July 14, 1959 E. LANDESMAN 2,894,451

SCREEN PRINTING MACHINE

Filed Sept. 4, 1956 5 Sheets-Sheet 1

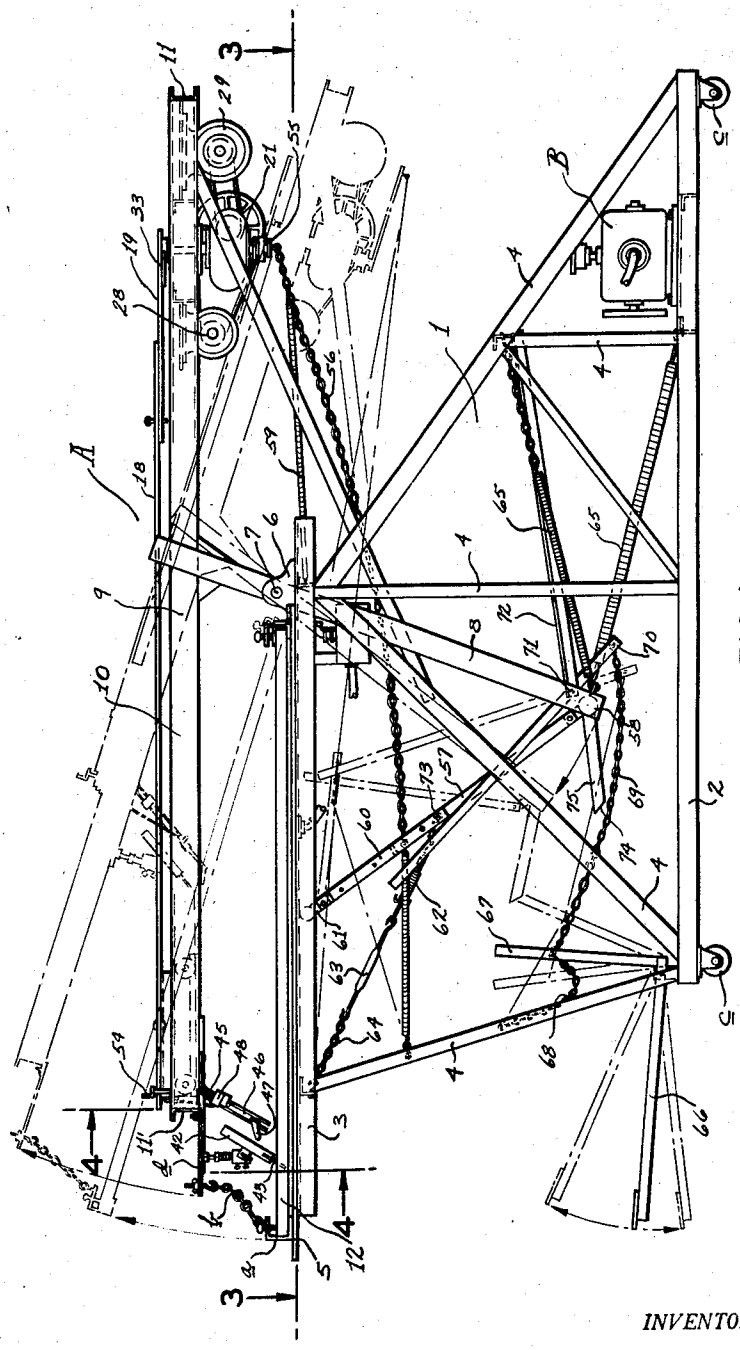


FIG. 1

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July 14, 1959 E. LANDESMAN 2,894,451

SCREEN PRINTING MACHINE

Filed Sept. 4, 1956 5 Sheets-Sheet 2

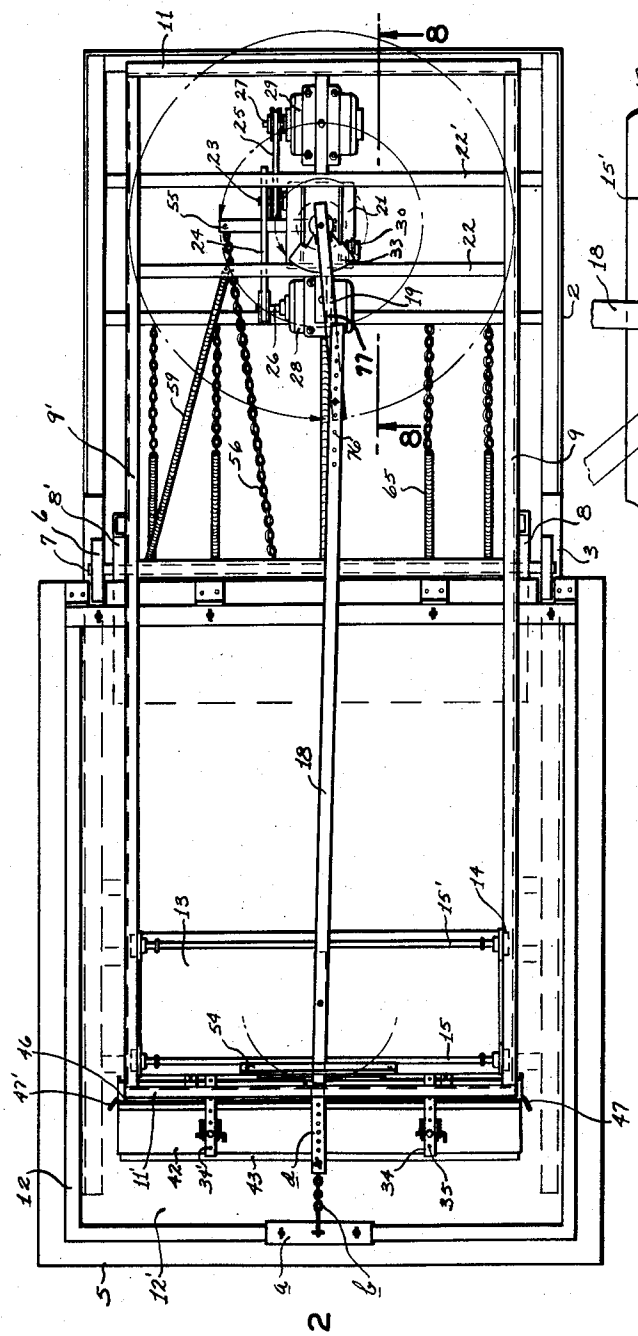


FIG. 2

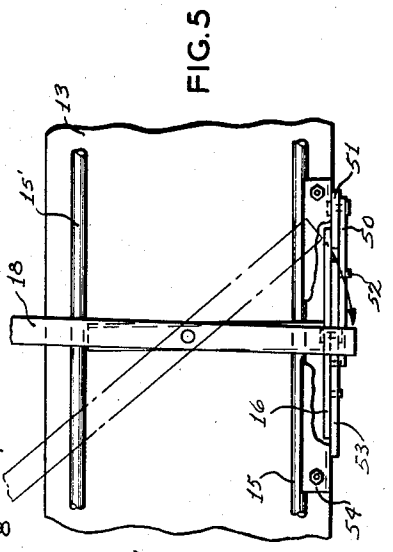


FIG. 5

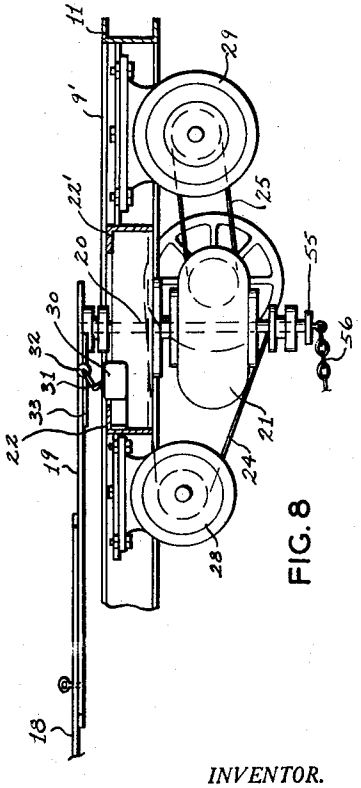


FIG. 8

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July 14, 1959 E. LANDESMAN 2,894,451

SCREEN PRINTING MACHINE

Filed Sept. 4, 1956 . 5 Sheets-Sheet 3

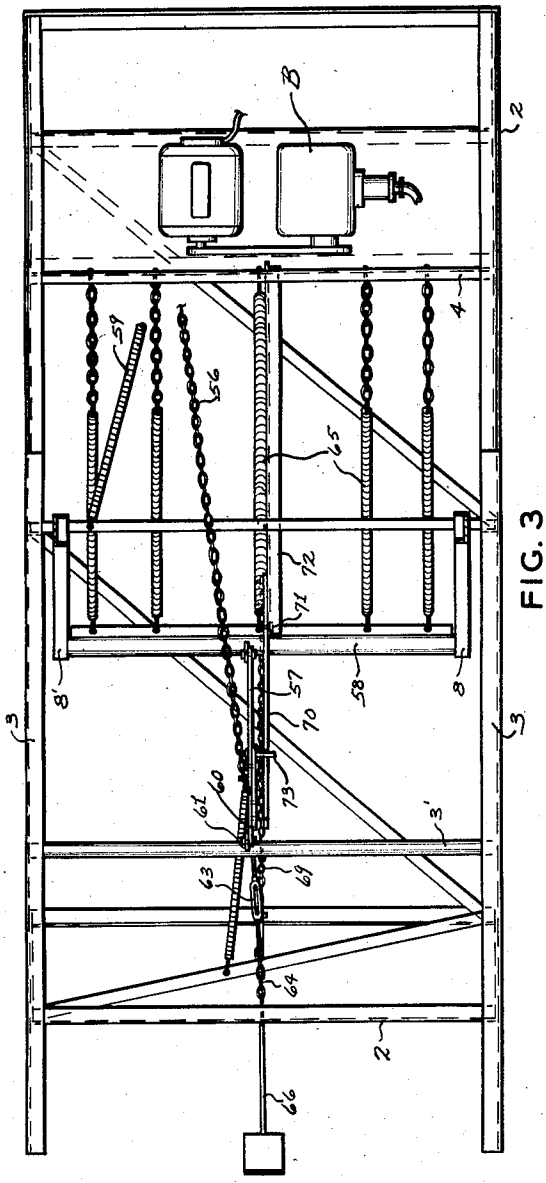


FIG. 3

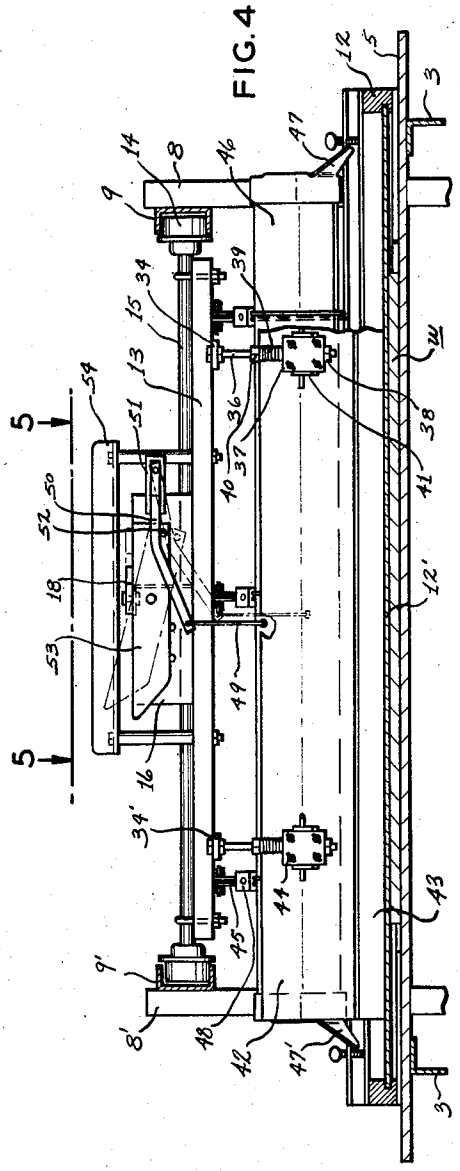


FIG. 4

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SCREEN PRINTING MACHINE

Filed Sept. 4, 1956 5 Sheets-Sheet 4

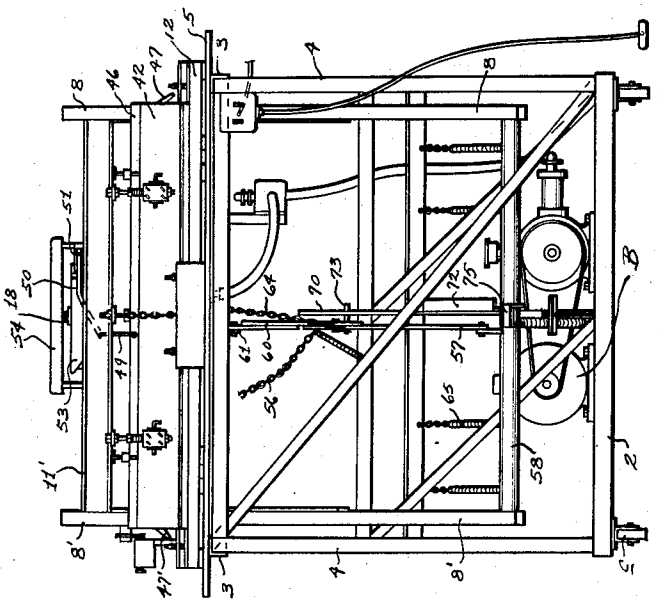


FIG. 7

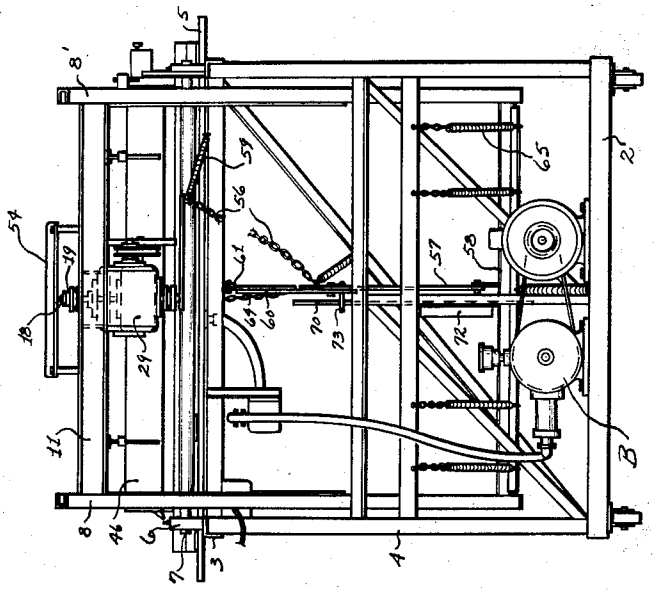


FIG. 6

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SCREEN PRINTING MACHINE

Filed Sept. 4, 1956 5 Sheets-Sheet 5

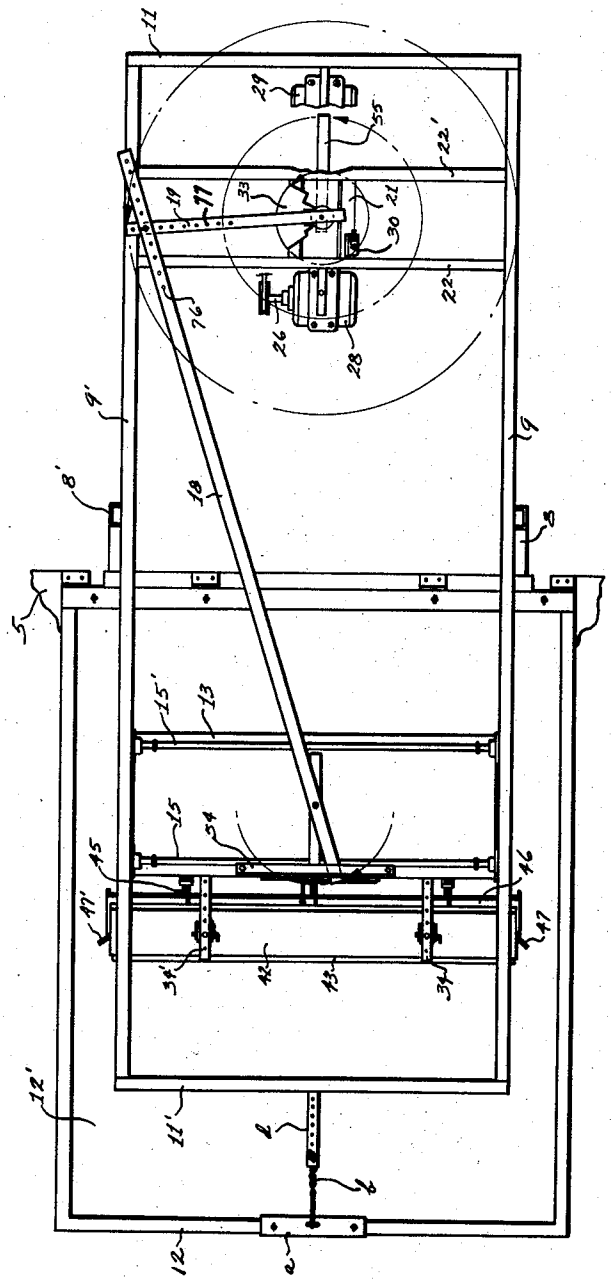


FIG. 9

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United States Patent Office

2,894,451

Patented July 14, 1959

2,894,451

SCREEN PRINTING MACHINE

Eugene Landesman, University City, Mo.

Application September 4, 1956, Serial No. 607,867

19 Claims. (Cl. 101—126)

This invention relates in general to printing apparatus and, more particularly, to screen printing machines.

An object of the present invention is to provide a screen printing machine incorporating a squeegee-bearing, rockably-mounted frame with novel means for swinging same between lowered or printing position and raised or work-feeding position in timed relation to travel of the squeegee.

It is another object of this invention to provide means for reciprocal travel of a squeegee along a swing frame with means for effecting an increase of speed during travel in one direction.

It is a further object of this invention to provide a reciprocally moving paint carrier adapted for edgewise engagement with a screen or stencil during movement in one direction; which is floatingly suspended for following the surface contour of the screen; which is provided with lateral paint trapping elements; and which is so constructed as to serve as a conductor for static charges on the screen.

It is a further object of the present invention to provide means for regulating the extent of travel of the squeegee so that the machine may, with equal facility, economically and rapidly accommodate work of varying dimensions.

It is an additional object to provide a screen printing machine comprising a pivotally mounted screen or stencil connected to a swing frame for movement therewith.

It is another object of this invention to provide a screen printing machine incorporating a lever operated system for maintaining the swing frame in upward position to permit ready access to the machine for repair and the like during operation thereof.

A still further object of this invention is to provide a screen printing machine which is durable in construction, reliable in operation, and economical to produce; and the use of which does not require highly skilled operators.

These and other detailed objects are obtained by the structures illustrated in the accompanying drawings (five sheets) in which—

Figure 1 is a side view of a screen printing machine constructed in accordance with and embodying the present invention.

Figure 2 is a top plan view showing the cross-head at the forward end of the swing frame.

Figure 3 is a horizontal transverse section taken on the line 3—3 of Figure 1.

Figure 4 is a vertical transverse section taken on the line 4—4 of Figure 1.

Figure 5 is a partial top plan view taken on the line 5—5 of Figure 4.

Figure 6 is a rearward end view of the machine.

Figure 7 is a front end view of the machine.

Figure 8 is a vertical transverse section taken on the line 8—8 of Figure 2.

Figure 9 is a top plan view with the swing frame in tilted position.

Referring now by reference characters to the drawings, A designates a screen printing machine comprising a support structure indicated generally at 1, having a relatively extended rectangular base 2, mounted on casters *c*, and an upper portion formed of parallel side members 3 connected by a cross member 3'; said base and upper portion being inter-connected by various support elements 4; said upper portion 3 being presented in a generally forwardly, offset manner with respect to said base 2. The forward end of said upper portion projects beyond the forward end of base 2 while the rearward end of parallel side members 3 are disposed substantially above the central or medial portion of base 2. Support members 4 consist of various uprights, braces, and the like, and are of any suitable stock, such as angle iron, etc. Fixed upon said side members 3 is a bed or platen 5 for work-receiving purposes. While mounted on said side members 3 at their rearward ends are aligned pillow blocks 6 for journaling therein of a shaft 7, presented transversely of said side members 3, upon which is secured a pair of spaced apart support arms 8, 8'. Said arms 8, 8' are in normally inclined relationship to the vertical, extending both above and below side members 3 and being rigid at their upper ends with the central portions of side elements 9, 9' respectively of a rectangular, swing frame 10, the ends of which are defined by rearward and forward cross members 11, 11'. Said swing frame 10 is thus adapted upon rotation of shaft 7 or by rocking of arms 8, 8' for swingable movement between horizontal or downward position, wherein it will be planarwise parallel to bed 5, and tilted or upward position (as shown respectively in full and dotted lines in Figure 1); there being means presently described for limiting the degree of rock of said frame 10. The rearward end portion of said swing frame 10 extends beyond the rearward edge of said members 3 of support structure 1, and will extend therebelow when in upward position.

Pivotally mounted upon bed 5 forwardly of pillow blocks 6 is the rearward edge portion of the frame 12 for supporting a screen or stencil 12' of conventional character, and having at its forward end a bracket *a* to which is secured the lower end of a relatively short chain or other flexible member *b*, the upper end of which is engaged to the end portion of an arm *d* extending forwardly from front cross member 11' of swing frame 10 whereby said screen 12' will be swung about the rearward edge of its frame 12 with respect to bed 5 upon rocking movement of said swing frame 10. Said chain 14 is of greater length than the distance between swing frame 10 and bed 5 when the former is in horizontal position so that therein screen frame 12 will be supported upon bed 5 so as to present screen 12' in operative position with respect to a work piece *w*. With swing frame 10 in upward position, screen 12' will be raised at its forward end from bed 5 to permit the withdrawal of completed work therefrom and the disposition thereon of a work blank for the subsequent printing operation.

Side elements 9, 9' are preferably of channel stock with their flanges being directed inwardly to form guides or trackways for reciprocal movement therealong of a cross-head or carriage 13 having rollers 14 mounted on the ends of transversely extending forward and rearward shafts 15, 15'. Cross-head 13 on its upper surface carries a generally T-shaped mounting block 16 having the end face of its head portion substantially flush with the forward edge of cross-head 13 and on the top surface of the lug portion of which is pivotally engaged

the forward end portion of an elongated connecting rod or pitman **18**. The other or rearward end of connecting rod **18** is swingably secured to a crank arm **19** fixed on the upper end of a vertically presented shaft **20** of a speed reducer **21**, the latter being suitably supported from cross members **22**, **22'** extending between side elements **9**, **9'** in the rearward end section of swing frame **10**.

Speed reducer **21** incorporates a shaft **23** axially perpendicular to shaft **20** and projecting laterally toward one side of frame **10**; said shaft **23** being operatively connected by drive belts **24**, **25** with the drive shafts **26**, **27** of motors **28**, **29** respectively. Said motors **28**, **29** are mounted on swing frame **10** and are respectively disposed forwardly and rearwardly of speed reducer **21**. With reference to Figure 8, it will be seen that the relationship of the pulleys whereby drive belt **25** connects motor **29** to speed reducer shaft **20** is such as to cause said latter shaft to be operated at a greater rate of speed when operatively connected to motor **29** than when driven by motor **28**. Motor **29** is adapted for intermittent operation, whereas motor **28** is connected for constant operation. Thus, the speed of rotation of shaft **20** will be influenced by motor **28** except when motor **29** is energized and thereon, due to the particular drive belt-pulley arrangement, an overriding effect will develop so that shaft **29** will, during such period of energization, rotate at an increased rate. It is obvious that both motors **28**, **29** may be of identical capacity and speed to effect the desired differential result; or a single dual speed motor may be utilized, or if desired motor **29** may be of the high-speed variety with motor **28** relatively slower. Disposed adjacent speed reducer **21** is a switch **30** for motor **29**, including a resiliently mounted arm **31** bearing at its upper end a cam member **32** for engagement by a switch operating plate **33** fixed on shaft **20** beneath crank **19**. Switch operating plate **33** is of arcuate character, and of such radial extent as to maintain switch **30** in closed, circuit-making condition during movement of shaft **20** through a corresponding arc of its path of rotation. Said switch operating plate **33** is mounted on shaft **20** with respect to crank **19** so that switch **30** will be engaged during the interval said crank **19** moves from a substantially forwardly directed position to a substantially rearwardly directed position, or wherein the same in cooperation with connecting rod **18** causes rearward travel of cross-head **13**. Thus, it will be seen that motor **29** is "cut in" when cross-head **13** is disposed at the forward end of swing frame **10** for travel thereof rearwardly at a relatively rapid rate.

Cross-head or carriage **13** mounts on its under surface a pair of spaced apart, parallel arms **34**, **34'** which extend forwardly thereof with each being provided with a series of aligned apertures **35** for selected downward extension therethrough of an elongated bolt **36** which projects through a bore in a mounting block **37** and having an adjusting nut **38** engaged on its lower end. Above each block **37**, a compression spring **39** is encirclingly disposed about each bolt **36**, bearing at its lower end against the upper surface of the related block **37** and at its upper end against a nut **40**, whereby blocks **37** may be resiliently and vertically adjustably maintained on bolts **36**. Secured pivotally to the opposite side faces of each block **37** are the arms of a yoke-type bracket **41**, the central portion of which is fixed to the forward face of a squeegee bar **42**, the latter being thereby presented transversely of said swing frame **10** and forwardly of and beneath cross-head **13** for movement therewith; said squeegee bar **42** being made of any suitable material, such as wood and the like, and having a groove formed in its under surface for receiving a downwardly projecting squeegee **43**. Threadedly engaged in each block **37** and extending therethrough is a plurality of abutment members or screws **44** in axially normal relationship to the associated bolt **36** which at their rearward ends are presented to abut the forward face of

squeegee bar **42** so that by the selected adjustment of the same, squeegee bar **42** may be lockingly maintained at a desired degree of inclination to the vertical or at the correct angle for the particular paint, ink, or other coloring matter utilized and the particular character of the screen **12'** so that a well delineated print of maximum definition will result.

Mounted on the under surface of cross-head or carriage **13** are the rearward end portions of a plurality of spaced sets of guide rods **45**, being arranged in pairs with their forward end portions bent forwardly and downwardly beneath cross-head **13** and spacedly and rearwardly of squeegee bar **42**, with the lower ends thereof terminating upwardly of the lower end of squeegee **43**. Slidably received within guide rods **45**, being presented at the angle determined thereby, for upward and downward movement therethrough, is a paint carrier **46** comprising a preferably flat metallic sheet, having at its lower side edges forwardly and slightly downwardly turned wing-like members **47**, **47'**; there being stop blocks **48** mounted on each pair of guide rods **45** to limit upward movement of said paint carrier **46**. Paint carrier **46** is substantially co-extensive with squeegee bar **42**, although wings **47**, **47'** extend laterally therebeyond, and centrally is suitably engaged to the lower end of a short rod **49**, the upper end of which is engaged to the lower end of an angulated arm **50**, the other end of the latter is pivotally mounted on a lug **51** extending laterally from the end face of T-block **16**, whereby said arm **50** is adapted for swinging in a vertical plane, transversely of swing frame **10**. Said arm **50** proximate its angle restingly abuts on its under surface a pin **52** projecting forwardly from one end portion of a dog **53** rockably secured on the forward face of block **16** for swinging movement in a plane parallel to that of arm **50**. The relative weight of paint carrier **46** will bias arm **50** downwardly whereby through engagement of the same with pin **52** dog **53** will be urged into downwardly swung position of its pin-bearing end (see Figure 5) so that paint carrier **46** will descend through guide rods **45** for engagement on its lower edge upon screen **12'**. Thus, in this position, the weight of paint carrier **46** will bear against screen **12'** to assure firm contact therewith. Dog **53** is so mounted with respect to block **16** that when in horizontal position (wherein paint carrier **46** will be in raised state) its upwardly presented edge will be flush with the upper surface of block **16** and hence be disposed for extension thereover of the forward end extremity of connecting rod **18**. Therefore, as connecting rod **18** follows its prescribed, reciprocating path of movement consequent to operation of crank **19**, it will periodically engage the upper surface of dog **53** so as to return same to horizontal position from rocked position resulting in lifting of paint carrier **46**, retaining same in such state for an interval, and then losing engagement with dog **53** to thereby effectively release paint carrier **46** for descent thereof (see Figures 4 and 5). There is also provided upon the upper surface of cross-head or carriage **13** for extension above the forward end of block **16**, a hold-down unit indicated at **54**, for maintaining the forward end extremity of connecting rod immediately upon block **16** to assure reliable coaction thereof with dog **53**.

Referring to Figures 2 and 9 it will be seen that connecting rod **18** will engage dog **53** for maintaining paint carrier **46** in elevated relation above screen **12'** during rearward travel of cross-head **13**, and will hence be out of engagement during forward travel of cross-head **13** permitting paint carrier **46** to be thereby in contact with screen **12'** during such portion of the cross-head's reciprocal movement. In lowered position paint carrier **46** is caused to traverse screen **12'** in an edgewise scraping manner for forcing the paint or other color material on said screen toward the forward end thereof for ultimate return by sweeping action of squeegee **43** in its operative or printing stroke. Due to the attitude of paint carrier

46 with respect to the upwardly rocked screen 12' the paint will be lifted, as it were, onto the paint carrier 46 and carried thereby. Thus, paint carrier 46 serves to deliver the paint to squeegee 43 and in the operation thereof its relationship to the screen is such that a residual layer of paint will remain upon the screen for finely covering the openings of the pattern thereof, which is desirable for the purpose of having the succeeding printing of maximum sharpness and definity. It should be noted that, by its particular means of suspension, paint carrier 46 is "free floating," in that it is transversely rockable about its point of attachment to rod 49, with guide rods 45 inhibiting swinging in a horizontal plane, whereby the bottom contacting edge of paint carrier 46 is self-adjusting with respect to the surface contour of screen 12' for the development of reliable paint clearing action. Furthermore, wing members 47, 47' trap paint which might be inadvertently driven outwardly toward the sides of screen 12' and direct same inwardly for reception by carrier 46. Although paint carrier 46 may be fabricated of any suitable, rigid material, the same in the present invention is made of metal to provide a conductive path therethrough for any static electric charges developed on screen 12', whereby such may be grounded on machine A. Heretofore, paint scraping or paint carrier members on printing machines have been designed solely for fixed adjustment so that if the particular screen is not entirely within a single plane inadequate contact will be developed between such a paint carrier and the screen with resulting incomplete paint delivering operation. The paint carrier of the present invention is suspended in such a manner as to assure positive contact with the screen surface despite any unevenness therein so that the paint delivering operation will be at all times complete.

Speed reducer shaft 20 is provided at its lower end with a power take-off upon which is affixed a lower crank arm 55, the latter being in planar parallel relationship to crank 19 and substantially axially perpendicular thereto, for reasons to be discussed below. Said lower crank 55 forms part of a system controlled by shaft 20 for effecting the rocking of swing frame 10 which comprises a flexible, connecting member 56, such as a chain or the like, secured at its rearward end to the outer end of crank 55 and engaged at its other or forward end to the upper end portion of a link 57 swingably mounted at its lower end upon a cross bar 58 between the lower ends of arms 8, 8'. An extension spring 59 engaged to flexible member 56 and an element of the support structure 1 retains said member 56 against undesired displacement from its course of movement. Proximate its point of attachment to flexible member 56, link 57 is pivotally engaged to the lower end of a companion link 60, cooperating therewith in toggle-joint-forming relationship, said companion link 60 being, in turn, swingably supported at its upper end to a bracket 61 fixed on cross brace 3'. Link 57 is connected adjacent its upper end to one end of a spring 62 with which is associated, for adjustment purposes, a turnbuckle 63, the latter being connected by means of a chain 64 to a frame element at the upper forward portion of machine support structure 1, whereby said spring 62 will bias link 57 into forwardly swung position, in axially aligned-toggle-joint formation with companion link 60, all as may best be seen in full lines in Figure 1. With links 57, 60 in such aligned relationship a downward and rearward force will be thereby directed against cross-bar 58, resulting in arms 8, 8' being swung rearwardly at their lower ends and forwardly at their upper ends to present swing frame 10 in horizontal or full downward position, planar-wise parallel to bed 5. Thus, in this relationship links 57, 60 cooperate to form a brace to prevent swinging of frame 10. Flexible member 56 is of such length that during swinging of lower crank 55 through the forward half of its travel, that is, from the position thereof shown in Figure 2 to a position 180° therefrom, along the path indicated by the arrow, it will be in a slack, unstressed state, and, hence, exert no pull upon link 57 so that the toggle joint will be maintained through influence of spring 62. However, upon movement of lower crank 55 through the rearward half of its path of travel, tension will be developed in flexible member 56 resulting in a rearward pulling force upon link 57, overcoming spring 62, and causing the breaking of the toggle joint, as links 57, 60 are swung into the relationship shown in dotted lines in Figure 1. By this action swing frame 10 will be swung downwardly at its rearward end, with arms 8, 8' being rocked upwardly and forwardly at their lower ends, whereby swing frame 10 is disposed in tilted or upward position, as indicated in dotted lines in Figure 1. It will be observed that the center of gravity of swing frame 10 is located rearwardly of its transverse median line due to the combined weights of motors 28, 29 and speed reducer 21. A plurality of coil springs 65 are engaged at their forward ends to cross-bar 58 and at their rearward ends to members 4 of the machine support structure 1 for balancing the swinging of said cross-bar 58, and arms 8, 8' with swing frame 10.

In view of the foregoing, the angular relationship between cranks 19 and 55 will be understood to cause swing frame 10 to be in a horizontal or downward position during rearward travel of cross-head 13 and to be in upwardly swung position during forward travel of cross-head 13.

If desired, a vacuum system, indicated broadly at B, may be provided with machine A for maintaining work pieces *w* against shifting upon bed 5 to assure proper registration with screen 12; said system does not form a part of the present invention, being of generally accepted or conventional design.

The operation of machine A will be apparent from the above: When swing frame 10 is in upwardly tilted position, screen 12' will, through gravity, be suspended therebelow with connecting chain *b* being of such length that squeegee 43 will be spaced from said screen 12' so that no inadvertent, premature contact may be made thereon while cross-head 13 is being moved forwardly. By its uniqely controlled means of suspension, as described herein above, paint carrier 46 will maintain engagement upon the surface of screen 12' during forward travel of cross-head 13 (swing frame 10 being in upward position) to assure effective and reliable advancing of the paint to the forward end of screen 12'. Cross-head 13 is driven in forward travel by motor 28. Upon the arrival of cross-head 13 at the forward end of swing frame 10 the latter will be, through operation of the described toggle-joint system, in lowered or horizontal position with squeegee 43 being presented in contact with screen 12' for effecting the printing stroke during the rearward travel of cross-head 13 (paint carrier 46 having been restored to raised position); it being remembered that motor 29 controls, through the associated pulleys, the rate of movement of cross-head 13 during its rearward travel. The operation of machine A is entirely automatic and the customarily, factory-provided power of 115 volts is adequate therefor. With swing frame 10 in raised or upward position and screen frame 12 correspondingly raised, the operator may remove the printed work piece and insert a blank with the interval of time therefor being sufficient due to the relatively slower rate of speed of cross-head 13 in traveling forwardly as motor 28 is then controlling.

Provided on machine A is an auxiliary lever system by operation of which swing frame 10 may be held in upwardly swung position at the election of the operator, such as for effecting any repairs and the like, and the use of which system does not require discontinuance of operation of motors 28, 29. A foot lever 66 extends forwardly from the lower portion of the support structure 1, and is rockably engaged at its inner end thereon; there being affixed to the inner end of said lever 66, in axial normal relationship thereto, an upstanding arm 67 which

is connected to the adjacent front support member 4 by a flexible connector or chain 68, the latter being of such length as to be in slack condition when said arm 67 is vertically disposed. A chain or other flexible linkage means 69 connects arm 67 to the lower end of an elongated dog 70 which proximate its lower end is mounted for swinging in a vertical plane, as at 71, upon the forward end of a support member 72 such as of angle iron, extending forwardly from the rear of the support structure 1. Said dog 70 is in immediate juxtaposition to toggle links 57, 60 and is adapted upon rearward swinging of its upper end to engage on its rearward upper surface a pin 73 projecting laterally outwardly from the lower end of link 60 (see Figures 1 and 3). Due to the eccentric mounting of dog 70 on member 72 the same will be biased, through gravity, downwardly and forwardly in its upper end, and hence spacedly forwardly of pin 73 when links 57, 60 are in aligned, brace-forming relation. Upon depression of foot lever 66, arm 67 will be rocked forwardly placing chain 69 under tension, and thereby causing the lower end of dog 70 to be rocked forwardly with the upper end thereof being swung rearwardly into abutting engagement with pin 73 and cammingly acting thereagainst to force link 60 into upwardly swung position, overcoming spring 62 and breaking the toggle joint to permit swinging of swing frame 10 into its tilted position. Pressure may be maintained on foot lever 66 to retain swing frame 10 in such attitude to allow any minor repairs to the machine, readjustment of the work, etc. so that upon release of such pressure, links 57, 60 will be restored for operative control by spring 62 and flexible connecting member 56, as dog 70 will thereby be freed for downward swinging out of engagement with pin 73. If however, it is desired to maintain swing frame in upward position without the constant exercise of pressure on foot lever 66, the user will manually rock swing frame 10 upwardly at its forward end to thereby cause cross bar 58 to be swung upwardly and forwardly, and then the user will rock lever 66 upwardly from depressed position to a point above horizontal whereby arm 67 will be rearwardly and downwardly swung, stressing chain 68 with such rocking of arm 67 causing the same, by gravity, to be urged downwardly. In this manner, arm 67 will be brought into engagement with the beveled end 74 of a cooperating detent member 75 rigid on cross bar 58 and extending forwardly thereof. Whereupon, the use will release manual support of swing frame 10 and hence allow the engagement between arm 67 and member 75 to effect retention of swing frame 10 in upward position until such time as the foot lever 66 may be returned downwardly to normal disposition.

Connecting rod 18 and crank 19 in their proximate end portions are each provided with a series of apertures 76, 77 respectively for selected mutual engagement as by a suitable fastener, such as a shoulder bolt, or the like. It will be noted that connecting rod 18 is in overlying relationship at its apertured end to the similarly perforated end of crank 19 so that by the predetermined alignment a range of adjustability in two distinct manners is provided. The distance between the point of attachment of crank arm to shaft 20 and the opening through which the particular bolt extends, determines the extent of travel of the cross-head 13. In other words, said distance represents a radius twice the extent of which measures the travel of cross-head 13. Accordingly, the connection of connecting rod 18 to crank arm 19 with respect to the aforesaid center of rotation will determine how far cross-head 13 travels. Hence, the openings 77 are presented for providing adjustability in the extent of travel of cross-head 13. The openings 76 in connecting rod 18 are provided for determining that portion of swing frame through which cross-head 13 will be moved reciprocally. Thus, if the particular work is located so as to be near the forward end of swing frame 10 when the latter is in lowered position connecting rod 18 is so secured to crank 19 as to provide travel of cross-head 13 only in the forward portion of swing frame 10. Similarly, if the work happens to be located toward the rearward portion of swing frame 10, connecting rod 18 is suitably secured to crank 19 so that cross-head 13 will only travel through a limited extent at the rearward portion of swing frame 10.

Accordingly, it is obvious that by the novel coaction of connecting rod 18 and crank 19 the extent of travel and the location of travel of cross-head 13 may be controlled, with the result that machine A may accommodate work units of varying dimensions in an effective economic manner, obviating any unnecessary travel of cross-head 13 so that the printing operation is accomplished with maximum speed.

It is understood that changes and modifications in the formation, construction, arrangement, and combination of the several parts of the screen printing machine may be made and substituted for these herein shown and described without departing from the nature and principle of my invention.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A screen printing machine comprising a support frame, a work-receiving member mounted on said support frame, an elongated frame rockably mounted on said support frame for movement within a vertical plane and above said work-receiving member between horizontal position and upwardly swung position, a squeegee carrier mounted in said elongated frame and being adapted for reciprocal movement therealong, and power means comprising differential speed motor means for causing said squeegee-carrier to travel more rapidly in one direction of travel than the other.

2. A screen printing machine as described in claim 1 wherein said power means comprises first and second motors, said first motor being adapted to cause said squeegee-carrier to travel more rapidly than said second motor, a switch for operation of said first motor, and means for intermittently closing said switch.

3. A screen printing machine as described in claim 1 wherein said power means comprises a speed reducer having a main shaft, first and second motors, said first motor being adapted to cause said squeegee-carrier to travel more rapidly than said second motor, means operatively connecting said first and second motors with the main shaft of said speed reducer, a switch for operation of said first motor, and a switch operating plate mounted on said main shaft for intermittent closure of said switch.

4. A screen printing machine comprising a support frame, a work-receiving member mounted on said support frame, an elongated frame swingably mounted on said support frame for movement within a vertical plane and above said work-receiving member between horizontal position and upwardly swung position, a squeegee-carrier mounted in said elongated frame for reciprocal traversing movement therealong, power means carried on said elongated frame for movement therewith comprising a main shaft axially normal to the longitudinal axis of said elongated frame, a crank arm fixed on said shaft for rotative movement in a plane parallel to the plane of said elongated frame, a connecting rod pivotally engaged at its ends to said crank and squeegee-carrier for effecting reciprocal movement thereof on rotation of said crank arm, and power means for causing said squeegee carrier to travel more rapidly in one direction than the other.

5. A screen printing machine as described in claim 4 wherein said power means comprises first and second motors drivingly connected to said main shaft, said first motor being adapted to cause said squeegee-carrier to travel more rapidly than said second motor, switch means for operation of said first motor, and means associated with said crank for intermittently closing said switch means.

6. A screen printing machine comprising a support

frame, a work-receiving member mounted on said support frame, an elongated frame swingably mounted on said support frame for movement within a vertical plane and above said work-receiving member between horizontal position and upwardly swung position, a squeegee-carrier mounted in said elongated frame for reciprocal traversing movement therealong, power means carried on said elongated frame for movement therewith and biasing said frame into upwardly swung position, and link means disposed below said support frame, a flexible member operatively connecting said link means to said power means whereby said link means effect rocking of said elongated frame into downwardly rocked or horizontal position during travel of said squeegee-carrier in one of its directions of movement.

7. A screen printing machine comprising a support frame, a work-receiving member mounted on said support frame, an elongated frame swingably mounted on said support frame for movement within a vertical plane and above said work-receiving member between horizontal position and upwardly swung position, a squeegee-carrier mounted in said elongated frame for reciprocal traversing movement therealong, power means carried on said elongated frame and comprising a main shaft, means connecting said squeegee-carrier to said main shaft for reciprocal travel responsive to rotation thereof, said power means biasing said frame into upwardly swung position, cooperating toggle links located below said support frame, flexible means operatively connecting said links to said main shaft for toggle-joint formation and deformation responsive to rotation thereof, and means engaging one of said links to said elongated frame.

8. A screen printing machine as described in claim 7 wherein a crank arm is mounted on said main shaft, a flexible member engages said crank arm with one of said links, and resilient means anchored on said support frame urging said links into toggle-joint formation.

9. A screen printing machine comprising a support frame, a work-receiving member mounted on said support frame, an elongated frame rockably mounted on said support frame for movement within a vertical plane and above said work-receiving member between horizontal position and upwardly swung position, a screen member pivotally mounted on said work-receiving member, means connecting said screen member with said elongated frame for movement therewith, a cross head adapted for reciprocal travel along said elongated frame, rockable mounting means carried on said cross head for swingable movement within a plane substantially perpendicular to the plane of the elongated frame a paint carrier suspended from said rockable mounting means for reciprocal movement downward into contact with and upward away from said screen during travel of the paint carrier responsive to operation of said rockable mounting means, and means for elevating said paint carrier from contact with said screen during travel in the opposite direction.

10. A screen printing machine comprising a support frame, a work-receiving member mounted on said support frame, an elongated frame rockably mounted on said support frame for movement within a vertical plane and above said work-receiving member between horizontal position and upwardly swung position, a screen member pivotally mounted on said work-receiving member, means connecting said screen member with said elongated frame for movement therewith, a cross-head adapted for reciprocal travel along said elongated frame, rockable mounting means carried on said cross-head for swingable movement in a plane substantially normal to the plane of the elongated frame, a paint carrier suspended from said rockable mounting means for reciprocal movement downward into contact with, and upward away from said screen member responsive to operation of said rockable mounting means, and guide rods for directing said paint carrier during its movement for presenting same to the screen member at a predetermined angle.

11. A screen printing machine comprising a support frame, a work-receiving member mounted on said support frame, an elongated frame rockably mounted on said support frame for movement within a vertical plane and above said work-receiving member between horizontal position and upwardly swung position, a screen member pivotally mounted on said work-receiving member, means connecting said screen member with said elongated frame for movement therewith, a cross-head adapted for reciprocal travel along said elongated frame, latch means pivotally mounted on said cross-head for swingable movement in a plane substantially normal to the plane of the elongated frame, a paint carrier comprising a relatively thin plate suspended at a point substantially intermediate its length from said latch means for disposition below said cross-head and being thus freely tiltable about its point of suspension, guide rods mounted on the under surface of said cross-head for receiving said paint carrier for restricting its path of movement toward and away from said screen member, and means for intermittently operating said latch means for releasing said paint carrier for downward movement toward the screen member.

12. A screen printing machine comprising a support frame, a work-receiving member mounted on said support frame, an elongated frame rockably mounted on said support frame for movement within a vertical plane and above said work-receiving member between horizontal position and upwardly swung position, a screen member pivotally mounted on said work-receiving member, means connecting said screen member with said elongated frame for movement therewith, power means including a main shaft carried on said elongated frame, a crank mounted on said main shaft, a connecting rod engaged to said crank at one end, a cross-head mounted on said elongated frame for reciprocal traversing movement therealong, said cross-head being engaged to the other end of said connecting rod, latch means mounted on said cross-head for intermittent engagement by said connecting rod, a paint carrier suspended from said latch means for disposition beneath said cross-head, and for movement therewith, guide rods mounted on said cross-head for directing movement of said paint carrier, said paint carrier having downwardly and forwardly turned wing elements, and means for limiting upward movement of said paint carrier.

13. A screen printing machine as described in claim 12 wherein the paint carrier is constructed of electrically conductive material for conducting static charges on said screen member.

14. A screen printing machine comprising a support frame, a work-receiving member mounted on said support frame, an elongated frame swingably mounted on said support frame for movement within a vertical plane and above said work-receiving member between horizontal position and upwardly swung position, a squeegee-carrier mounted in said elongated frame for reciprocal traversing movement therealong, power means carried on said elongated frame comprising a main shaft axially normal to the longitudinal axis of said elongated frame, an upper crank fixed on said shaft, a connecting rod pivotally engaged at ends to said upper crank and squeegee carrier for effecting reciprocal movement thereof on rotation of said upper crank, a lower crank mounted on said main shaft, a flexible member secured to said lower crank, cooperating links for toggle-joint formation operatively connected to said flexible member, and means connecting said links and said elongated frame so that when said links are in toggle-joint formation the elongated frame will be in upwardly swung position, said lower crank and upper crank being so axially related as to cause said squeegee carrier to move toward

the forward end of said elongated frame while said toggle joint is formed.

15. In a screen printing machine, a support frame, having an upper horizontal portion, an elongated rectangular frame rockably mounted on the upper portion of said support frame for movement within a vertical plane toward and away from said upper portion thereof, the mounting means therefor comprising arms extending downwardly from opposite sides of said elongated frame, a shaft transversly mounted on the upper portion of said support frame, said arms being fixed on said shaft, said arms at their lower ends extending downwardly below the upper portion of said support frame, a cross-bar extending beneath the lower ends of said arms, cooperating toggle-links operatively connected to said cross-bar, resilient means provided on said support frame for urging said cooperating links into toggle-joint formation, and power operated means for intermittently swinging said cooperating links out of toggle-joint formation whereby said elongated frame is swung into upward position.

16. In a screen printing machine as described in claim 15, a dog member mounted rockably on said support frame, and in juxta-position to said cooperating links, a projection provided on one of said links within the path of swinging movement of said dog, and lever-operated means for effecting swinging of said dog to bring same into contact with the said projection to thereby cause swinging of said cooperating links out of toggle-joint formation and thereby said elongated frame will swing into upward position.

17. A screen printing machine comprising a support frame, a work-receiving member mounted on said support frame, an elongated frame swingably mounted on said support frame for movement within a vertical plane and above said work-receiving member between horizontal position and upwardly swung position, a squeegee-carrier mounted in said elongated frame for reciprocal traversing movement therealong, power means carried on said elongated frame for movement therewith comprising a main shaft axially normal to the longitudinal axis of said elongated frame, a crank fixed on said shaft for rotative movement within a plane parallel to the plane of the elongated frame, a connecting rod pivotally engaged at ends to said crank and squeegee carrier for effecting reciprocal movement thereof on rotation of said crank, said crank and connecting rod each having a plurality of openings in their proximate end portions, and fastener means for extension through selected aligned openings of said crank and connecting rod for controlling the extent and location of travel of said squeegee carrier.

18. In a screen printing machine, a support frame having an upper horizontal portion, an elongated rectangular frame rockably mounted on the upper portion of said support frame for movement within a vertical plane toward and away from said upper portion thereof, the mounting means therefor comprising arms extending downwardly from opposite sides of said elongated frame, a shaft transversely mounted on the upper portion of said support frame, said arms being fixed on said shaft, said arms at their lower ends extending downwardly below the upper portion of said support frame, a cross-bar extending beneath the lower ends of said arms, cooperating toggle-links operatively connected to said cross-bar, means for urging said cooperating links into toggle-joint formation, a dog member mounted rockably on said support frame, and in juxtaposition to said cooperating links, a projection provided on one of said links within the path of swinging movement of said dog, and lever-operated means for effecting swinging of said dog to bring same into contact with the said projection to thereby cause swinging of said cooperating links out of toggle-joint formation and thereby free said elongated frame for swinging into upward position.

19. In a screen printing machine comprising a support frame, a work-receiving member mounted on said support frame, an elongated frame swingably mounted on said support frame, an elongated frame swingably mounted on said support frame for movement within a vertical plane and above said work-receiving member between horizontal position and upwardly swung position, power means carried on said elongated frame and comprising a main shaft, said power means biasing said frame into upwardly swung position, a pair of cooperating toggle links, one of said links being engaged at one of its ends to the support surface, the other of said links being engaged at one of its ends for connection to the elongated frame, spring means biasing said links into toggle-joint formation, a crank operated by the main shaft of said power means, and a flexible, elongated, member engaging said crank with one of said links for effecting deformation of the toggle joint during movement of the crank through a portion of its rotative path.

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