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J. R. DAVEY
SHEET-MOVING APPARATUS

2,862,445

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Fig. 1

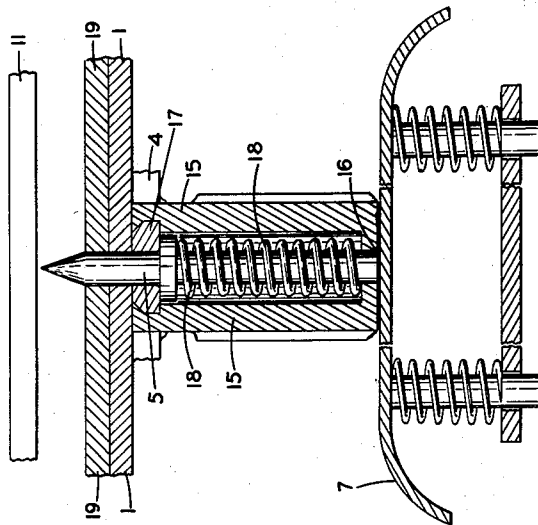
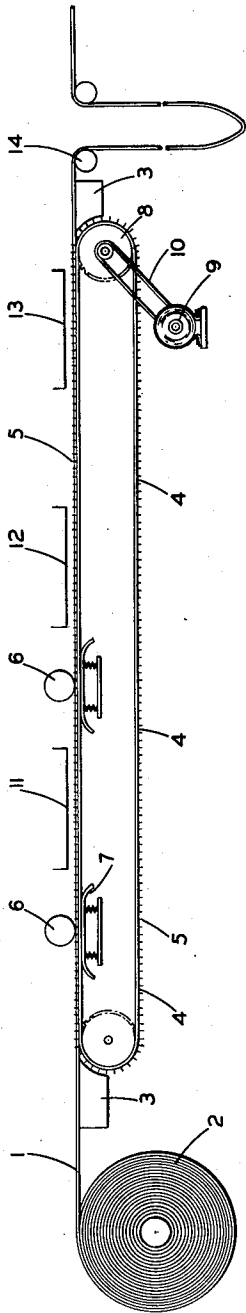


Fig. 3

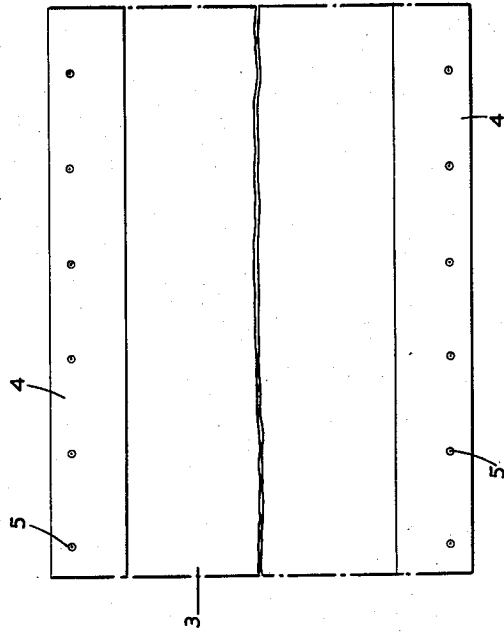


Fig. 2

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2,862,445

SHEET-MOVING APPARATUS

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Application September 8, 1954, Serial No. 454,711

3 Claims. (Cl. 101—407)

This invention relates to sheet-moving apparatus, and more particularly to sheet-moving apparatus utilized in connection with the deposition of material on the surface of a sheet.

In the deposition of material on the surface of a sheet as by stenciling, printing, or otherwise subjecting a sheet to a surface treatment, it is often customary to provide a mechanism whereby the sheet to be treated is continuously or semicontinuously advanced through the surface-treating apparatus. The sheet is often unwound from a feed roll or other source, advanced through the surface-treating apparatus, treated in any manner necessary to render the material deposited on the surface more or less permanent, and then packaged or otherwise disposed of.

Examples of such processes are the printing of yard goods of floor coverings, the manufacture of linoleum, the manufacture of wall coverings, and the surface-treating of sheet goods to achieve any of the desirable characteristics now well known in the art, such as waterproofing, fire retardation, and the like.

One type of sheet-moving apparatus that has been used extensively in the past is made of a series of metal slats fastened together to form a flexible endless belt. The surface of these slats is roughened in order that sufficient friction will develop between the surface of the slats and the sheet goods to be treated so that when the belt is driven the sheet will be advanced in the desired manner. Although such an apparatus has served very well in the past, it suffers from several shortcomings. First, slippage sometimes occurs between the sheet and the slats. Such slippage can destroy the final pattern where a sequence of printing blocks is used to apply a design to the sheet or where a sequence of stencils is used to deposit material on the surface of the sheet to be later formed into a unified pattern, as in linoleum manufacture. Second, the metal slats must be strongly supported from underneath in order to bear the weight of a printing operation. Third, the metal slats are subject to such mechanical breakdowns as warping or twisting.

A second type of sheet-moving apparatus has utilized pin bands. These pin bands are usually endless bands of metal equipped with a plurality of pointed band pins extending outwardly from the surface of the band. The bands then travel along the edges of a fixed tabling surface fabricated of wood or other suitable material. The sheet is fed to the table in such manner that the band pins penetrate the edge of the sheet. Suitable driving means urge the bands into motion. The sheet is thus carried down the table and through the various treating stations. At the end of the table the treated sheet is simply passed off the table. The band pins are readily disengaged from the sheet at one end of the table as the endless pin band continues to draw fresh sheeting material onto the other end of the table. This type of mechanism, while useful in many applications suffers from the shortcoming that the treating mechanisms, such as stencils and printing blocks, may not extend to that por-

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tion of the pin band which bears the band pins. Otherwise the printing blocks or stencils or other equipment will press down on the pins and either break them or blunt them or otherwise destroy their usefulness. This is particularly true where the same surface-treating apparatus is to be utilized for many different kinds of procedures, each of which calls for stencils or printing blocks or other apparatus of different kinds and widths.

It is the primary object of the present invention to present a sheet-moving apparatus which does not suffer from the shortcomings described above.

To this end the invention contemplates at least one pin band and means for driving the pin band. A plurality of pointed band pins are mounted on the pin band. Each of the pins is mounted in an extended position and yet is adapted to be retracted when sheet-treating apparatus is pressed down on the sheet and in contact with the pins. A means is provided for forcing the pins into the sheet.

For purposes of illustrating the invention, references is had to the accompanying drawing, in which:

Figure 1 is a diagrammatic elevation of a treating table including the sheet-moving apparatus of the present invention;

Figure 2 is a sectional elevation of a method of mounting a retractable band pin on the pin band; and

Figure 3 is a fragmentary plan view of a treating table illustrating the arrangement of the sheet-moving apparatus of the present invention.

At Figure 1 is shown a sheet-treating apparatus utilizing the sheet-moving apparatus of the present invention. A suitable sheet material 1 unwinds from the feed roll 2 for passage down the treating table top 3. The pin bands 4 and the band pins 5 in their normally extended position engage the sheet 1 shortly after the sheet 1 passes onto the table 3. A preess-down roller or plate 6 in conjunction with the spring-urged pin back-up plate 7 forces the band pins 5 into the sheet 1. A driving means urges the pin band 4 in the direction desired. In Figure 1 the driving means consists of a sprocket 8 and a motor 9 connected to the sprocket 8 by means of a belt 10. A plurality of the means for forcing the band pins 5 into the sheet 1 may be used if desired, in Figure 1 this means consists of a combination of a press-down roller or plate 6 and the spring-urged pin back-up plate 7 as described above. Figure 1 shows two such combinations but, depending on the circumstances, one alone may suffice.

As the sheet 1 moves down the table and arrives at an appropriate position and stops momentarily, the stencils 11, 12, and 13 drop into such a position that they rest on or very near the sheet 1. In this position, the stencils are adapted to deposit any desired material in the appropriate design on the sheet 1. The ends of the stencils which protrude over the row of band pins 5 will simply depress the pins 5 from their extended position into a retracted position. Once the material has been deposited through the stencils and the stencils are moved upwards and away from the sheet 1, the pins 5 will resume their normal extended positions.

In normal operation on a stenciling table, as illustrated in Figure 1, the driving means will be adapted to move the sheet 1 in a semicontinuous manner. This means that the sheet 1 will be advanced for the required distance and then stopped for the period of time necessary for the stencils to move down to the sheet and deposit the requisite material. Then when the stencils are raised, the driving means will again move the sheet 1 for the requisite distance before halting the sheet for another contact with a stencil.

After the sheet 1 has passed the full length of the table 3, the sheet may be readily disengaged from the

band pins 5 as by passing the treated sheet over the roller 14. The treated sheet 1 may then pass into whatever treating zones are needed in order to dry or cure or otherwise effect the more or less permanent set of the material that has been deposited on the sheet. It should be apparent from Figure 1 that instead of utilizing stencils to deposit material on the surface of the sheet, there may be used printing blocks or any other of the known sheet-treating devices.

Figure 2 illustrates an embodiment of an individual band pin and the requisite mounting. The band pin 5 is mounted in the band pin socket 15 which has an opening 16 in the base thereof. The band pin retainer 17 prevents the band pin 5 from being urged out of the band pin socket 15 by the band pin spring 18. The base of the band pin 5 is substantially flush with the opening 16 and the base of the band pin socket 15 when the pin is carried in its normal extended position as shown. When a sheet presses down on the point of the band pin 5, however, the band pin will be forced into a retracted position so that its bottom protrudes through the opening 16 at the base of the band pin socket 15. It is this protruding bottom while in a retracted position that is contacted by a spring-urged back-up plate 7 in order to again urge the band pin 5 into its normal extended position and thus, with the aid of the press-down plate or roller 6, to penetrate the sheet to be treated.

Figure 2 also diagrammatically illustrates in elevation the sheet 1 to be treated, a thickness of the material 19 deposited on the sheet 1, and the bottom of a descending stencil 11; it is understood that the stencil 11 may be instead a printing block or other treating device. Figure 2 also illustrates one method by means of which the band pin socket 15 may be positioned in respect to the pin band 4.

Figure 3 illustrates the type of apparatus to be preferred in stenciling or printing a sheet. Two pin bands 4 traverse the opposite edges of the table 3, thus carrying a sheet, not shown, by means of the penetration of the band pins 5 through the edges of the sheet.

Although it is a preferred modification of the present invention to use two pin bands, one at each edge of the treating table, certain applications may call for only one pin band. In the case of a narrow sheet to be treated, a pin band may run down the center of the table.

The spacing of the band pins on the pin band is not critical. Any desired spacing consistent with good grip-page may be used. Although it is preferred to have the band pins mounted on a straight line on the pin bands, such is not essential.

In certain applications, as in the manufacture of linoleum, it will be desirable to trim off the edges of the sheet before finally packaging the treated sheet. In other applications, where the goods are not harmed by

perforations throughout their length, such trimming may be unnecessary; in this latter application, the pins need not penetrate the sheet along the edges thereof but may instead penetrate the sheet at any convenient location.

I claim:

1. In a device for depositing material on a moving sheet, the combination with a treating table of two pin bands adapted to travel along the edges of said table, a plurality of band pin sockets having openings in the bases thereof mounted on the underside of said pin bands, a plurality of pointed band pins mounted in each of said sockets, a plurality of band pin springs mounted in each of said sockets and adapted to urge said band pins into an extended position, the pointed end of said pins protruding through openings in said pin bands when the pins are in an extended position, the base end of said pins protruding through openings in said sockets when the pins are in a retracted position, forcing means adapted to press the sheet to be treated against the point of said pins, and pressing means cooperating with said forcing means adapted to press against the base of said pins and press said pins from said retracted position to said extended position.

2. Apparatus according to claim 1 wherein said forcing means comprises a roller and said pressing means comprises a spring-urged back-up plate.

3. Sheet-moving apparatus for a treating table comprising in combination two metal endless pin bands adapted to travel along the edges of a treating table, driving means for said pin bands, a plurality of band pin sockets having openings in the bases thereof and being mounted along the length of said pin bands and on the underside of said pin bands, a plurality of band pins having a pointed end and a base end mounted in each of said band pin sockets, a plurality of band pin springs mounted in each of said band pin sockets and adapted to urge said band pins into an extended position through openings in said pin bands, and means for forcing said pins through a sheet to be treated, said forcing means comprising means for pressing said sheet against the points of said pins operating in coordination with means pressing against the base of said pins to force the pins from a retracted position to an extended position, said band pins being adapted to assume a retracted position when contacted with sheet-treating apparatus.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 2,862,445

December 2, 1958

John R. Davey

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 1, line 30, for "goods of floor coverings" read -- goods or floor coverings --; column 2, line 11, for "shotcomings" read -- shortcomings --; line 20, for "references" read -- reference --; line 36, for "preess-down" read -- press-down --; column 3, line 53, for "streated" read -- treated --.

Signed and sealed this 10th day of March 1959.

(SEAL)
Attest:

KARL H. AXLINE
Attesting Officer

ROBERT C. WATSON
Commissioner of Patents