

Jan. 8, 1952

L. R. WADE

2,581,775

SCREEN PRINTING MACHINE

Filed Sept. 4, 1948

2 SHEETS—SHEET 1

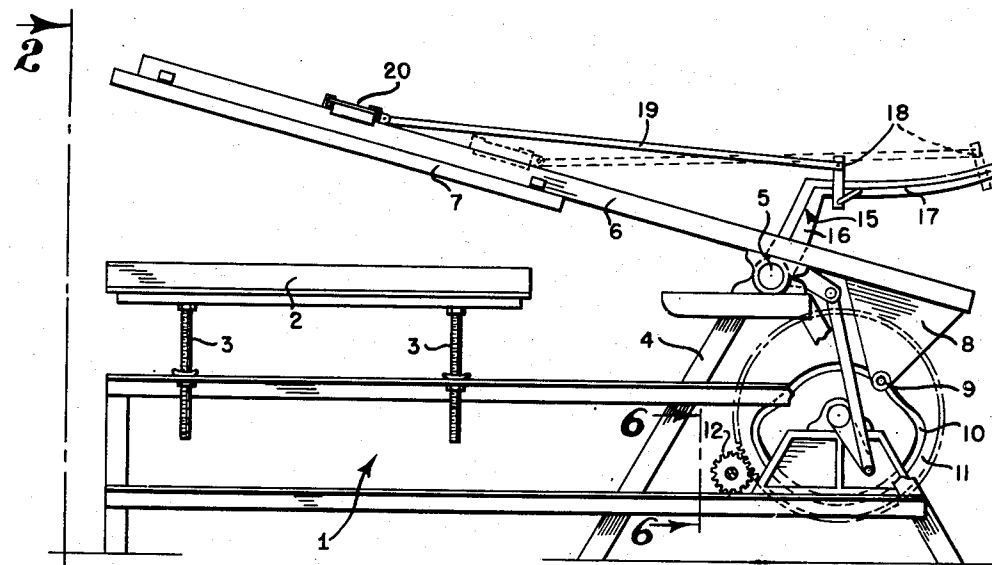


FIG 1

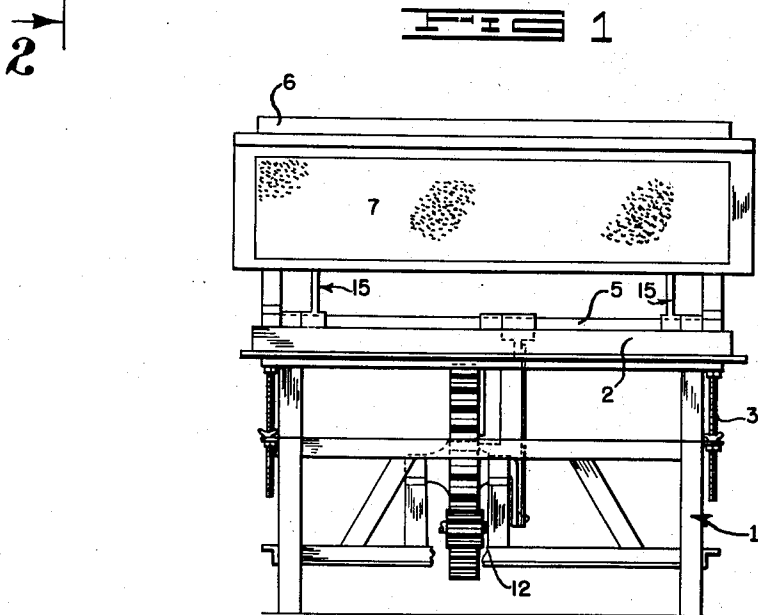


FIG 2

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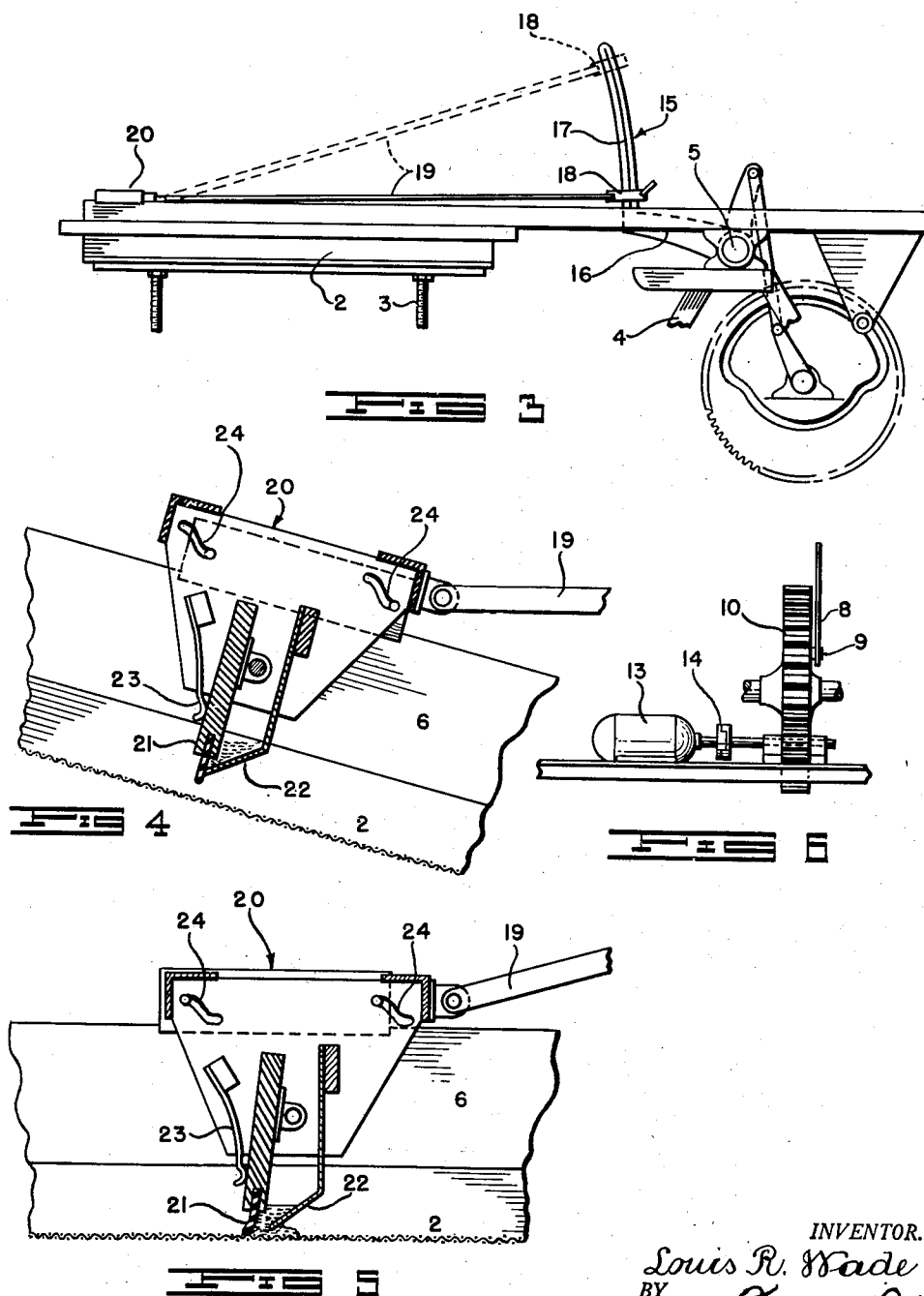
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2 SHEETS—SHEET 2



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SCREEN PRINTING MACHINE

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4 Claims. (Cl. 101—123)

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My invention relates to screen printing machines and included in the objects of my invention are:

First, to provide a screen printing machine which incorporates a novel squeegee operating mechanism having a readily adjustable stroke so that printing screens of different areas may be interchangeably used in the machine;

Second, to provide a screen printing machine wherein the printing screen is raised and lowered automatically in timed relation to the movement of the squeegee, the return movement of the squeegee occurring while the printing screen is raised so that during such time work may be changed;

Third, to provide a screen printing machine in which the printing screen, carrier, and the squeegee operating mechanism share a common pivotal axis so that tilting movement of the carriage does not affect operation of the squeegee operating mechanism; and

Fourth, to provide a screen printing machine which, although automatic in its operation except for insertion and removal of the work, is particularly simple of construction and dependable in its operation.

With the above and other objects in view as may appear hereinafter reference is directed to the accompanying drawings in which:

Figure 1 is a substantially diagrammatical side view of my screen printing machine showing it in a position assumed when the printing screen is raised;

Figure 2 is a front view of the machine taken from the plane 2—2 of Figure 1;

Figure 3 is a fragmentary substantially diagrammatical view showing my screen printing machine in a position assumed when the screen is in contact with the table;

Figure 4 is a fragmentary view of the squeegee carriage mechanism shown during the return movement of the squeegee;

Figure 5 is a similar view showing the squeegee during its operating movement; and

Figure 6 is a substantially diagrammatical view taken through 6—6 of Figure 1 and illustrating the drive means for the screen printing machine.

My screen printing machine includes a frame structure 1 of generally rectangular form which extends under and supports a table 2 by means of adjustable posts 3. The table is provided with suitable means (not shown) for holding work in position for printing. The rear portion of the frame structure 1 includes an A frame 4 which journals a transversely extended main shaft 5.

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A pivotal frame structure or carrier 6 is mounted on the main shaft 5 and extends forwardly over the table 2. The carrier 6 supports a screen printing frame 7 which may be conventional. Such screen printing frame involves a wooden inner frame covered by a silk screen on which is formed the design to be printed by rendering certain portions of this screen permeable to ink. The inner frame is adjustably mounted in an outer frame for purposes of registering the design. The structure is not shown in detail inasmuch as the construction of such screen printing frames is well known.

The carrier 6 also extends rearwardly from the main shaft 5 and is provided with a depending bracket 8 which carries a cam follower 9 adapted for engagement with a cam track 10. The cam track may be formed in the side of a main drive gear 11. The drive gear 11 is engaged by a pinion gear 12 driven directly by a motor 13 or suitable speed reducing means. A conventional clutch 14 is interposed with such clutch being operated by means (not shown) from the front of the machine. While the cam and gear arrangement is shown for simplicity of illustration, it should be borne in mind that various link and lever arrangements may be employed to effect oscillation of the frame structure or carrier 6.

Journalled on the main shaft 5 is one or more squeegee operating levers 15. Each squeegee operating lever includes a radial portion 16 and an arcuate portion 17. The center of the arcuate portion substantially coincides with the forward margin of the printing screen when the parts of the printing machine are in the position shown in Figure 3. The arcuate portions of the levers 15 are provided with adjustable clamps 18 which are pivotally connected to struts 19, the forward ends of which are joined to a squeegee carriage 20 adapted to travel back and forth across the screen printing frame. It will thus be seen by examination of Figure 3 that irrespective of the adjustment of the clamps 18 the forward position of the carriage is not altered. As shown in Figure 1, however, the rear position of the carriage is altered by adjustment of the clamps 18. By this means the length of stroke may be changed as desired.

The squeegee carriage 20 may be conventional and is illustrated herein substantially diagrammatical. The carriage actuates a squeegee 21 in the form of a bar having a flexible wiping blade adapted to engage a printing screen for the purpose of forcing ink through the permeable

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portions thereof. It is desirable that a type of squeegee structure be employed wherein the ink is carried to the forward side of the printing frame without contact with the printing screen inasmuch as the printing screen is raised from the work during this movement. This may be accomplished by the use of an ink retainer blade 22 which is positioned for engagement by the squeegee to form a trough and by pivotally mounting the squeegee so that normally it is urged against the blade 22 by springs 23 but is drawn away from the plate when moved across the printing screen. In addition, elevating means 24 cause the carriage to raise when moved in a direction shown in Figure 4 and to lower when the carriage is moved in a direction shown in Figure 5.

The squeegee operating levers 15 are connected by lever arms 25 to links 26 which, in turn, are joined to levers 27 mounted on the shaft which carries the cam 10 and the gear 11.

Operation of my screen printing machine is as follows: The shape of the cam track 10 and the position of the levers 25 and 27 as well as the squeegee operating levers 15 are such that the screen printing frame occupies a lower position, such as is shown in Figure 3, for a predetermined portion of the cycle and a raised position, such as is shown in Figure 1, during another selected portion of the cycle. During the time that the printing screen is in its lower position as shown in Figure 3 the squeegee is caused to move from the forward toward the rearward side of the screen by rearward pivotal movement of the operating levers 15 about the axis of the main shaft 5. When this stroke is completed the printing screen is raised. During this upward movement or immediately thereafter the squeegee is moved to its forward position at the same time the operator removes the printed material and places new work on the table. By the time the printing screen is ready to be lowered or during the lowering of the screen the squeegee reaches the forward side thereof ready for a working stroke.

It will be observed that a particularly simple operating mechanism is provided and that the desired action of the squeegee carriage is accomplished by reason of the fact that both the operating levers 15 and the frame structure 6 pivot about the same axis, namely, the axis of the main shaft 5. It will also be observed that adjustment of the operating stroke of the squeegee carriage is extremely simple, this being accomplished merely by adjustment of the clamps 18, preferably when the machine is in the position shown in Figure 3.

Having fully described my invention, it is to be understood that I do not wish to be limited to the details herein set forth, but my invention is of the full scope of the appended claims.

I claim:

1. A screen printing machine, comprising: a frame structure; a work supporting means thereon; a main shaft supported by said frame structure; a carrier adapted to receive a printing screen and oscillatably mounted on said main shaft above said frame structure to move said printing screen between a lower printing position and a raised position relative to work on said supporting means; a squeegee carriage movable on said carrier over said printing screen; operating means for said carriage including a lever pivoted on the axis of said main shaft, and struts extending from said lever to said carriage; and

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means for actuating said carrier and said carriage in unison whereby an operating stroke of said carriage occurs when said printing screen is in engagement with said work and a return movement occurs when said printing screen is raised from said work.

2. A screen printing machine, comprising: a frame structure, including a work supporting means at the forward portion of said frame structure and a main journal means rearwardly of said work supporting means; a printing screen carrier pivotally mounted on said main journal means and adapted to move a printing screen between a lower printing position and a raised position; a squeegee carriage mounted on said carrier for forward and rearward movement across said printing screen, said squeegee carriage including a squeegee element, means co-acting with said squeegee element to support a quantity of ink, and means for causing said squeegee to contact said printing screen and operate thereon during movement in one direction and to raise from said screen during movement in the opposite direction; and a drive means for said carriage including a lever pivotally mounted on the axis of said main journal means and having an arcuate arm and a strut extending therefrom to said carriage, said strut adjustable on said arm to vary the stroke of said carriage, the locus of said arcuate arm being in approximate coincidence with the forward edge of said printing screen when said screen is in its operating position and said carriage is in its forward position whereby regardless of the point of connection of said strut with said arm, the forward position of said carriage remains substantially unchanged.

3. A screen printing machine, comprising: a frame structure; a work supporting means thereon; a main shaft supported by said frame structure; a carrier adapted to receive a printing screen and oscillatably mounted on said main shaft above said frame structure to move said printing screen between a lower printing position and a raised position relative to work on said supporting means; a squeegee carriage movable over said screen between a forward and a rearward position; an operating means for said carriage, including a lever pivoted on the axis of said main shaft, said lever having an upright portion, the extremities of which are substantially equidistant from the forward margin of said printing screen when said screen is in its lower or printing position, and struts adjustable on said upright portion and extending to said forward margin for attachment to said carriage; and coordinated actuating means for said carrier and said operating means to cause rearward movement of said carriage when said printing screen is in its lower or printing position, and to return said carriage when said printing screen is in its raised position.

4. A screen printing machine, comprising: a frame structure, including a work supporting means at the forward portion of said frame structure and a main journal means rearwardly of said work supporting means; a printing screen carrier pivotally mounted on said main journal means and adapted to move a printing screen between a lower printing position and a raised position; a squeegee carriage mounted on said carrier for forward and rearward movement across said printing screen, said squeegee carriage including a squeegee element, means co-acting with said squeegee element to support a

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quantity of ink and means for causing said squeegee to contact said printing screen and operate thereon during movement in one direction and to raise from said screen during movement in the opposite direction; and a drive means for said carriage including a lever pivotally mounted on the axis of said main journal means and having an upright arm and a strut extending therefrom to said carriage, said strut adjustable on said arm to vary the stroke of said carriage, at extreme points of adjustment said strut being approximately equidistant from the forward edge of said printing screen when said screen is in its operating position and said carriage is in its

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forward position whereby regardless of the point of connection of said strut with said upright arm, the forward position of said carriage remains substantially unchanged.

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The following references are of record in the file of this patent:

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