

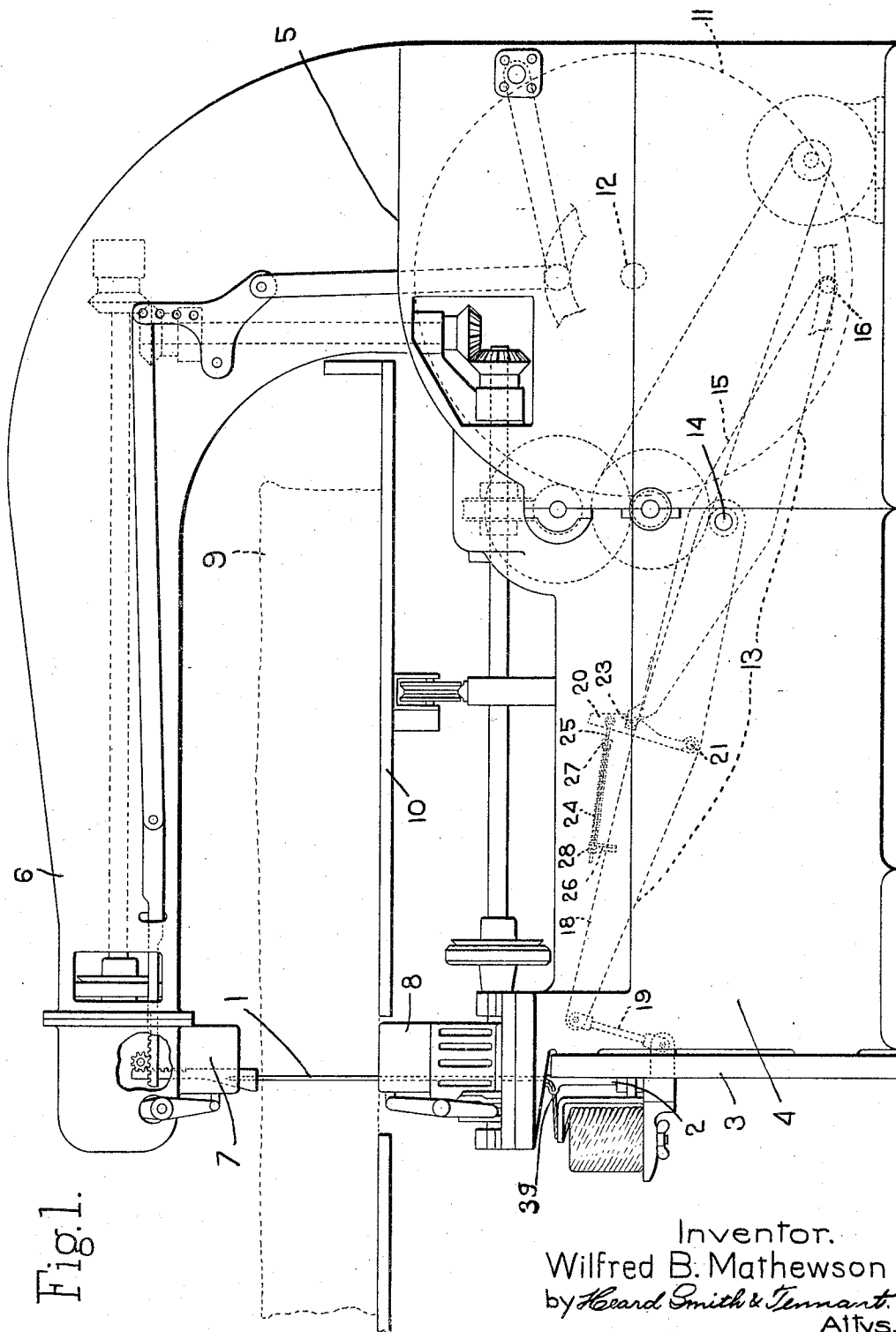
Jan. 17, 1933.

W. B. MATHEWSON
MATTRESS TUFTING MACHINE

1,894,409

Filed Feb. 8, 1932

2 Sheets-Sheet 1



Inventor.
Wilfred B. Mathewson
by *Heard Smith & Tennant.*
Attys.

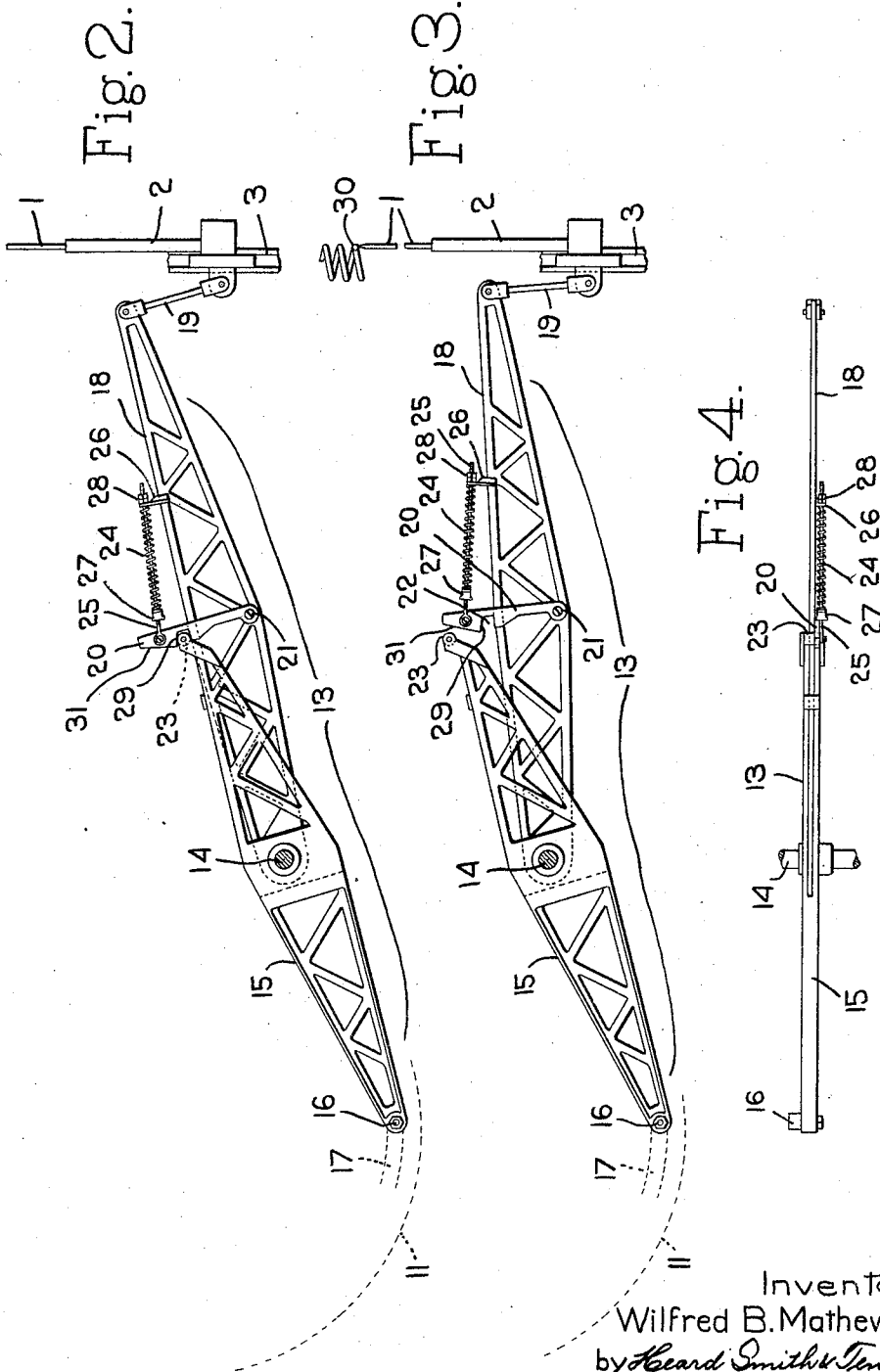
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UNITED STATES PATENT OFFICE

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RATION OF MAINE

MATTRESS-TUFTING MACHINE

Application filed February 8, 1932. Serial No. 591,477.

This invention relates to mattress-tufting machines and has for its general object to provide a novel needle-operating mechanism by which the needle will be prevented from becoming injured in case it meets abnormal resistance during its penetrating thrust.

The invention is particularly advantageous when used in tufting so-called "inner spring" mattresses, this term being used to describe mattresses which have springs built into the body thereof. In tufting mattresses of this type there is always the possibility that the needle will strike against one of the coil springs and if this occurs with mattress-tufting machines now in use such engagement of the needle with the spring is apt to either bend the needle or break the spring or cause some other damage.

The present invention provides an improved form of connection between the needle and the cam or other moving part by which the needle is operated, which connection is normally operative to transmit motion from the cam or other moving part to the needle but which becomes inoperative for this purpose if the needle meets undue resistance during its penetrating thrust.

The operative connection between the cam or other moving device and the needle herein disclosed is also constructed so that if it becomes inoperative during any penetrative thrust of the needle by reason of the needle meeting undue or abnormal resistance, said connection will automatically become operative again during the portion of the cycle of movement of the cam or other device in which the needle has its retractive movement so that the disrupting of the connection between the cam and the needle is momentarily only and does not involve the stoppage of the machine.

In order to give an understanding of the invention I have illustrated in the drawings a selected embodiment thereof which will now be described after which the novel features will be pointed out in the appended claims.

Fig. 1 is a side view of a mattress-tufting machine embodying my invention;

Figs. 2 and 3 are fragmentary views illus-

trating operative connection between the cam and the needle;

Fig. 4 is a top plan view of Fig. 2.

The mattress-tufting machine illustrated in Fig. 1 is of the type in which the tufting needle is inserted upwardly through the mattress from beneath. In said machine said tufting needle is indicated generally at 1 and it is mounted on a needle carrier 2 which has sliding movement in ways 3 carried by the base portion 4 of the frame 5 of the machine. This frame is shown as having an overhanging arm 6 which carries at its end an upper knotter 7. The base portion 4 of the machine carries a lower knotter 8. The mattress to be tufted, which is indicated by dotted lines 9, is supported on a movable platform 10 during the tufting operation.

In the operation of the machine the tufting needle 1 is inserted upwardly through the mattress as shown in Fig. 1 thereby carrying a length of cord or string 39 through the mattress, and then the upper knotter 7 operates to tie a tuft to the cord or string. The needle is then withdrawn leaving a length of cord or string in the mattress after which the lower knotter 8 operates to tie a second tuft to the cord or string beneath the mattress.

In the tufting of so-called "inner spring" mattresses there is always danger that during a penetrating thrust of the needle it will strike against one of the springs within the mattress. If this occurs damages are liable to result either to the needle, or to the spring, or to both, or to some other part of the machine and, as stated above, the present invention has for its object to provide a novel needle-operating mechanism which will function normally to give the needle its penetrating thrust but which will become inoperative for this purpose in case the needle meets undue resistance.

In the construction herein shown the needle is given its vertical oscillatory movement by means of a needle operating cam 11 which is carried by a driven shaft 12. The motion from the cam 11 is transmitted to the needle carrier 2 through operative connections which are normally operative but which be-

come disrupted if the needle meets undue resistance during the penetrating thrust so that the cam can continue its rotative movement without giving further movement to the needle. Said operative connections are also constructed so that if they become disrupted by reason of the needle meeting undue resistance during its penetrating thrust they will automatically become operative again during the portion of the rotative movement of the cam 11 by which the needle is normally retracted from the mattress. Hence these connections automatically become disrupted when the needle meets undue resistance and then automatically become operative again for the next penetrating thrust of the needle.

The connections between the cam 11 and the needle carrier 2 herein shown are in the form of a two-part lever indicated generally at 13 which is fulcrumed on a shaft 14 carried by the base 4 of the machine. This lever comprises the main section 15 which is formed with a follower 16 operating in the cam groove 17 of the cam 11 and an extension section 18 which is normally connected to the main section 15 so as to move therewith as a unit but which is adapted to be disconnected therefrom in case the needle 1 meets with undue resistance.

The extension section 18 is shown as pivotally mounted at one end on the shaft 14 and the other end of said section is connected to the needle carrier 2 through the medium of a link 19. This extension section 18 is normally locked to the main section 15 but the lock is of a character which will become automatically released when the needle 1 meets undue or abnormal resistance during its upward or penetrative thrust.

The device herein shown for connecting the two sections 15 and 18 of the lever 13 is in the form of a latch member 20 pivoted at 21 to the section 18 and provided with a notch 22 adapted to receive a roll 23 carried on the end of the lever section 15. The latch member 20 is acted upon by a spring 24 which normally holds it in its operative locking position shown in Fig. 2. The latch is shown as having a spring-carrying rod 25 pivoted thereto, the end of the rod extending through an aperture in a guide member 26 carried by the lever section 18. The spring 24 encircles the rod 25 and is confined between the guide 26 and a collar 27 which is adjustably mounted on the rod 25 and by which the tension of the spring can be adjusted. This rod 25 is also shown as having nuts 28 screw threaded to the free end thereof which limit the swinging movement of the latch toward the left Fig. 3.

Normally the two sections 15 and 18 of the lever member 13 are locked together as shown in Fig. 2 by reason of the fact that the roll 23 on the end of the lever section 15 occupies the notch 22 of the latch 20 and by further

reason of the fact that the latch is held in its operative position shown in Fig. 2 by the pressure of the spring 24.

The upper face 29 of the notch 22 is inclined slightly so that the lifting force of the roll 23 has a camming action which tends to swing the latch 20 backwardly out of engagement with said roll. The spring 24, however, is so adjusted as to overcome this tendency so long as the needle 1 meets no abnormal resistance during its penetrative thrust. In other words, the spring 24 will be adjusted so as to maintain the latch 20 in its operative position so long as the needle 1 meets only the ordinary or normal resistance in its upward movement.

Under these circumstances the two sections 15 and 18 of the lever 13 are connected together so that they move in unison as a rigid lever and the needle 1 is given its required penetrative and retractive movements.

If, however, the needle meets an abnormal resistance, such for instance, as would develop if the needle engaged one of the turns 30 of one of the springs in the interior of the mattress as shown in Fig. 3, then the increased pressure of the roll 23 against the inclined face 29 of the notch 22 which would thus result would cause the latch 20 to be forced backwardly and thus disconnected from the roll thereby disrupting the connection between the two lever sections 15 and 18 and allowing the section 15 to continue its movement without giving movement to the section 18. This operation is illustrated in Fig. 3.

The nut or collar 28 restrains the spring-impelled movement of the latch 20 when it has thus been disconnected from the roll 23 and maintains it in its proper position.

Upon the return movement of the lever section 15 by which normally the needle is given its retractive movement the roll 23 engages the inclined face 31 of the latch and forces the latch backwardly against the action of the spring 24 and subsequently snaps into the notch 22 whereby the two lever sections 18 and 15 are automatically connected again ready for the next penetrative thrust of the needle.

When the connections between the cam and the needle thus become disrupted during any penetrative thrust then the operative will shift the position of the mattress slightly so that on the next penetrative thrust the needle will be in a position sufficiently to one side of the spring with which it contacted at the previous penetrative thrust to permit the needle to make its proper movement.

With this device, therefore, the tufting operation may be continuously performed and if at any penetrative thrust the needle strikes an abnormal resistance the operative connections between the cam and the needle become momentarily disrupted so that the ma-

chine can continue through its tufting cycle without injury to the needle.

Before the tufting cycle is completed, however, the operative connections between the cam and the needle are again automatically established ready for the next penetrative thrust. There is, therefore, no necessity for stopping the machine in case the needle meets undue or abnormal resistance. All that is necessary is to merely shift the mattress when the needle has been withdrawn so as to remove from the path of the needle the obstruction which produced the abnormal resistance.

While I have illustrated herein a selected embodiment of my invention yet I do not wish to be limited to the construction shown as any suitable connection between the cam and the needle which will automatically become disrupted when the needle meets undue pressure will come within the invention.

I claim—

1. In a mattress-tufting machine, the combination with a tufting needle, of a cam for operating said needle and connections between the cam and the needle operative to give the needle its penetrating thrust against normal resistance but which become inoperative when the needle meets abnormal resistance.

2. In a mattress-tufting machine, the combination with a tufting needle, of a cam for operating the needle, operative connections between the cam and the needle which remain operative so long as the needle meets only normal resistance during its penetrative thrust but which become inoperative when the needle meets abnormal resistance during its penetrative thrust and become operative again automatically during the retracting movement of the needle.

3. In a mattress-tufting machine, the combination with a tufting needle, of a two-part lever for actuating the needle, means to apply power for operating the needle to one part of the lever, the other part thereof being connected to the needle, means normally connecting the two parts together, which means is responsive to abnormal resistance encountered by the needle during its penetrating thrust for disconnecting said parts of the lever from each other.

4. In a mattress-tufting machine, the combination with a tufting needle, of a two-part lever for operating said needle, a latch normally connecting the two parts of the lever for movement as a rigid unit, and means for rendering said connecting means inoperative when the needle meets undue resistance during its penetrative thrust.

5. In a mattress-tufting machine, the combination with a tufting needle, of a two-part lever for operating said needle, a latch normally connecting the two parts of the lever for movement as a rigid unit, and means for rendering said connecting means inoperative

when the needle meets undue resistance during its penetrative thrust and for rendering the connection operative again during the succeeding retractive movement of the needle.

6. In a mattress-tufting machine, the combination with a tufting needle, of a two-part lever for operating the needle, a latch normally connecting said two parts of the lever so that they move in unison as a unit, and means for rendering the latch inoperative when the needle meets abnormal resistance during its penetrative thrust.

7. In a mattress-tufting machine, the combination with a tufting needle, of a two-part lever for operating the needle, a latch normally connecting said two parts of the lever so that they move in unison as a unit, and means for rendering the latch inoperative when the needle meets abnormal resistance during its penetrative thrust, and subsequently rendering the latch operative again during the retracting movement of the needle.

In testimony whereof, I have signed my name to this specification.

WILFRED B. MATHEWSON.

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