lugs 32 are projected into the recesses 31 and when therein the supporting frame 25 and the gelatin sheet 24 are prevented from being lifted vertically off the bed plate 10. This overcomes the tendency that the adhesion of the paper impression-receiving sheet 33 to the gelatin sheet 24 has to lift the supporting frame 25 and gelatin sheet 24 off the bed plate 10, when the impression-receiving paper sheet 33 is lifted off the gelatin sheet 24 after each duplicating operation.

To lock either the gelatin duplicating sheet 24 or the stencil inking sheet upon the supporting frame 25 the lock-up means illustrated in Figs. 9 and 10 are provided; said lock-up means including a pair of parallel rails or depending portions 34 formed as an integral part of the base 44 of the frame 25 and on the bottom and at opposite ends thereof. The means for locking the gelatin transfer sheet 24 on the base 10 also includes a pair of clamping members 35, hingedly mounted at their inner ends on the base 44 of the frame 25, as at 36, on the bottom side thereof. Each of these clamping members 35 has an outer end portion 41 that is U-shaped in cross section (Fig. 9) and these end portions 41 are arranged to bind the end portions 37 of the fabric base 40 of the duplicating sheet 24 against the rails 34; the clamping members 35 being held in clamping position by their binding action against the flexible end portions 37 of the fabric base 40 of the duplicating sheet 24.

Formed in each clamping member 35 is a cut-out portion or opening 42 (Fig. 10). These openings 42 serve as hand holes through which the tapered end portions 37 of the fabric base 40 may be grasped so that the sheet 40 and the gelatin sheet 24 may be pulled taut during the operation of clamping the end portions 37 against the rails 34.

To duplicate copies with the present device, using a gelatin sheet, a suitable impression-transmitting or duplicating sheet is laid upon the base 44 of the frame 25. The tapered end portions 37 of the fabric base 40 are then extended around the ends of the base 44, under the rails or depending portions 34, and thence between the base 44 and the clamping members 35. These tapered end portions 37 are then grasped through the hand holes 42 and pulled toward each other so as to pull the fabric base 40 and the gelatin sheet 24 thereon taut upon the base 44 prior to the completion of the clamping operation. The clamping members 35 are then pivoted toward the base 44, into the position of Fig. 9, to bind the end portions 37 of the fabric base 40 between the rails 34 and the U-shaped end portions 41 of the clamping members 35.

The frame 25 having the gelatin sheet 24 thus clamped thereon is then laid upon the bed plate 10 with one end thereof within the corner-locating pieces 30. The projecting lugs 32 at one end of the base are there entered in the corresponding recesses 31. The slidable work-locating bar 23 is then slid against the opposite end of the base 25 so that said end is arranged within the corner-locating pieces 27. The adjacent lugs 32 are then entered in the corresponding recesses 31, whereupon the slidable bar 23 is clamped in position by adjusting the clamping nuts 29.

The impression or inscription-receiving sheet 33 is then laid upon the gelatin sheet 24, over the desired inscription written on the gelatin in duplicating or transfer ink, in the usual manner. The carriage 11 is then moved over the bed plate 10 along the trackways 12.

At this point it is important and essential to note that the upper or transfer surface of the gelatin duplicating sheet 24 projects slightly above the lowermost point assumed by the impression roll 19 when the vertical rollers 16 are bearing upon the horizontal walls 13 of the trackways 12, (Figs. 2, 3, and 4) so that as the carriage 11 is moved over the bed 10 during the duplicating or transferring operation the impression roll 19 and its carriage 11 are forced to climb slightly up onto the upper or impression-transferring surface of the gelatin duplicating sheet 24. This causes the impression roll 19 to ride with its own weight and the weight of its carriage 11 upon the impression-receiving paper sheet 33 during the duplicating operation. This produces the pressure on the sheet 33 necessary to effect the transfer from the duplicating sheet 24 onto the impression-receiving sheet 33 and eliminates the necessity for the prior art practice of effecting this necessary transfer pressure by exerting downward pressure upon the impression roll during the duplicating operation, either manually or by means of springs; it being understood that downward pressure may be applied to the impression roll carriage 11 to improve the copies taken off the gelatin sheet 24 when the image or inscription transferred therefrom onto the inscription-receiving sheet 33 begins to grow dull after a number of copies have been made therefrom during the duplicating operation.

It is to be noted that the horizontal guiding rollers or anti-friction elements 17 cooperate with the vertical walls 14 of the trackways 12 to guide the impression roll 19 and its carriage 11 against sidewise or lateral movement both when the vertical rollers 16 are riding upon the horizontal walls 13 of the trackways and when the vertical rollers 16 are riding above the horizontal walls 13 of the trackways during the duplicating operations.

Stops 43 may be provided at the ends of the trackways 12 to prevent the carriage 11 from overrunning the same during the duplicating operation.

In Figs. 11 and 12 the new duplicating device is shown specifically adapted for use as a stencil printing or duplicating device and in these figures an inking or ink-absorbent sheet or pad 45 is shown arranged upon the base 44 of the frame 25 and locked thereon in the same manner that the gelatin duplicating sheet 24 and its fabric base 40 are arranged upon the frame 25 and locked thereon, as hereinbefore described.

In this use of the invention the inking sheet 45 is locked upon the frame 25 and saturated, or partially saturated, with suitable transfer or

stencil ink. The frame 25 having the inking sheet 45 locked thereon is then placed upon the bed 10 and locked thereon in the manner already described for locking the frame 25 and gelatin duplicating sheet 24 on the bed 10. A stencil sheet 46 is then laid over the inking sheet or pad 45 and an impression-receiving sheet 47 is laid over the stencil sheet 46 whereupon the impression roll carriage 11 is moved over the bed 10 to complete the stencilling operation.

The aforementioned stencil combination is such that the upper surface of the stencil sheet 46 and the impression-receiving sheet 47 laid thereover project slightly above the lowermost point of the impression roll 19 when the vertical rollers 16 of the carriage 11 are resting upon the horizontal walls 13 of the trackways 12 (Fig. 12) so that the impression roll 19 and its carriage 11 are forced to climb slightly up onto the upper surface of the stencil sheet 46 and the impression-receiving sheet 47 laid thereover during the stencil duplicating operation, thereby lifting the vertical rollers 16 of the carriage 11 up slightly off from the horizontal walls 13 of the trackways 12 and causing the impression roll 19 to bear with its own weight and the weight of its carriage 11 upon the impression-receiving sheet 47 and the stencil sheet 46 during the stencilling operation to create the pressure necessary to effect the stencilling operation.

As the impression roll 19 and its carriage 11 are moved over the bed 10 during the stencil duplicating operation, the weight and consequent downward pressure of the impression roll 19 and its carriage 12 upon the impression-receiving sheet 47, and upon the stencil sheet 46 and inking sheet 45 laid thereunder, causes ink from the inking sheet 45 to penetrate through the stencil marks or lines of weakened union 48 in the stencil sheet 46 onto the impression-receiving or transfer-receiving sheet 47 to effect the stencilling operation.

Downward pressure may be applied to the handle 18 of the carriage 11 to improve the stencil copy made on the impression-receiving sheet 47 if the copy grows dull after a considerable number of stencilled copies have been made following an application of ink to the inking sheet 45.

While a suitable means 31—32 and 22—30, 23—27—26—29, etc., has been shown for locking the supporting frame 25 for the duplicating sheet in working position upon the bed plate 10, and a suitable means 34—35—41, etc., has been shown for locking either the gelatin sheet 24 and its fabric base 40 or the stencil inking sheet 45 upon the frame 25, it is to be understood that the present invention is not limited to the two specific and aforementioned means shown to accomplish their respective functions, nor are they the essence of the invention, since other equivalent means may be substituted therefor within the scope of the present invention as defined in certain of the appended claims; the essence of the present invention residing rather in the provision of a duplicating device comprising the combination hereinafter claimed and including a bed having parallel trackways; a duplicating or transfer sheet arranged upon the bed; and an impression roll movable over the bed and adapted to climb slightly up onto, and to bear with its weight upon the upper or impression-transferring face of the duplicating sheet during the duplicating operation so as to bring about the pressure on the transfer sheet necessary to effect the transfer or duplicating operation; and which combination includes means cooperating with the trackways to guide the impression roll both when the latter is bearing with its weight upon the trackways and when it is riding upon the duplicating or transfer sheet during the duplicating operation. This combination is the essence of the invention and the aforementioned objects and the appended claims are to be interpreted with this in mind.

For a more complete discussion of the advantages of an impression-transferring device of this character reference is made to the applicant's aforementioned patent.

The duplicating device defined in certain of the appended claims is a species of the printing or impression-transferring device described in my above-identified patent and falls within certain of the generic claims found in that patent but none of the claims hereinafter made for the present invention is broad enough to read upon or to be generic to the printing press described and claimed in the aforementioned patent.

As used hereafter in the claims the term "duplicating sheet' is generic and includes either a gelatin sheet, such as 24, alone or in combination with a fabric base, such as 40; while this term also includes a stencil sheet, such as 46 alone or in combination with a stencil inking sheet such as 45 or other like or equivalent duplicating sheets or combinations thereof, by which an original inscription may be duplicated or transferred from an original sheet onto a copy or inscription-receiving sheet.

I claim:

1. In a duplicating device, the combination of: a bed; spaced work-locating bars on the bed each having recesses formed therein; and a frame for supporting a duplicating sheet on the bed during the duplicating operation; said frame including a base adapted to be mounted on the bed between said bars and having portions projecting therefrom receivable in said recesses to hold the frame on the bed and against movement relative thereto.

2. In a duplicating device, the combination of: a bed; work-locating means on the bed including a work-locating member slidably mounted on the bed for movement thereover; a frame for supporting a duplicating sheet on the bed; said frame including a base member; one of said members being provided with a recess and the other of said members having a projecting portion receivable in said recess to hold the frame on the bed and against movement relative thereto.

3. In a duplicating device, the combination of: a bed; work-locating means including a work-locating member mounted on the bed; a frame for supporting a duplicating sheet on the bed; said frame including a base member; one of said members being provided with a recess and the other of said members having a projecting portion receivable in said recess to hold the frame on the bed and against movement relative thereto.

4. A duplicating device comprising the combination: a frame including a base having portions depending from the bottom side thereof; clamping members pivotally mounted on the base on the bottom side thereof; a duplicating sheet arranged upon the base and including a base having flexible end portions extended around the ends of the first-named base and

projected across the bottom of said depending base portions and along the bottom side of said first-named base; said clamping members having portions adapted to cooperate with said depending base portions to clamp said flexible end portions upon the first-named base and against movement relative thereto.

5. A duplicating device comprising the combination: a frame including a base having portions depending from the bottom side thereof; clamping members pivotally mounted on the base on the bottom side thereof; a duplicating sheet arranged upon the base and including a base having flexible end portions extended around the ends of the first-named base and projected across the bottom of said depending base portions and along the bottom side of said first-named base between the latter and said clamping members; said clamping members having portions adapted to cooperate with said depending base portions to clamp said flexible end portions upon the first-named base and against movement relative thereto; each of said clamping members having an opening formed therein and said openings providing hand holes thereupon which said flexible end portions may be grasped and pulled taut prior to the completion of the clamping operation.

6. A duplicating device comprising the combination of: a frame including a base having a portion depending from the bottom side thereof; a clamping member pivotally mounted on the base on the bottom side thereof; a duplicating sheet arranged upon the base and having a flexible end portion extended around one end of said first-named base and projected below said depending base portion and along the bottom side of said first-named base; said clamping member having a portion adapted to cooperate with said depending base portion to clamp said flexible end portion upon the first-named base and against movement relative thereto.

7. A duplicating device comprising the combination of: a frame including a base having a portion depending from the bottom side thereof; a clamping member pivotally mounted on the base on the bottom side thereof; a duplicating sheet arranged upon the base and having a flexible end portion extended around one end of said first-named base and projected below said depending base portion and along the bottom side of said first-named base between the latter and said clamping member; said clamping member having a portion adapted to cooperate with said depending base portion to clamp said flexible end portion upon the first-named base and against movement relative thereto; said clamping member having an opening formed therein and said opening providing a hand hole through which said flexible end portion may be grasped and pulled taut prior to the completion of the clamping operation.

8. In a duplicating device, a supporting frame for a duplicating sheet, comprising a relatively flat base adapted to support a duplicating sheet and around one end of which one end portion of the duplicating sheet may be folded so as to be extended along the bottom side of said base; said base having a stationary clamping rail depending from its bottom side and below which the said end portion of the sheet may be extended; and a movable clamping member having an inner end portion pivotally mounted on the said base on the bottom side thereof and having an outer end portion movable in a vertical plane toward and away from said base and into and out of clamping engagement with said rail so as to releasably clamp the said end portion of said sheet therebetween.

9. In a duplicating device, a supporting frame for a duplicating sheet, comprising a relatively flat base adapted to support a duplicating sheet and around the ends of which the end portions of said sheet may be folded so as to be extended along the bottom side of said base toward each other; said base having stationary clamping rails depending from its bottom side adjacent opposite ends thereof and below which the said end portions of said sheet may be extended; and movable clamping members each having an inner end portion pivotally mounted on the said base on the bottom side thereof and each having an outer end portion movable in vertical planes toward and away from said base and into and out of clamping engagement with the corresponding one of said rails so as to releasably clamp the said end portions of said sheet therebetween.

10. In a duplicating device, a supporting frame for a duplicating sheet, comprising a relatively flat base adapted to support a duplicating sheet and around one end of which one end portion of the duplicating sheet may be folded so as to be extended along the bottom side of said base; said base having a relatively stationary clamping member provided on its bottom side and below which the said end portion of the sheet may be extended; and a relatively movable clamping member having an inner end portion pivotally mounted on the said base on the bottom side thereof and having an outer end portion movable in a vertical plane toward and away from said base and into and out of clamping engagement with said relatively stationary clamping member so as to releasably clamp the said end portion of said sheet; said movable clamping member having an opening formed therein providing a hand hole through which the said end portion of said sheet may be drawn to pull the sheet taut prior to the completion of the clamping operation.

11. In a duplicating device, a supporting frame for a duplicating sheet, comprising a relatively flat base adapted to support a duplicating sheet and around the ends of which the end portions of said sheet may be folded so as to be extended along the bottom side of said base toward each other; said base having relatively stationary clamping members provided in its bottom side adjacent opposite ends thereof and below which the said end portions of said sheet may be extended; and relatively movable clamping members each having an inner end portion pivotally mounted on the said base on the bottom side thereof and each having an outer end portion movable in vertical planes toward and away from said base and into and out of clamping engagement with the corresponding one of said relatively stationary clamping members so as to releasably clamp the said end portions of said sheet therebetween; each of said movable clamping members being provided with an opening and said openings providing hand holes through the said end portions of said sheet may be drawn to pull the sheet taut prior to the completion of the clamping operation.

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