

Oct. 6, 1936.

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2,056,355

TUFTING MACHINE

Filed Feb. 15, 1933

3 Sheets-Sheet 1

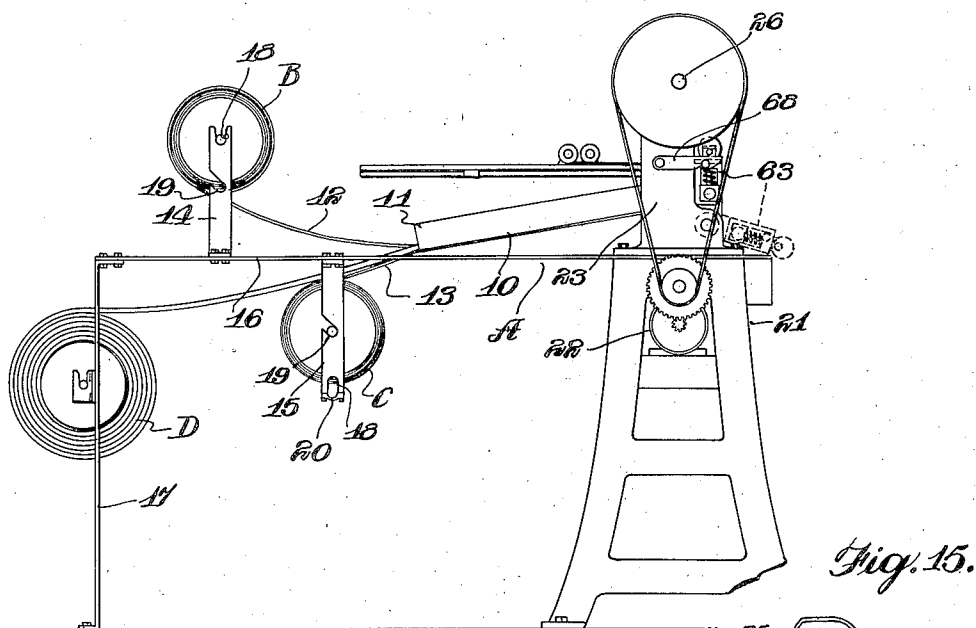


Fig. 1

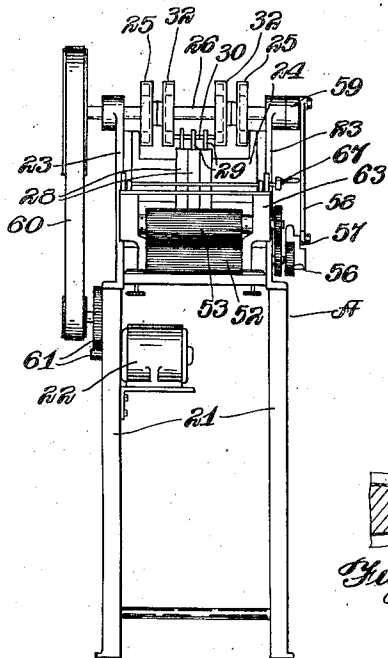


Fig. 2

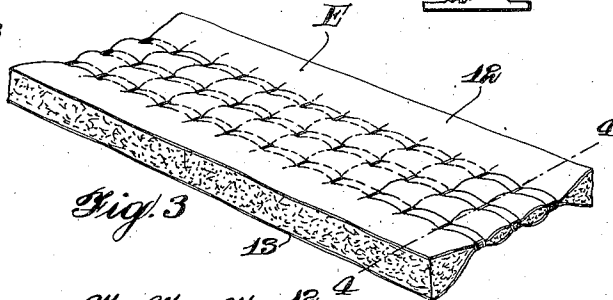


Fig. 3

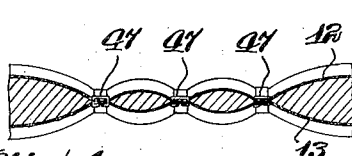


Fig. 4

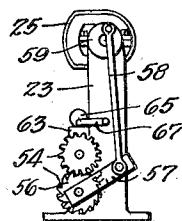


Fig. 15.

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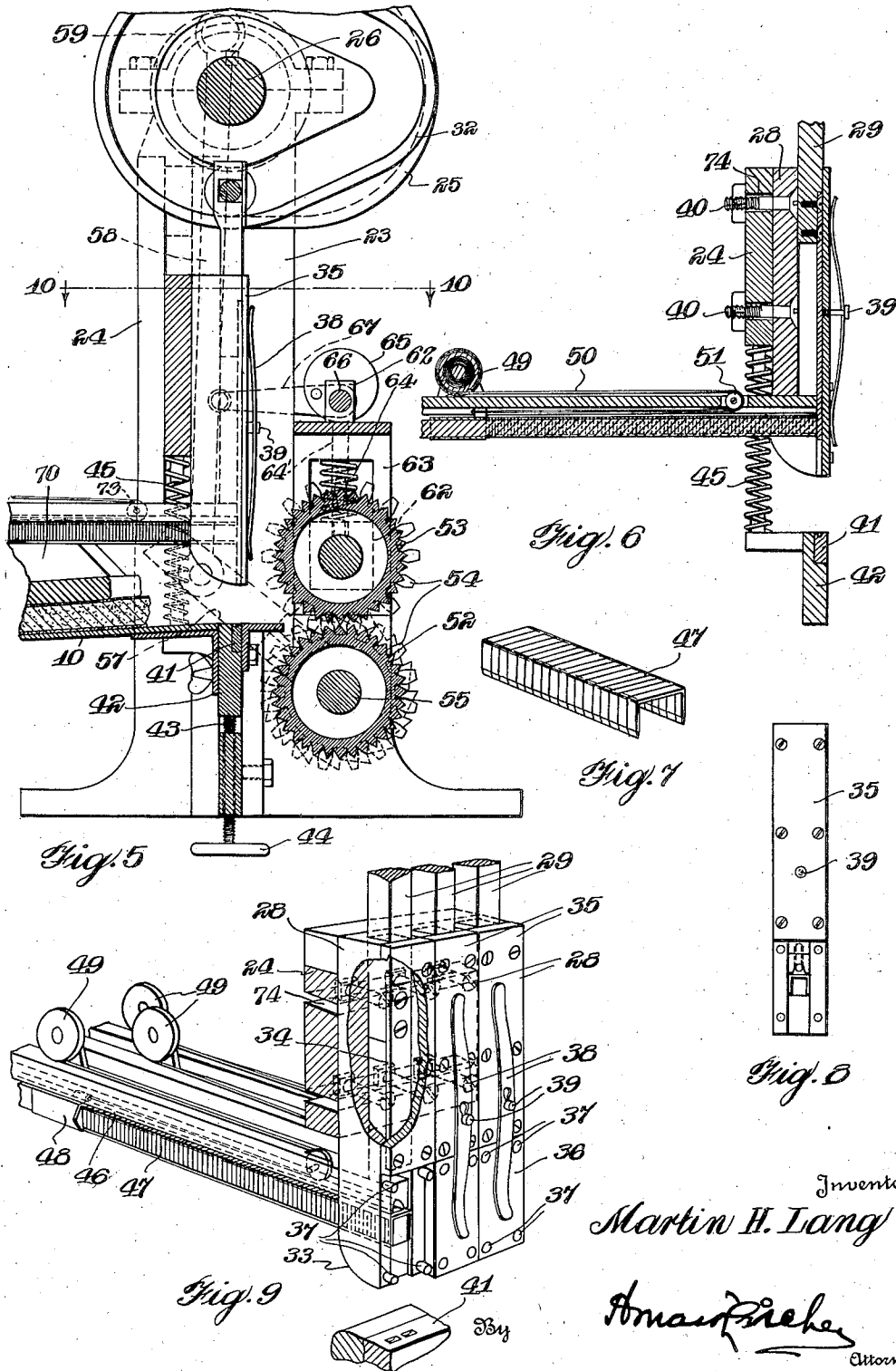
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TUFTING MACHINE

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3 Sheets-Sheet 2



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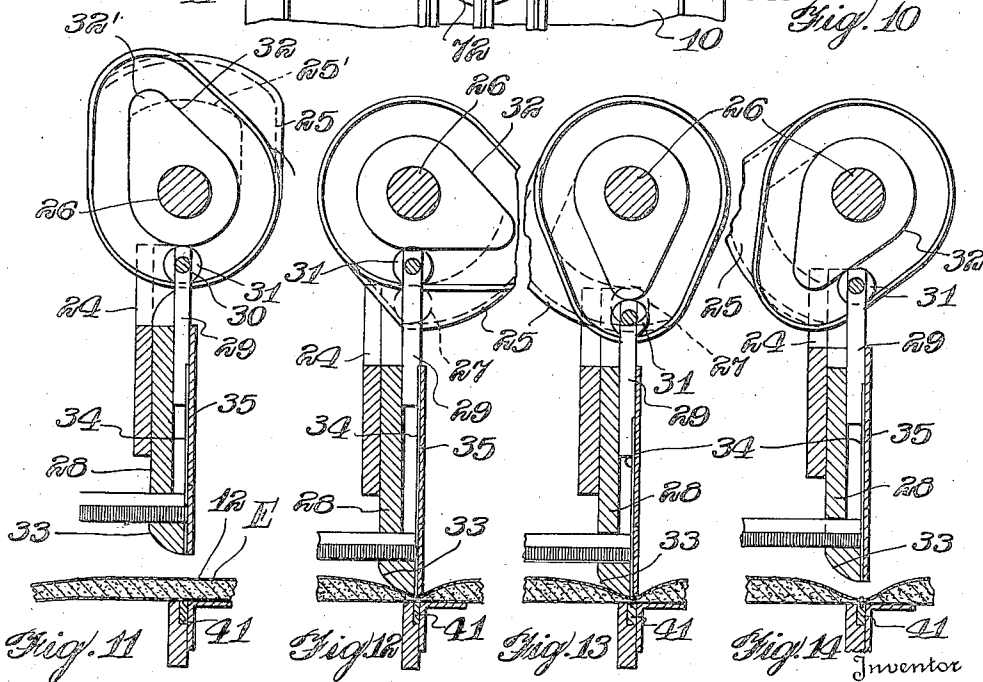
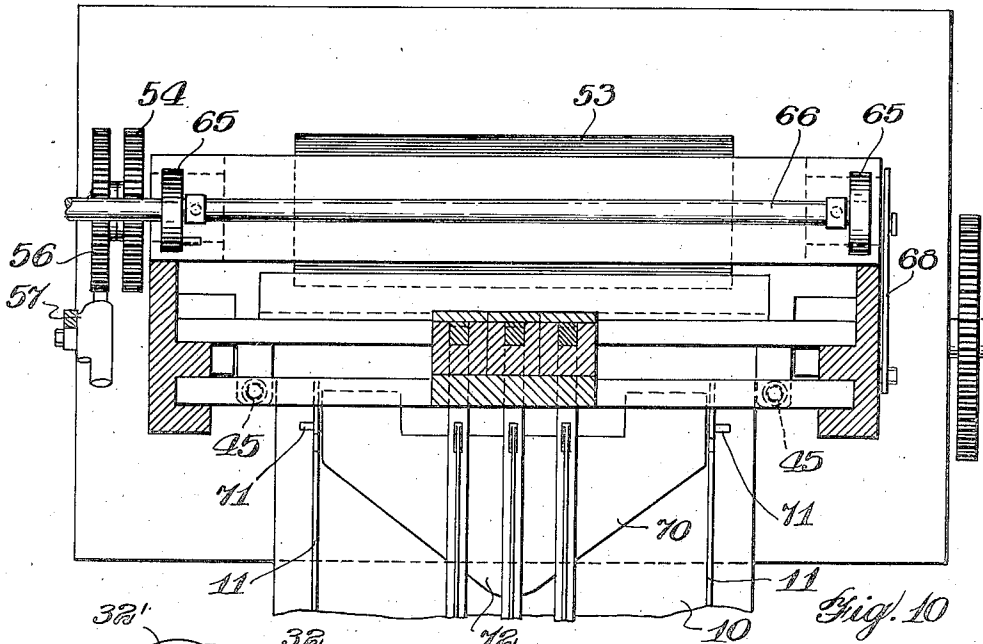
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TUFTING MACHINE

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

2,056,355

TUFTING MACHINE

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14 Claims. (Cl. 45—138)

This is a tufting machine having means for automatically tufting the filler, cotton, or padding between side walls as the side walls and filling are carried along a table and through drafting rolls.

A feature resides in a tufting stapling mechanism which is provided with a series of driving members which carry the staples down to the sheathing to be tufted and clinches the staples on anvils below the same while the padded sheathing is compressed at the point of staple tufting. The tufting staples may be positioned in line so as to form a series of rows of tufting staples, each row of which is driven into tufting position automatically by the mechanism provided for operating the same. The device may be provided with as many staples or stapling heads as may be desired, each of which is adjustable in relation to each other so that the staples may be spaced apart at the intervals desired, and more or less staple driving members may be provided as may be desired.

The tufting device is provided with means for simultaneously operating the staple driving members and at the same time operating the compressing cross head means which presses the padded sheathing together between the side walls and permits the staples to be driven through the same, providing a means for staple tufting articles, such as side walls of mattresses, top and bottom upholstering sheathings for mattresses, cushions and the like. The construction is simple and the padded sheathing may be quickly and economically staple tufted with the staple tufting means acting also as a decorative feature for tufted or quilted sheathing so that a side wall for a mattress may be made very quickly on my tufting machine as well as a quilt or a top or bottom tufted or quilted sheathing for mattresses.

A feature resides in uniformity and automatically passing staples through the outer covering walls between which a cotton, wool or other padding is adapted to be held so that the staple elements which form the tufting means are passed through the side walls and padding without tearing the same but rather by piercing and clinching preferably flat staple-like members which form uniform rows of tufting elements in the padding. My tufting device is provided with means for ironing out the wrinkles of the padded sheathing before it passes under the tufting means so as to hold the same stretched out flat and smooth while it is being tufted. A further feature resides in an adjustable and movable drafting means

which is designed to draw the tufted sheathing through the tufter and to assist in holding the same stretched taut while it is being tufted. The drafting means includes a pair of rollers which include spring means for holding the same adjustable in relation to each other. This releasing means provides the rolls with a resilient compressing action in operation. Further, the rolls may be released and rotated away from each other to give free access to the stapling elements quickly and easily when it is desired. I provide means in my tufting device which gives free and quick access to each of the staple driving members and further provide each staple driving member with a freely removable staple guiding plate together with spring means for holding said plates in operative position. Means are provided for holding these plates removable separately, whereupon free access is given to the staple groove at any time.

A further feature resides in providing resilient individual follower elements for each row of staples for urging the staples under spring tension into driving position.

It is also a feature to provide an adjustable anvil means which permits the anvils to be adjustable in relation to the driving heads of the staples and resilient means for holding the anvils in operative position against the adjusting means. The anvils for each staple are removable so that they can be easily replaced. Means is further provided for holding the anvils together collectively so that they can be adjusted together into the desired operating position.

In the drawings forming part of this specification:

Figure 1 is a side elevation of my tufting machine.

Figure 2 is a front view of the same.

Figure 3 illustrates a portion of a mattress side wall, after it has been tufted on my machine.

Figure 4 is a transverse section through the side wall on the line 4—4 of Figure 3.

Figure 5 is an enlarged detail partly in section, of my automatic tufting machine.

Figure 6 is a longitudinal section through one of the stapling heads.

Figure 7 is a perspective of a row of the staples which are held together by a thin lacquer or suitable means which permits them to be easily separated in use in my tufting machine.

Figure 8 is a front detail of one of the staple driving heads.

Figure 9 is a perspective detail, partly broken away, of a series of staple driving heads, staple

supporting tracks and one of the anvils positioned below one of the staple driving heads.

Figure 10 is a section on the line 10—10 of Figure 5.

Figure 11 is a diagrammatic sectional side detail of the driving head anvil and cam operating means with the parts in one position.

Figure 12 is a similar view to Figure 11, with the parts in another position.

Figure 13 is a similar view to Figure 11, with the parts in still another position.

Figure 14 is similar to Figure 11 with the parts in a still further position.

Figure 15 is a side elevation view of the feeding mechanism.

My tufting machine A is designed to provide a simple device which will support an upper roll B of sheathing or covering material, a lower roll C of covering material, and a roll of padding or filler D. The coverings from the rolls B and C may be carried up onto the assembling table 10 which may be formed with sides 11 so that the filler of cotton, wool, or other suitable padding may follow between the sides 12 and 13 from the covering rolls B and C.

The side 12 will preferably form the top or outer surface of the finished tufted sheathing such as E, illustrated in Figure 3, while the side 13 will form the inner or under side of the same. The side 12 may be of a decorative nature such as is used on the outer surfaces of mattresses or quilts and in fact, both sides 12 and 13 may be of the same character and of a decorative nature such as where the finished tufted sheathing is of a quilt nature.

The rolls B and C are adapted to be held by suitable brackets 14 and 15 which are supported by the frame portion 16 of the machine A which projects toward the back of the same. The roll D is adapted to be supported by the upright member 17 at the back end of the frame 16. Each of the rolls B, C, and D may be readily replaced when desired. I provide the brackets 14 and 15 with notches 18 and 19 so that a larger or a smaller roll may be supported on the same. When a roll such as C is held in the lower bracket 15 in the notch 18, a suitable strap member 20 is secured to hold an end of the roll in operative position. This strap 20 supports the roll.

The machine A is formed with a main frame 21 which is adapted to support an operating motor 22. The frame 21 supports the upper frame portion 23 between the sides of which a reciprocating cross head 24 is supported. The cross head 24 slides between the sides of the frame 23 and is adapted to be operated up and down by the cam wheels 25 which are supported by the shaft 26. Suitable cam following rollers 27 connect the cams 25 with the reciprocating cross head 24.

The cross head 24 is adapted to adjustably support the staple driving heads 28 each of which is formed with an operating plunger 29 which is connected to the short counter shaft 30. The ends of the counter shaft 30 are supported by the cam wheels 31 which travel in the cam groove of the driving cams 32 which in turn are supported upon the shaft 26 adjacent the cams 25. These cams 25 and 32 operate together, however, their cam grooves are of a different shape as will be illustrated by the cam grooves showing in Figures 11 to 14, inclusive.

The cam grooves of the cam wheels 32 are formed with an apex or driving end 32', while the cam grooves of the cam wheels 25 are formed

with an arcuated cam groove 25' which is concentric with the shaft 26. At the other ends of the respective cams 25 and 32 their cam grooves are of the same character, having an arc concentric with the shaft 26.

Thus it will be apparent that in the operation of the shaft 26 the cam wheels 25 and the cam wheels 32 will rotate together, the cam wheels 25 regulating the movement of the cross head 24 while the cam wheels 32 will operate the driving plungers 29 in the stapling heads 28. The lower end of the stapling heads 28 is arcuated at 33 to permit the sheathing E to slide under the arcuated surface 33 as it is drawn along the table 10 and also forming the lower edge of the staple driving head 28 with a constricted end out of which the staple is driven when the driving head 28 is pressed down tight against the padded sheathing E. Each of the plungers 29 carry a staple driving blade 34 which projects beyond the plunger 29 and operates in the staple receiving groove formed in the head 28. Removable face plates 35 give free access to the upper ends of the staple driving heads 28, however, these plates are held on normally by suitable screws so as to hold the driving plungers 29 with their driving blades 34 in operative position in the same. The lower end of the staple groove is covered by an easily removable plate 36 which is held on the pins 37 when in operating position. A suitable spring 38 which is snapped onto the key stud 39 holds the plate 37 by spring tension on the pins 37. The plate 35 carries the key stud 39 and the spring 38 is formed with an opening and slot which locks over the head of the key stud 39 to hold the spring 38 in position to hold the plate 36 on the pins 37. One of the plates 36 is shown removed from the pins 37 in Figure 9.

The staple driving heads 28 are held adjustable to the cross head 24 by the bolts 40, as illustrated in Figure 6. The bolts 40 are carried in suitable slots 41 formed in the cross head 24 so that the staple driving heads 28 may be adjusted in relation to each other so as to space the same one adjacent the other in close relation or separated as desired. By this means I provide a construction wherein the cross head 24 supports a gang of staple driving heads 28 and when they are operated by the cams 32 they will drive a row of staples into the padded sheathing supported below the same.

The frame 23 is adapted to adjustably support removable clinching mandrels 41 which are held in the bed plate 42 supported between the sides of the frame 23 in the slots 43. An adjusting screw 44 is adapted to adjust the bed plate 42 into the desired position against the tension of the coil springs 45. I provide two of these coil springs 45, one at either end of the bed plate so as to give sufficient tension to cause the bed plate 42 to follow the adjusting screw 44. This permits the clinching mandrels 41 to be adjusted in relation to the driving heads 28 so as to properly position the same.

For each driving head 28 I provide a staple track 46 which carries the staples 47. The staples 47 are preferably formed in groups as illustrated in Figure 7, and are connected together by suitable lacquer or other easily breakable means although the staples have been cut and formed separately when they were made. The staples 47 preferred in my tufting are of a flat character as illustrated in Figure 7, designed for the purpose of being clinched as illustrated in Figure 4, with the clinching ends

spaced apart and the body having a flat close engagement with the side walls 12 and 13 so as to form a flat bearing and engagement with the walls 12 and 13 to form a tufting means which will tuft the sides 12 and 13 at the points of the staples without tearing the sides and forming a very neat and decorative tufting means which is buried into the material and forms a strong engagement, preventing the goods from tearing at the point of tufting by the staples. The rows of staples 47 are held on the tracks 46 and are caused to be urged toward the stapling heads 28 by the follower plates 48 through means of coil springs 49 and the connecting cord 50 which passes over the idle wheels 51 and which extends back to the plate 48. Thus the staples 47 are held under spring tension so as to urge the same into the staple groove of the driving heads 28.

I provide serrated draft rollers 52 and 53 in front of the lower portion of the frame 23 which are driven by intermeshing gears 54. The roller 52 is mounted on the shaft 55 and a ratchet gear 56 is mounted on the end of this shaft adjacent the gears 54 and is adapted to be operated by the ratchet arm 57, which in turn is reciprocated by the rod 58 illustrated in Figure 5 and also in Figure 2. The rod 58 is operated by the member 59 which is connected to the shaft 26.

The motor 22 operates the shaft 26 by the belt 60 through the gears 61 so as to operate the machine A, causing the same to automatically tuft rows of tufting staples 47 through the padded sheathing E.

The serrated draft rolls 52 and 53 draw the tufted sheathing through the same, pulling and holding the sheathing E taut over the table 10 beneath the staple driving heads 28. The top roller 53 is held in slidable end bearings 62 which are supported in the swinging frame 63 normally held under the tension of the end springs 64 when the frame 63 is held in operative position as illustrated in Figure 5. Cam wheels 65 supported on the ends of the operating shaft 66 (see Figure 10) are operated by the hand lever 67. The shaft 66 is journaled in vertically slidable posts 64' secured to the end bearings 62. Operation of the hand lever 67 acts to rotate the shaft 66, causing the cams 65 to engage against the top of the frame, moving the shaft 66 away from the top of the frame. The posts 64' are raised vertically, raising the bearing block 62 and the top roller 53 away from the roller 52 under tension of the springs 64. When the rolls 52 and 53 are spaced in this manner, the padded sheathing E may be more easily adjusted between the rollers 52 and 53.

An important feature of my tufter A resides in the construction which permits the roller 53 to be released from the roller 52 and by disengaging the locking hook 68 illustrated in Figure 1 and also in Figure 10, the frame 63 may be dropped forward as illustrated in dotted lines in Figure 1, leaving free access to the table 10 and to each of the staple driving heads 28. This operation is quick, simple and very effective in adjusting my machine A and also in drawing the padded sheathing E up into position on the table 10, ready to be engaged by the rollers 52 and 53. When the driven rollers 52 and 53 are operating in a manner to engage the padded sheathing E, each time the rod 58 is operated by the wheel 59 the ratchet will cause the wheels 52 and 53 to rotate in a manner to draw the padded sheathing E along the table 10 and a

degree at a time according to the ratchet movement of the driven wheels. Thus each time a gang or row of staples are driven through the padded sheathing E by the staple driving heads 28, the driven rollers 52 and 53 will draw the stapled padded sheathing a step forward through the machine A into position to drive another row of staples. In this manner the tufting machine A operates automatically to place rows of tufting staples 47 in the sheathing as illustrated in Figure 3, making a very neat and decorative means of tufting the sheathing. The operation is quick, accurate, positive and yet very simple.

As the padded sheathing E is drawn along the table 10 it is caused to be ironed smooth before it passes under the driving heads 28 by means of the ironing member 70. This member is pivoted at 71 in the side wall 11 of the table 10 by means of slots 73, as illustrated in Figure 10. The ironing member 70 is comparatively heavy, is of a flat triangular nature, with a rounded pointed end 72 which hangs down from the pivot points 71 and tends to iron out the upper surface 12 perfectly smooth and flat, holding this surface in this manner until the staples 47 have been driven through the padded sheathing E. Naturally the lower surface or covering 13 is also held flat, in fact, both of the coverings 12 and 13 are smoothly ironed out by the iron member 70 before the same are staple tufted. The iron 70 may be as heavy as may be desired and may be varied in weight in accordance with the padding to be placed between the sides 12 and 13.

My tufting machine A is designed to tuft side walls for mattresses, cushions and the like, which consist of a comparatively narrow strip of padded sheathing. It is also apparent that my tufting machine A may drive a row of staples in gangs through a padded sheathing E of any width that may be desired by making my tufting machine A wider in character and supplying it with the desired gang of staple driving cross heads 28. I have illustrated three staple driving heads 28 held adjacent each other in a gang which automatically drive a row of three staples through the sheathing E at one time. The pad 10 of the machine may be made as wide as desired. My machine A is adapted to tuft quilts or other padded sheathing, placing the tufting staples through the material without tearing the same, and permitting tufting staples to be used of a character to bind the sides firmly together without tearing out. I have illustrated flat staples, however, it is apparent any form of staples may be used by my machine, even round wire staples if it is so desired. Round wire staples are not as desirable for holding material for the reason that they do not grip the surface of the cloth with sufficient firmness to prevent the same from tearing. Nevertheless, they may be used in my machine if it is desired even though I prefer the flat staples for ordinary tufting of textile, with a padding between the same.

The adjustable nature of my tufting machine, together with the simple operation thereof provide a means particularly adapted for tufting side walls of mattresses or cushions so that they may be made more economically and yet have a better decorative character and more uniform than where other means of tufting is employed.

In accordance with the patent statutes I have described the principles of operation of my tufting machine and while I have endeavored to set forth the best embodiment thereof, I desire to have it understood that this is only illustrative

of a means of carrying out my invention and that obvious changes may be made within the scope of the following claims without departing from the spirit of my invention.

5 I claim:

1. A tufting device comprising, a frame, means for supporting a supply of tufting staples, a gang of staple driving heads adapted to receive staples from said source of supply, a gang of clinching anvils adjustably positioned below said heads, a reciprocating cross head carried by said frame, means for reciprocating said cross head, means for adjustably supporting said gang of stapling heads to said cross head, means for driving said stapling heads into operative position toward said anvils, means for automatically drawing material and padding between said staple driving heads and said anvils while they are separated from each other, and holding the material at rest at intervals, said cross head driving means pressing said gang of staple driving heads simultaneously against the material to be tufted, forcing the same toward said anvils, and said driving means for said staple driving heads forcing staples therefrom into the material and clinching the same on said anvils to tuft the material with a plurality of staples placed simultaneously while the material is at rest on said anvils.

2. A staple tufting machine comprising, means for supporting a series of rows of staples, staple driving heads providing holding means, staple driving means in said heads, a cross head for supporting a gang of said staple driving heads, anvils for each of said staple driving heads, and means for reciprocating said cross head to force said staple driving heads toward said anvils into operative position to hold the material, said staple driving means operating after said heads are adjacent said anvils to automatically drive and then clinch a series of tufting staples through a padded sheathing.

3. A tufting machine comprising, means for driving a row of tufting staples through a padded sheathing at spaced apart points, draft means on one side of said staple driving means for drawing the sheathing a step at a time into position to be staple tufted, and means on the other side of said staple driving means for ironing out the wrinkles in the padded sheathing, said draft means drawing the sheathing taut between said draft means and said ironing means to hold the padded sheathing wrinkleless while being staple tufted.

4. A staple tufting machine for a continuous strip of material comprising, a gang of staple driving heads transversely aligned with relation to the direction of travel of the material, means for adjustably supporting said heads, separate adjustable anvils for each of said heads, means for supplying staples to each of said heads, removable inspection plates permitting the examination of the staple receiving channel in each of said heads, and spring means engaging said plates for holding said inspection plates to each of said heads.

5. A staple tufting machine comprising, a gang of adjustably supported staple driving heads, anvils for each of said driving heads, means for adjusting said anvils toward and away from said driving heads, a removable inspection cover for each of said heads, spring means for holding said covers to said heads, means for supplying staples to each of said heads, means for supporting a supply of covering and padding material, draft rollers for pulling the covering and padding

material into position to be stapled by said heads, means for operating said draft rollers intermittently, and means for operating said staple driving heads to staple tuft the padded sheathing at the interval of rest of said draft rollers.

6. A staple tufting machine comprising, a gang of adjustably supported staple driving heads, anvils for each of said driving heads, means for adjusting said anvils toward and away from said driving heads, a removable inspection cover for each of said heads, spring means for holding said covers to said heads, means for supplying staples to each of said heads, a sheathing receiving table associated with said anvils, means for supporting a supply of covering and padding material, draft rollers adjacent said heads for pulling the covering and padding material into position to be stapled by said heads to form a sheathing, means for releasing said draft rollers from operative position and away from said staple driving heads, means for operating said draft rollers intermittently, and means for operating said staple driving heads to staple tuft the padded sheathing at the interval of rest of said draft rollers.

7. A staple tufting machine comprising, a series of staple driving elements, a source of supply of staples for said elements, means for collectively gathering and feeding padding and covering material through said machine, means for operating said gathering and feeding means intermittently, means spaced from said gathering and feeding means for ironing out the wrinkles in the padded sheathing to position the opposed coverings in substantially parallel relationship before it is stapled, and means for automatically driving a row of tufting staples between said ironing means and said feeding means at a time to tuft the covering to the padding at spaced apart points.

8. A tufting device comprising, a series of tufting driving elements, means for feeding tufting elements to said driving elements, means for supplying a padding with a covering over the same in the form of a padded sheathing, table means over which the padded sheathing is adapted to be carried, draft rolls for drawing the padded sheathing over said table beneath said tufting driving elements, and flat ironing means resting upon the sheathing for retarding and smoothing out the padded sheathing under the tufting driving elements.

9. A staple tufting machine including draft means for pulling the tufting through the machine, flat ironing means for smoothing the wrinkles from said tufting at a point spaced from said draft means, means mounting said ironing means to ride flat on the surface of the tufting, and stapling means operable between said ironing means and said draft means for stapling the tufting.

10. A tufting machine comprising, means for supporting a supply of padding material, means for supporting a supply of covering material, a table for collectively receiving the padding and covering material, flat means in said table for ironing out the wrinkles in said covering and padding as it passes along said table, means mounting said ironing means to lie flat on the covering, means for pulling the covering and padding over said table, and means for staple tufting the padding to the covering material automatically as it is drawn collectively through said machine on said table.

11. A tufting machine for tufting padding to a covering material, means for collectively carry-

ing the padding and covering material over a common point, means for smoothing said material, means for pivotally and slidably mounting said smoothing means, and means for staple tuft-
5 ing the smoothed padding and covering material together automatically at uniformly spaced apart points.

12. A device for tufting sheet padding comprising, means for supporting a supply of sheet-like
10 padding, means for supporting covering material for each side of the padding, means for collectively drawing from the source of supply the covering with the padding therebetween, means for smoothing
15 said material to position said coverings substantially parallel, means for pivotally and slidably supporting said smoothing means, and means for tufting the padding between the covering at spaced apart points to automatically form a tufted padded sheathing.

20 13. A staple tufting machine for sheathing comprising, a series of staple driving heads, means for supporting and reciprocating said heads col-

lectively into operative position, means for feeding staples to each of said heads, clinching anvils for each of said heads, draft means for the sheathing movably supported adjacent said heads,
5 means for retaining said draft means in operative position, and adapted to be released so that the draft means may be moved away from the heads.

14. A tufting machine for padding sheathing comprising, a series of staple driving heads, means
10 for feeding staples to each of said heads, inspection cover plates on each of said heads, means for holding said plates easily removable therefrom, draft rollers movably mounted adjacent said
15 heads for drawing padded sheathing in position to be staple tufted by said heads, spring means for relatively urging said draft rollers together,
20 means for operating said draft rollers, and means for retaining said draft rollers in operative position and releasable to permit one roller to be moved out of operative position.

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