Nov. 30, 1937. W. B. FOSTER 2,100,844

MATTRESS TUFTING MACHINE

Filed Feb. 5, 1936 2 Sheets-Sheet 1

Fig. 1

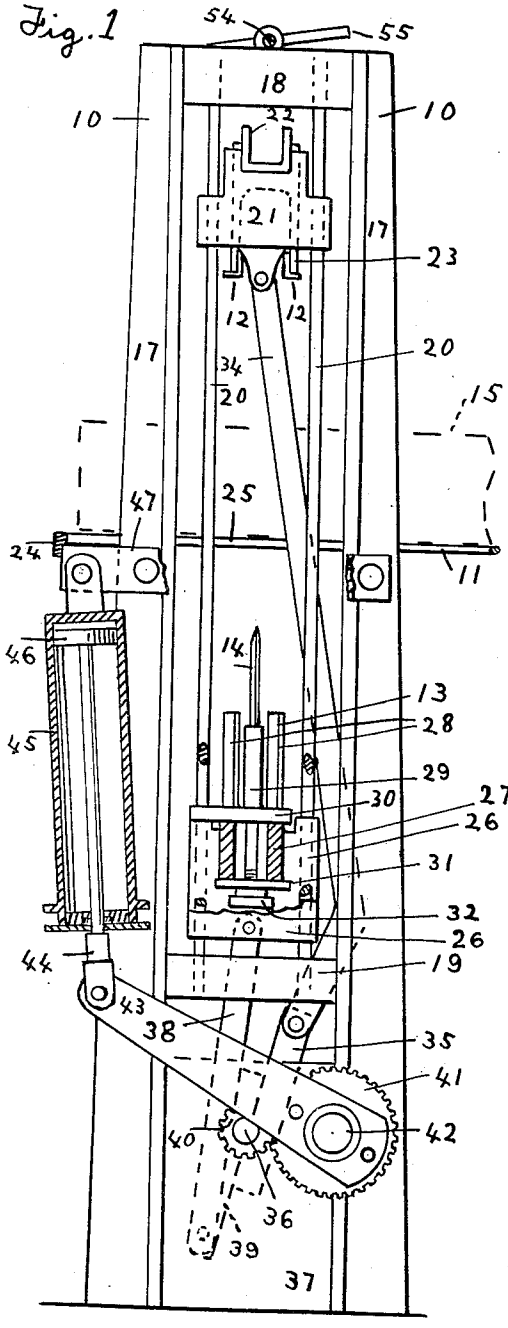
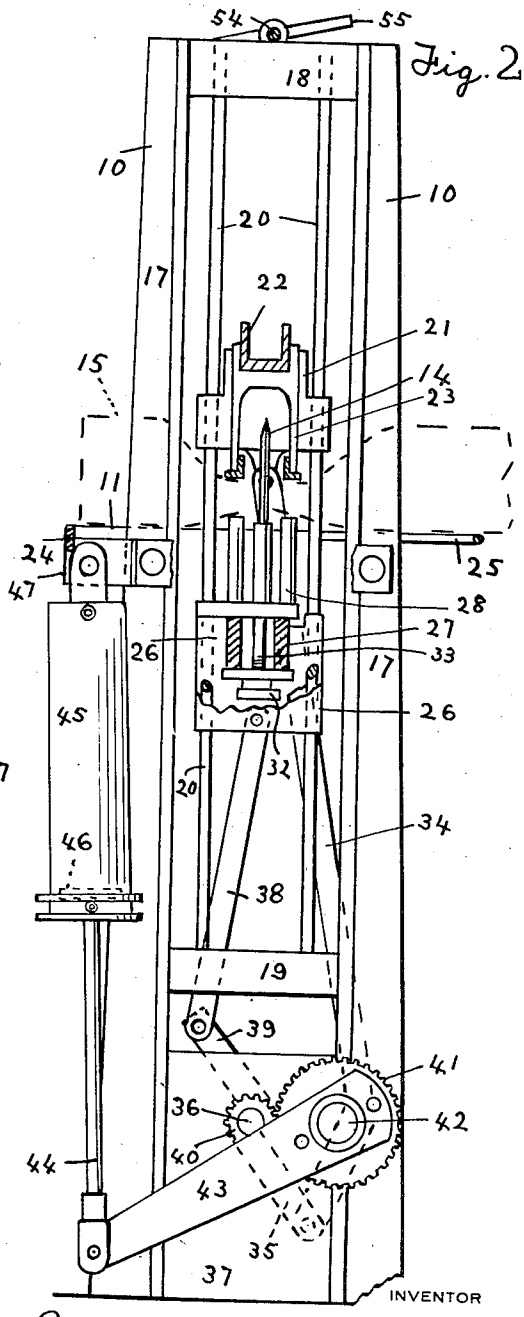


Fig. 2



INVENTOR

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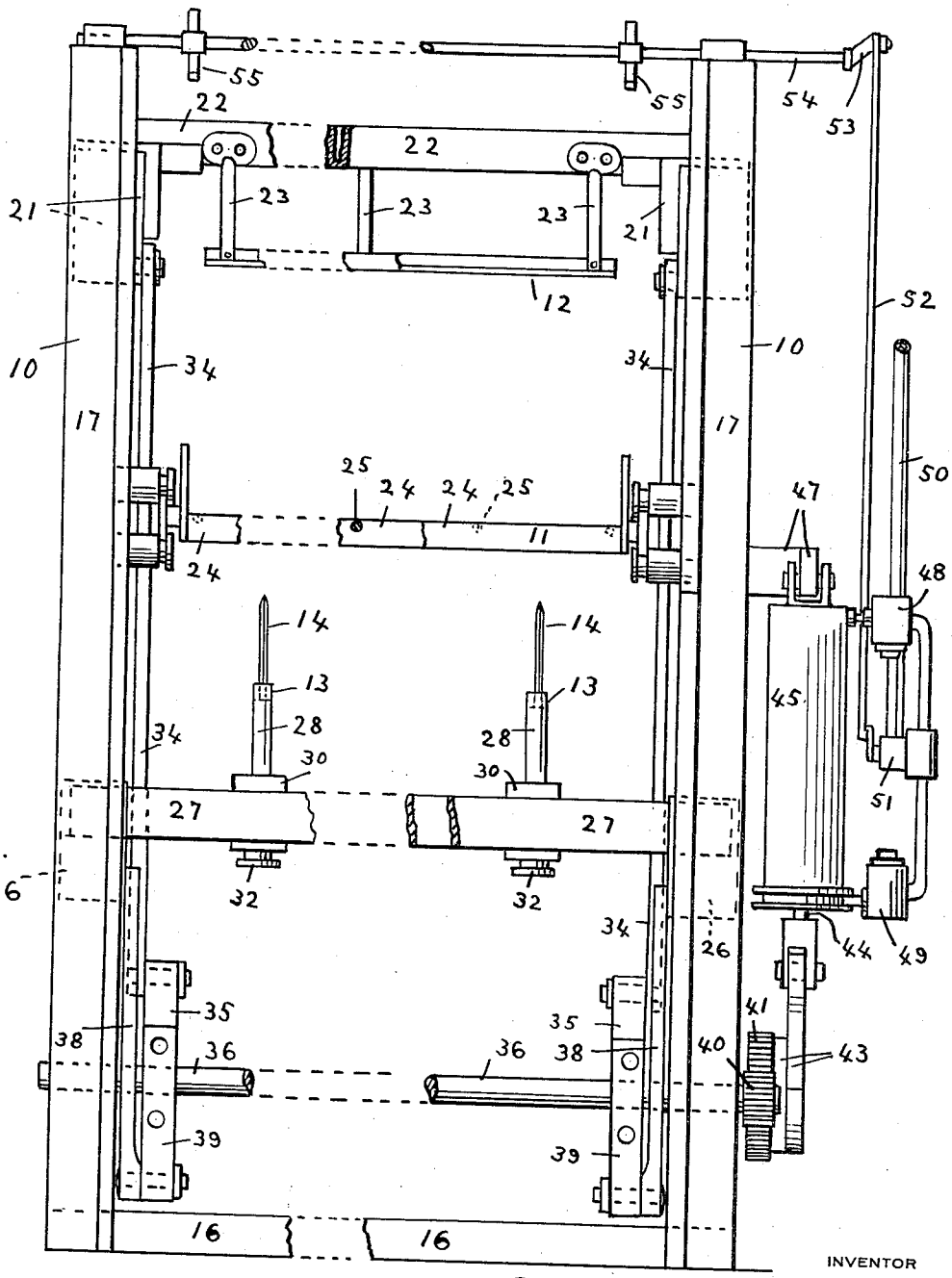
BY Martin & Rendell

ATTORNEYS

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MATTRESS TUFTING MACHINE

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INVENTOR

William B. Foster

BY Martin & Rendell

ATTORNEYS

Fig. 3

Patented Nov. 30, 1937

2,100,844

UNITED STATES PATENT OFFICE

2,100,844

MATTRESS TUFTING MACHINE

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Application February 5, 1936, Serial No. 62,500

7 Claims. (Cl. 112—3)

My present invention relates to a mattress tufting machine.

The purpose of this invention is to provide a mattress tufting machine of new and improved construction and one wherein the means for forcing the tufting needles through the mattress are so constructed and operated as to allow the tufting needles to be pushed through the mattress with a minimum of danger of breaking the needles or injuring or distorting the mattress or its filling. The mattresses and cushions are now very commonly provided with a spring filling of coiled springs about which spring filling are placed successive layers of sisal and cotton or other filling enclosed within the usual ticking or covering. This practice of using a filling of metallic coiled springs has greatly added to the problem of tufting a mattress or cushion containing such spring filling in that the tufting needles employed to carry the twine loop of a tufting button through the mattress may and often do strike some portion of the wire of the coiled springs. When tufting such a spring filled mattress by hand the operator manipulating the tufting needle at once feels the contact of a needle against a spring and can manipulate and divert the needle so as to pass by the spring without breaking the needle and without damaging the mattress and without substantially dislocating the projecting end of the needle when it comes through to the further side of the mattress. For speed and economy of operation, however, it is desired that the piercing of the mattress by the tufting needle be done by a machine carrying a row or sometimes several rows of tufting needles at the same time. If such a machine is operated by hand or foot power the mechanism for moving the machine with such man power must be geared up to such an extent to get the required ease of operation by man that the operator can no longer sense the contact of an individual needle with a spring. To a still greater extent when ordinary power means are operatively connected to a tufting machine the operator has no way of feeling the contact or of guiding or modifying the motion of the machine accordingly and the machine itself under the movement imparted by power operating mechanism as heretofore applied to tufting machines simply pushes the needles unyieldingly through the mattress so that if a needle strikes a spring directly enough or between two closely located wires or a knotted portion of a wire the needle may break before the engaged portion of the spring filling can re-locate itself enough to allow the needle to pass. In other words with ordinary power-operated mechanism heretofore applied to tufting machines the power mechanism advances the needles positively and with the full power of the machine at every part of the needle movement.

The purpose of my present invention is to overcome the foregoing disadvantages of present tufting machines and to provide a tufting machine having power operating means that will to a helpful extent simulate the feeling and probing and resilient action of a tufting needle in the hands of a skilled operator and specifically the purpose of this invention is to provide a tufting machine wherein the power operating mechanism is of the compressed air type so that the motion of the needles can be started and continued a considerable portion if not all of the way through the compressed mattress while the machine and the needles mounted thereon has still a certain amount of resiliency or probing action that allows the needle to find a way past the compressed springs or to allow the spring filling to shift sufficiently to allow the needle to pass thereby. I have found that a thus equipped tufting machine even one carrying a plurality of tufting needles simultaneously, operates in the advantageous manner above mentioned and greatly reduces the possibility of breaking needles or dislocating the spring filling or damaging any part of the mattress or other cushion being tufted by the machine.

A further purpose is to provide such a machine having simplicity and compactness in construction and size and safety and efficiency in operation.

Further purposes and advantages of this invention will appear from the specification and claims herein.

Fig. 1 is a view mostly in end elevation of a mattress tufting machine embodying this invention, the parts of the machine being shown in the position they occupy when the machine is open, that is when it is not compressing a mattress and when the needles are not projecting through the compressed part of the mattress. The end of the machine shown is the end to which the compressed air mechanism is applied for operating the machine. Certain parts of the machine and the air control valves are broken away in order to more clearly show the location and operation of the important parts of the machine. Fig. 2 is a view similar to Fig. 1 but with the parts in closed position. Fig. 3 is a side elevation of the machine in the main as

shown in Fig. 1 but showing the air pipes and valves.

Referring to the drawings in a more particular description it will be seen that the machine comprises a frame work including two spaced vertical standards 10, a mattress supporting platform 11 mounted between said standards for horizontal movement transversely of said standards and upper and lower compressors 12 and 13 having their ends carried by said standards and movable vertically thereof towards and from each other and incidentally towards and from the intermediately located platform 11. The lower compressor carries a series of vertically disposed tufting needles 14 so located and of proper size to insure that upon the closing of the machine and the compression of the mattress between the two compressors the upstanding point of the needle or needles will extend through and above the upper surface of the mattress 15.

The end standards 10 extend rigidly upward from the bottom 16 of the framework of the machine and the standards 10 conveniently comprise two spaced posts 17 connected at the top by a short cross member 18 and connected some distance above the floor by an intermediate cross piece 19. Extending between the top 18 and said intermediate cross piece 19 in each standard there is located a pair of spaced guide rods 20. Upon these guide rods there is slidingly mounted the opposite ends of both the upper compressor 12 and the lower compressor 13.

The upper compressor conveniently consists of a pair of cross heads 21 each located upon an opposite pair of guide rods 20. Between these cross heads 21 there extends a rigid horizontal bar 22 conveniently in the form of a channel iron. From this cross rod 22 there project downwardly a plurality of forked arms 23 the lower ends of which carry the two spaced bars forming the upper compressor 12. The bars may be conveniently in the form of angle iron and are adapted to themselves engage the upper surface of the mattress along two spaced lines and between which there is a zone up through which the points of the needles 14 may extend without danger of the needles contacting either part of said upper compressor.

The mattress-supporting platform 11 preferably consists of a surrounding framework 24 and several rods 25 with the rods extending horizontally and transversely of the end standards as shown in Fig. 1 whereby the mattress placed upon the platform is sufficiently supported but large spaces are allowed between the adjacent rods 25 through which spaces not only the upper ends of the needles 14 project but also the upper parts of the lower compressor 13 when the machine is moved to closed position as shown in Fig. 2. For convenience in manipulating the mattress the platform 11 is conveniently mounted so as to move in a horizontal direction transversely of the standards.

The lower compressor unit 13 consists of two crossheads 26 slidingly mounted upon the lower part of the guide rods 20 and preferably two strong spaced bars 27 secured at their opposite ends to said crossheads 26. Upon these bars are located the units consisting of the pairs of lower compressor posts 28 and needle holders 29 from which extends upwardly a needle 14. An assemblage of two posts spaced on opposite sides of the needle holder 29 is conveniently assembled upon a plate 30 resting upon the top of the bars 27 and clamped in desired position thereon by a cooperating member 31 engaging the bottom of the said bars 27 by means of a nut 32 and bolt 33 reaching to the plate 30. Ordinarily these different units of lower compressor posts and needle holders are readily adjusted along on the rods 27 or removable therefrom to fit different patterns and forms of tufting. When the mattress has been placed in the desired position in the machine and the needles 14 have been loaded with the usual twine loops carrying a tufting button for the bottom side of the mattress, the machine is operated to bring down the upper compressor 12 against the upper surface of the mattress and compress it more or less to the extent indicated in Fig. 2. At the same time the lower compressor and the set of needles have been raised so as to push the upper end or point of the needles carrying their respective tufting loops up through the mattress more or less to the position shown in Fig. 2. The same movement has brought the lower compressors up through the spaces between adjacent rods upon the platform so as to compress the mattress from below more or less as shown in Fig. 2.

Convenient means for so moving the compressors and the set of needles may consist of two upper links 34 having their upper ends respectively connected to the opposite upper crossheads 21 and their lower ends pivotally connected to the outer ends of crank arms 35 provided upon a main shaft 36 extending lengthwise of the machine with its opposite ends mounted in suitable bearings provided in a lower cross frame member 37 connecting the standards 10 and a lower pair of connecting links 38 having their upper ends connected to the lower crossheads 26 and their lower ends respectively connected to the outer ends of another pair of crank arms 39 on said main shaft. The crank arms as best shown in Figs. 1 and 2 extend in opposite directions so that upon the shaft 36 being given a clockwise motion as seen in Figs. 1 and 2 for nearly half of a rotation, the lower compressor and set of needles will be moved to raised position and the upper compressor will be moved to lowered position. The convenient form of so rotating the main shaft 36 is to use a small pinion 40 upon one end of the main shaft 36 which small pinion is engaged by a larger one 41 mounted upon a stub shaft 42. The larger gear 41 is given its lesser rotation by means of motion imparted to a lever 43 rigid with said shaft and wheel 41 and projecting to the left as the parts are seen in Figs. 1 and 2.

To the outer end of said lever 43 there is pivotally secured the lower end of the piston rod 44 of a compressed air unit having a cylinder 45 and piston 46. The upper end of said cylinder is securely but pivotally mounted upon the left hand end of a strong bracket 47 mounted upon the near standards 10 as shown in Figs. 1 and 2. At the opposite ends of this compressed air unit there are provided proper regulating valves 48 and 49 adapted to admit the air at the proper pressure from the pipe 50 through common valve 51. Pipe 50 leads to a proper source of compressed air under pressure. The common valve 51 is manipulated by a rod 52 going up to a crank arm 53 on a rock shaft 54 conveniently mounted upon the top of the standards and so as to be rocked from several convenient positions about the machine as by means of a couple of transversely extending handles 55 near the opposite ends of the shaft 54. With the parts shown in open position as in Fig. 1 the admission of air to the upper side of

the piston 46 will tend to move the piston rod 44 downwardly and thereby move the operating parts of the machine to closed position. This closing movement, however, on account of being caused by the regulated admission of compressed air to the compressed air unit will be brought about in a relatively slow and easy manner and by proper regulation of the machine with just enough power to compress the mattress and make the points of the needles pass upwardly through the mattress with a gentle or probing action and not with a punching drive as has been common heretofore with power-operated tufting machines. If one or more of the needles originally meet a part of a coiled spring the time taken for the air pressure to increase enough to force the needles upwardly allows the needles to slip sidewise relative to the springs or more likely for the springs to slip sidewise or endwise from the sloping points of the needles and so allow the coiled springs to re-locate themselves to one side or the other of the needles.

It will be seen that I have illustrated and described in detail my invention as applied to a mattress tufting machine where the needles are arranged vertically below the horizontally supported mattress and the points of the needles carrying the twine loops of the tufting buttons are pushed up through the mattress when the mattress is compressed by compressor members located respectively above and below the mattress. It will be understood, however, that this type of a tufting machine is shown and described in detail not as limiting the application of my invention, but simply as illustrating its application. It will be obvious that as suggested by or included within certain of the claims, my invention is equally applicable to tufting machines where the point of the needle descends into and through the mattress to receive below the mattress the twine loop of the tufting button and to draw the loop up through the mattress and that the invention is equally applicable to a tufting machine where the mattress is disposed in a vertical position and the needles are arranged and moved in a horizontal plane.

What I claim as new and desire to secure by Letters Patent is:

1. In a mattress tufting machine, the combination of a frame having two spaced vertical standards, a numerously-perforated mattress-supporting platform mounted horizontally between said standards, a compressor above said platform and slidingly mounted in said standards for vertical movement, a needle-carrying bar located below said platform and slidingly mounted in said standards for vertical movement, needles upstanding in said needle bar, means for lowering said compressor to compress the portion of a mattress therebelow on the platform, means for raising said needle bar and thereby pushing its needles through the apertured platform and their points through the compressed portion of the mattress and a non-automatic compressed-air operated mechanism operatively connected to said means for moving the needle-bar, said compressed air mechanism including a cylinder, a piston reciprocatingly mounted therein and air valves for passing compressed air selectively to the opposite ends of said cylinder, said valves being manually controlled for each separate reciprocation of the piston whereby the needles are raised with a yielding pressure derived from only one, separate, manually initiated and controlled stroke of the piston.

2. In a mattress tufting machine, the combination of a frame having two spaced vertical standards, a numerously-perforated mattress-supporting platform mounted horizontally between said standards, a compressor above said platform and slidingly mounted in said standards for vertical movement, a needle-carrying bar located below said platform and slidingly mounted in said standards for vertical movement, needles upstanding in said needle bar, means for lowering said compressor to compress the portion of a mattress therebelow on the platform, means for raising said needle bar and thereby pushing its needles through the apertured platform and their points through the compressed portion of the mattress and a non-automatic compressed-air-operated mechanism operatively connected to said means for moving the needle-bar and to the means for moving said compressor, said compressed air mechanism including a cylinder, a piston reciprocatingly mounted therein and air valves for passing compressed air selectively to the opposite ends of said cylinder, said valves being manually controlled for each separate reciprocation of the piston whereby the needles are raised with a yielding pressure derived from only one, separate, manually initiated and controlled stroke of the piston.

3. In a mattress tufting machine, the combination of a frame having two spaced vertical standards, an openwork mattress-supporting platform mounted horizontally between said standards, upper and lower compressors respectively above and below said platform and having their opposite ends slidingly mounted in said standards for vertical movement, a set of tufting needles upstanding from the lower compressor and adapted when raised to project through the compressed portion of a mattress on the platform, means operatively connected to said compressors for moving them towards and from each other and for pushing the upper ends of said needles through the compressed portion of a mattress and a non-automatic compressed-air-operated mechanism connected to said means for compressing the mattress and to the means for pushing the needles through the compressed portion thereof, said compressed air mechanism including a cylinder, a piston reciprocatingly mounted therein and air valves for passing compressed air selectively to the opposite ends of said cylinder, said valves being manually controlled for each separate reciprocation of the piston whereby the needles are pushed with a yielding pressure derived from only one, separate, manually initiated and controlled stroke of the piston.

4. In a mattress tufting machine, the combination of a mattress-supporting platform, oppositely located compressors movable relative to each other and adapted to compress a part of a mattress located upon said platform, a tufting needle movably mounted to have its point enter and extend through the compressed part of said mattress, means for so moving said needle and a non-automatic compressed-air operated mechanism operatively connected to said means for moving the said needle, said compressed air mechanism including a cylinder, a piston reciprocatingly mounted therein and air valves for passing compressed air selectively to the opposite ends of said cylinder, said valves being manually controlled for each separate reciprocation of the piston whereby the needles are pushed with a yielding pressure derived from only one, separate,

manually initiated and controlled stroke of the piston.

5. In a mattress tufting machine, the combination of a mattress-supporting platform, oppositely located compressors movable relative to each other and adapted to compress a part of a mattress located upon said platform, a tufting needle movably mounted to have its point enter and extend through the compressed part of said mattress, means for so moving said needle and a non-automatic compressed-air operated mechanism operatively connected to said means for moving the said needle and to said compressors, said compressed air mechanism including a cylinder, a piston reciprocatingly mounted therein and air valves for passing compressed air selectively to the opposite ends of said cylinder, said valves being manually controlled for each separate reciprocation of the piston whereby the needles are advanced with a yielding pressure derived from only one, separate, manually initiated and controlled stroke of the piston.

6. In a mattress tufting machine, the combination of spaced means adapted to engage the opposite faces of a part of a mattress located therebetween and to compress the engaged part by relative movement of said compressor means, a tufting needle movably mounted near one of said compressor members and adapted to have its point enter and extend through the compressed part of said mattress, means for so moving said needle, and a non-automatic compressed-air operated mechanism operatively connected to said means for moving the said needle, said compressed air mechanism including a cylinder, a piston reciprocatingly mounted therein and air valves for passing compressed air selectively to the opposite ends of said cylinder, said valves being manually controlled for each separate reciprocation of the piston whereby the needles are advanced with a yielding pressure derived from only one, separate, manually initiated and controlled stroke of the piston.

7. In a mattress tufting machine, the combination of spaced means adapted to engage the opposite faces of a part of a mattress located therebetween and to compress the engaged part by relative movement of said compressor means, a tufting needle movably mounted near one of said compressor members and adapted to have its point enter and extend through the compressed part of said mattress, means for so moving said needle, and a non-automatic compressed-air operated mechanism operatively connected to said means for moving the said needle and to the movable members of said compressors, said compressed air mechanism including a cylinder, a piston reciprocatingly mounted therein and air valves for passing compressed air selectively to the opposite ends of said cylinder, said valves being manually controlled for each separate reciprocation of the piston whereby the needles are advanced with a yielding pressure derived from only one, separate, manually initiated and controlled stroke of the piston.

WILLIAM B. FOSTER.