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H. M. MORGANSTERN ET AL

2,983,241

SEWING MACHINE WITH VACUUM HOLD DOWN

Filed March 11, 1956

FIG. 1.

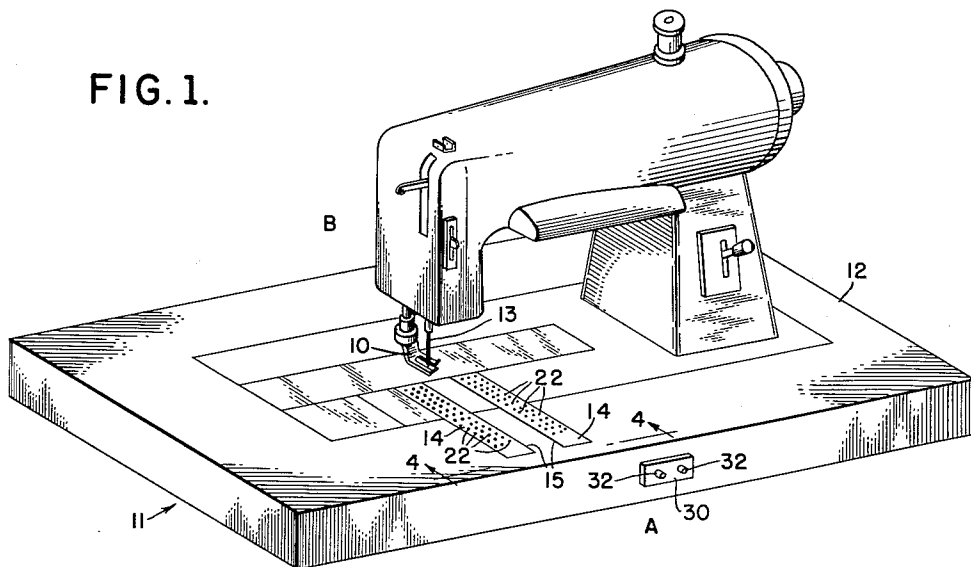


FIG. 4.

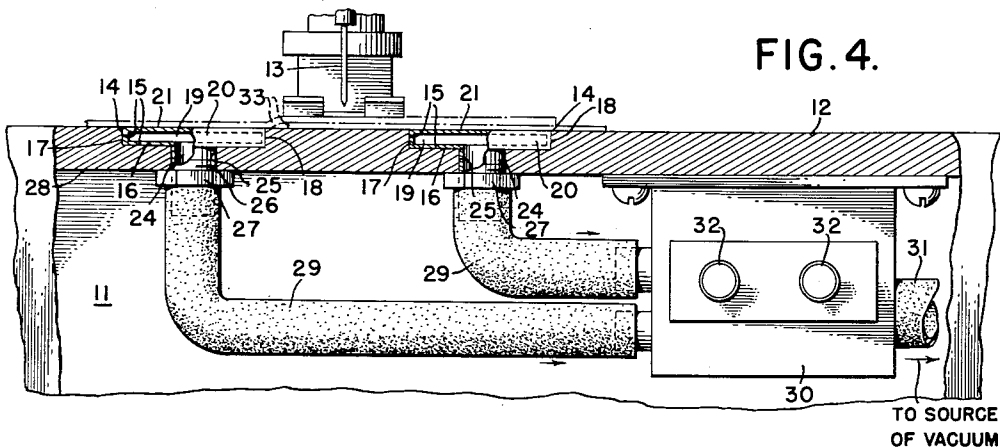


FIG. 3.

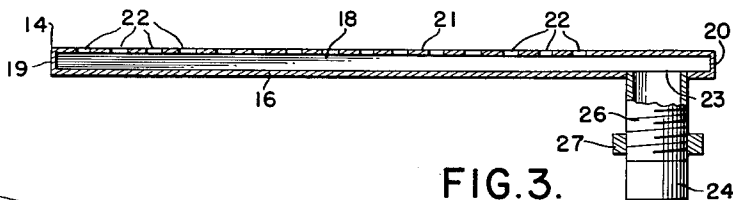
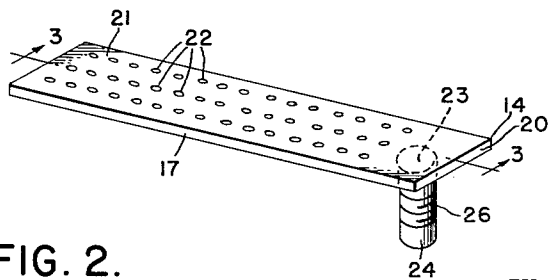


FIG. 2.



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7 Claims. (Cl. 112-260)

This invention relates to sewing machines and it is more particularly concerned with means in combination with sewing machines for holding in place material being fed to the sewing needle thereof.

One of the objects of this invention is the provision of ever ready means for firmly holding in place material being sewn by a sewing machine, while permitting the material to move relative to the sewing needle under the normal pulling force thereof by the sewing operation.

Another object of the invention is the provision of means of the type mentioned in combination with a sewing machine which is simple and easy to use by the machine operator.

A still further objection of the invention is to provide such means which can be readily installed on existing sewing machines or built into a new sewing machine without changing the fundamental design or principle of operation of the machine.

A still further object is to provide a device of the type mentioned which does not interfere with or reduce the efficiency or effectiveness of the sewing machine or any parts thereof, and actually increases its efficiency and readiness for use.

These and still further objects, advantages, and features of the invention will be apparent from the following description considered together with the accompanying drawing.

In the drawing:

Fig. 1 is a perspective view of a sewing machine in which there has been incorporated vacuum hold down elements in accordance with an embodiment of this invention.

Fig. 2 is a perspective view of one of the hold down elements of Fig. 1, apart from the sewing machine per se.

Fig. 3 is a longitudinal sectional view along the line 3-3 of Fig. 2.

Fig. 4 is a section along the line 4-4 of Fig. 1, partly broken away.

Referring with more particularity to the drawing in which like numerals designate like parts, the embodiment illustrated comprises a conventional sewing machine 11 mounted on a table 12 and having the usual vertical reciprocating sewing needle 13, presser foot 10 and stitch forming means (not shown). Material to be sewed normally is fed to the needle from one side A toward the opposite side B.

Between the needle 13 and the side A there is disposed one or more elongated chambers 14, 14, each of which is disposed in a transverse elongated recess 15, 15 of the table 12, substantially as shown. Each of the chambers 14 comprises a bottom wall 16, side walls 17 and 18, end walls 19 and 20, and a top wall or platen 21 having perforations 22 therethrough.

The bottom wall 16 has an opening 23 therethrough into which is fitted a partially threaded nipple 24. An aperture 25 in the bottom wall of each recess 15 is adapted to receive the nipple 24. Threads 26 of the nipple 24 each engage a nut 27 which bears and is drawn

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up tight against the bottom surface 28 of the table 12, substantially as shown, thus holding the chamber in each case securely in its recess 15. The nipple 24 in each case extends below the nut 27 and is connected to a tube 29. The tubes 29, 29 are connected to a subatmospheric plenum chamber 30. Subatmospheric pressure in the chamber is provided through a pipe line 31 leading to a conventional source of vacuum (not shown). The plenum chamber 30 is provided with interior dampers or air valves (not shown), one for each of the tubes 29, 29, having control knobs 32, 32, respectively, for selectively opening and closing the valves.

To use the invention, the material 33 to be sewed is placed in the table in the usual position for sewing and the knobs 32, 32 or either of them is adjusted for the application of suction to either or both of the chambers 14 to the degree desired or needed for holding the particular material. In this respect, heavier materials may require more suction than lighter materials and multiple plies of material may also require more suction than only, say, two plies. In any event, the holding action of the suction should not be so great as to overcome the pulling force of the sewing machine on the material as it is being sewn. Thus the pieces being sewn are maintained in constant relative position as they are fed to the sewing needle 13 and are released therefrom after being stitched.

The chamber units 14 are readily replaceable by means of the nuts 27.

Having thus described our invention, we claim:

1. The combination of a sewing machine having a mechanism that includes a reciprocating sewing needle, a presser foot, and a stationary smooth horizontal surface adjacent the needle for slidably supporting materials to be sewn together by the needle, members forming a chamber below said surface, said chamber having a perforated wall substantially flush with said surface to one side of a line of feed passing through the presser foot and terminating in front of the presser foot, said chamber also having an air outlet, and means for communicating said outlet to a source of subatmospheric pressure to cause air to flow from the exterior to the interior of the chamber through the perforated wall and thereby hold together the materials as they slide thereover.

2. The combination of a sewing machine having a mechanism that includes a sewing needle, presser foot, and a table having a smooth surface adjacent the needle for slidably supporting materials to be sewn together by the needle, said table having a recessed portion to one side of a line of feed passing through the presser foot and terminating in front of the presser foot, members forming a chamber of a size and shape substantially equal to the recess, said chamber having a perforated top wall, said wall being substantially flush with the said surface of the table, and a tubular member for communicating the interior of the chamber to a source of subatmospheric pressure to cause air to flow from the exterior to the interior of the chamber through said perforated top wall and hereby hold together the materials as they slide thereover.

3. The combination of a sewing machine having a mechanism that includes a sewing needle, presser foot, and a table having a smooth surface adjacent the needle for slidably supporting materials to be sewn together by the needle, said table having a recessed portion to one side of a line of feed passing through the presser foot and terminating in front of the presser foot, members forming a chamber of a size and shape substantially equal to the recess, said chamber having a perforated top wall thereof, said wall being substantially flush with the said surface of the table, a tubular member for communicating the interior of the chamber to a source of subatmos-

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pheric pressure to cause air to flow from the exterior to the interior of the chamber through said perforated top wall and thereby hold together the materials as they slide thereover, and means for removably holding the chamber in the recess.

4 The combination as defined by claim 3 in which the holding means includes a member engaging the tubular member.

5 The combination of a sewing machine having a mechanism that includes a sewing needle, presser foot, and a table having a smooth surface adjacent the needle for supporting material to be sewn by the needle, said table having a recessed portion to one side of a line of feed passing through the presser foot and terminating in front of the presser foot, members forming a chamber of a size and shape substantially equal to the recess, said chamber having a perforated top wall thereof, said wall being substantially flush with the said surface of the table, a tubular member for communicating the interior of the chamber to a source of subatmospheric pressure, said tubular member having a threaded exterior portion and a nut engaging said threaded portion and abutting the table for holding the chamber in the recess.

6 The combination of a sewing machine having a mechanism that includes a sewing needle, presser foot, and a table having a smooth surface adjacent the needle for slidably supporting materials to be sewn together by the needle, said table having an elongated recessed portion to one side of a line of feed passing through the presser foot and terminating in front of the presser foot, members forming an elongated chamber of a size and shape substantially equal to that of the recess, said chamber having a perforated top wall substantially flush with the said surface of the table, a plenum chamber, means communicating the interior of the elongated chamber

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with the interior of the plenum chamber, and means for maintaining the interior of the plenum chamber at subatmospheric pressure to cause air to flow from the exterior to the interior of the chamber through said perforated top wall and thereby hold together the materials as they slide thereover.

7 The combination of a sewing machine having a mechanism that includes a sewing needle, presser foot, and a table adjacent the needle for supporting material to be sewn together by the needle, said table having a pair of elongated recessed portions to one side of a line of feed passing through the presser foot and terminating in front of the presser foot, members forming a pair of elongated chambers of a size and shape to fit the recessed portions, respectively, said chambers each having a perforated top wall substantially flush with the upper surface of the table, a plenum chamber, means communicating the interior of each of said elongated chambers to the interior of the plenum chamber and means for communicating the interior of the plenum chamber to a source of subatmospheric pressure.

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