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SCREEN PRINTING APPARATUS WITH MAGNETIC SQUEEGEE MOVING MEANS

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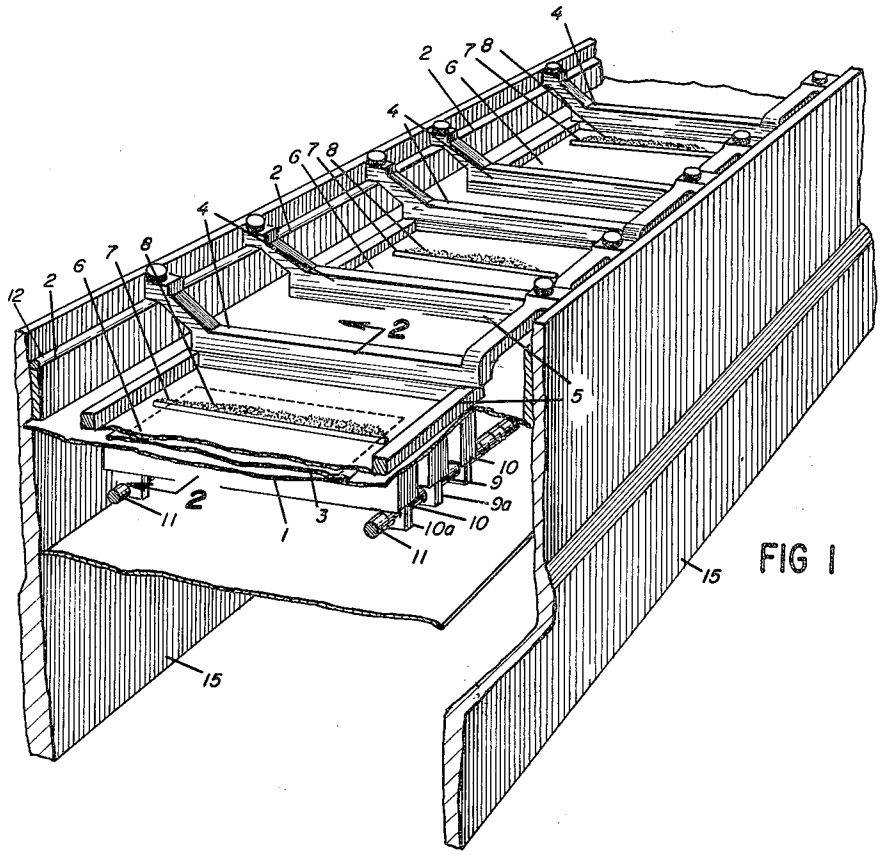

FIG 1

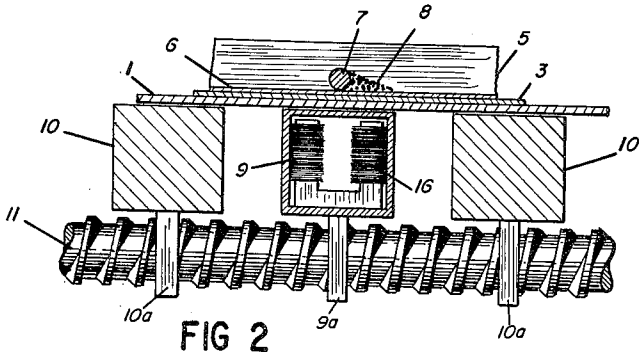

FIG 2

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SCREEN PRINTING APPARATUS WITH MAGNETIC SQUEEGEE MOVING MEANS

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1 Claim. (Cl. 101—123)

This application is a continuation-in-part of my application Serial No. 703,017, filed December 16, 1957, now abandoned.

The present invention relates to magnetic means for moving a squeegee in a screen printing apparatus.

In the usual screen printing machine, the squeegees for spreading the printing paste over the screens having therein the patterns to be printed are carried on a reciprocable carriage above the screens, and the squeegees are suspended from these carriages. Many types of devices have been suggested for insuring that the pressure of the squeegees on the screens is uniform across the entire width of the screen, thus insuring that the paste is spread evenly and that the printing of the pattern on the cloth is accurate and even. All of these devices, however, operate to exert pressure on the squeegee from overhead, i.e. through the carriage from which the squeegee is suspended. It is not easy to control such pressure when it is exerted from above against the screen, and it is not easy to insure that the pressure is uniform all along the length of the squeegee.

It is an object of the present invention to provide means for moving the squeegees back and forth across the screens with the squeegees exerting uniform pressure along the entire length of each of them.

It is a further object of this invention to provide means for moving the squeegees which draws the squeegees down against the screens instead of pressing them down from above the screen.

These objects are carried out by providing a squeegee of magnetic material, and providing a magnet beneath each screen, cloth and supporting belt which extends across the entire width of the screen and magnetically attracts the squeegee with a uniform attractive force so that the squeegee exerts uniform pressure on the screen at all points along its length. The magnet is movable back and forth so that as it moves it causes the squeegee on top of the screen to move with it.

A preferred embodiment of the invention will now be described in connection with the accompanying drawings, in which:

FIG. 1 is a perspective view, partly cut away, showing the portion of the screen printing machine in which the screens and squeegees are positioned; and

FIG. 2 is a sectional elevation view taken along line 2—2 of FIG. 1.

An endless belt 1 is driven over two rollers (not shown) and the top run of the belt serves as a support for the cloth 3 which is to be printed. The edges of the top run of the belt 1 are guided along the bottom edges of guides 2 mounted on the side frames 15 of the apparatus. Secured to lifting rods 12 along the top edges of the guides 2 are frame holders 4 which extend across the run of the belt 1 and which also extend downwardly toward the surface of the belt 1. There is one pair of frame holders 4 for each screen on the apparatus. Secured between the frame holders 4 of each pair is a frame 5 which has stretched over the bottom thereof a screen 6 with a pattern cut therein which is to be printed on the cloth 3. The pattern is indicated in the drawing by the dotted line exentding around the screen.

On each screen 6 is a squeegee, which in the apparatus according to the present invention is a cylindrical rod 7 having a small diameter, for example 0.5 cm. The squeegee is movable back and forth across the screen 6, and as it moves it pushes a mass of paste ink 8 ahead of it to spread it over the screen, and at the same spread the paste through the openings forming the pattern in the screen and onto the cloth to be printed. In the embodiment shown, the squeegee 6 is movable in a direction parallel to the direction of the run of the belt 1, but it is also possible to have the squeegee run in the direction transverse to the belt.

Beneath the upper run of the endless belt 1 are a plurality of groups of beams, one group for each frame 5. Each group of beams includes at least two supporting beams 10 spaced from each other in the direction of the run of the belt 1, and a magnettic beam 9 which lies between the supporting beams 10. The supporting beams 10 support the belt in the vicinity of the frames 5 so that the cloth 3 is kept substantially flat. The magnetic beam 9 has magnet means therein which in the present embodiment is comprised of electromagnets 16 extending along the length of the beam.

At each end of the supporting beams 10 is a nut 10*a* secured to the bottom of the beam, and at each end of the magnetic beam 9 is a nut 9*a* also secured to the bottom of the beam. Extending through all of the nuts on one side of the upper run of the belt 1 is a threaded spindle 11, and a similar spindle extends through the nuts on the other side of the belt. The spindles 11 are driven by the driving means for the belt (not shown) so that the movement of the beams 9 and 10 are synchronized with the movement of the belt as described hereinafter.

In operation, the cloth 3 to be printed is secured to the belt 1 in a conventional manner and the belt 1 with the cloth secured thereto is fed into one end of the machine by means not shown. The edges of the belt run along the guides 2 and the central portion of the belt is supported by the supporting beams 10. The driving means for the belt move the belt step by step, each step being a movement for a distance equal to the dimension of a frame holder 4 plus the distance between frame holders, so that the area of the cloth which is beneath one frame holder 4 at the end of one step is moved to a position under the next frame holder 4 in the next step.

At the completion of a step, the lifting rods 12 are lowered so as to lower the frame holders 4 mounted thereon, and a quantity of printing paste is placed along the rod 7, either by an automatic dispensing means known to those in the art, or manually. Thereupon the spindles 11 are driven in a direction to move the supporting beams 10 and the magnetic beam 9 along the bottom of the belt from a position below one edge of the frame holder 4 to a position below the other edge of the frame holder.

Since the rod 7 is of magnetic material, and since the magnetic beam 9 will attract the rod 7, the rod 7 will be moved along over the screen 6 on the bottom of the frame holder 4 so as to spread the paste 8 through the pattern in the screen onto the cloth. When the rod 7 approaches the edge of the frame holder 4, the paste will start to pile up and will flow over the rod 7, so that when the rod reaches the end of its movement adjacent the edge of the frame holder 4, the paste which remains after spreading has flowed over the rod and is ahead of the rod when the reverse movement of the rod takes place.

If it is desired to spread the paste twice, the direction of rotation of spindles 11 is reversed, and the magnetic beam 9 and supporting beams 10 are moved back to the starting point, again causing the rod 7 to move across the screen 6 spreading paste ahead of it.

The lifting rods 12 are then lifted, lifting the frame holders and the screens 6 from the cloth, and the belt driving means again moves the cloth forward another step. Thereupon, the entire process is repeated.

It will thus be seen that the rod 7, which acts as a squeegee, exerts even pressure upon the screen 6 and the cloth 3 as it moves across the screen to spread the paste, being drawn against the screen with uniform pressure by the magnetic beam 9 beneath the belt. There is no complicated apparatus for raising and lowering a squeegee from above the screen, and no complicated means for exerting uniform pressure along the top of the squeegee so as to attempt to exert uniform squeegee pressure on the screen. There is only the simple rod and the simple magnetic beam beneath the belt.

It will of course be understood that the present invention is not limited to the use of electromagnets for the magnetic beam. It is equally possible to use permanent magnets.

It is thought that the invention and its advantages will be understood from the foregoing description and it is apparent that various changes may be made in the form, construction and arrangement of the parts without departing from the spirit and scope of the invention or sacrificing its material advantages, the form hereinbefore described and illustrated in the drawings being merely a preferred embodiment thereof.

I claim:

In an apparatus for treating the surface on one side of a web of non-magnetic textile material by rolling a roller along the one side of the web material, the combination of web holding means for holding the web in a fixed position, a roller of a material capable of being attracted by a magnet and being on one side of the web to be treated, said roller having a large axial dimension relative to its diameter such that when it is supported only at its ends it tends to sag between the ends and it tends to exert non-uniform pressure along its length, and said roller being capable of moving along the said one side of the web to be treated, a magnetized body on the other side of the web to be treated and substantially coextensive with the roller and supporting the roller against sagging and attracting the roller with a substantially uniform force along its length, and body moving means in which said magnetized body is mounted and movable along the said other side of the web to be treated, whereby the elongated roller is moved along the one side of the web to be treated.

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