F. C. GENGE.

METHOD OF AND MACHINE FOR FILLING CONTAINERS WITH SPRINGS.

APPLICATION FILED APR. 30, 1919.

1,370,533. **Patented Mar. 8, 1921.**

5 SHEETS—SHEET 1.

Fig. 8.

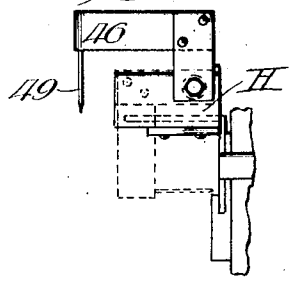
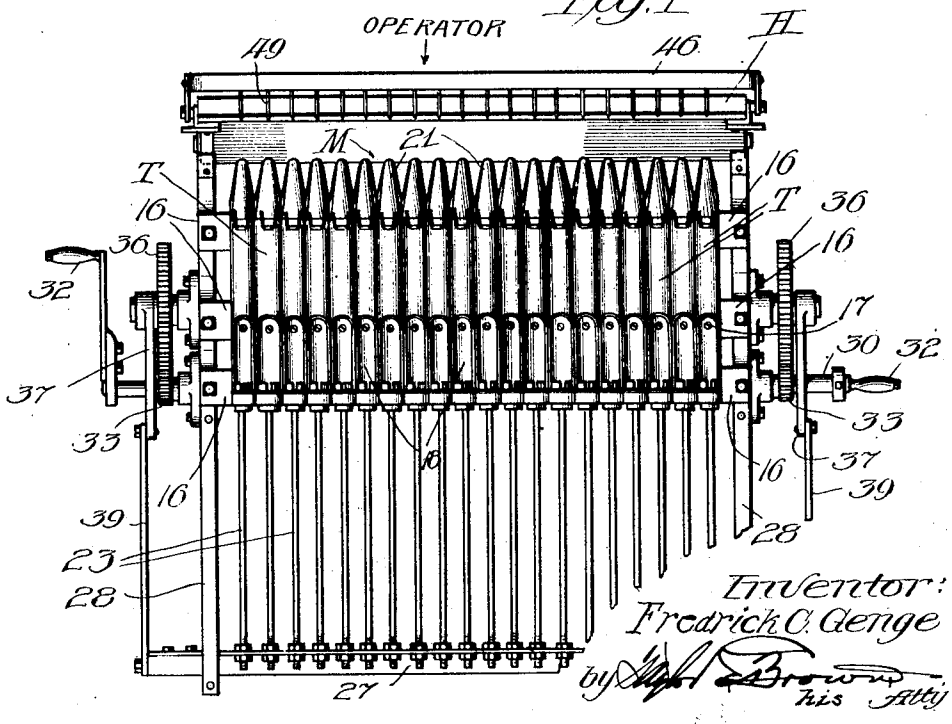


Fig. 1.

Fig. 1a



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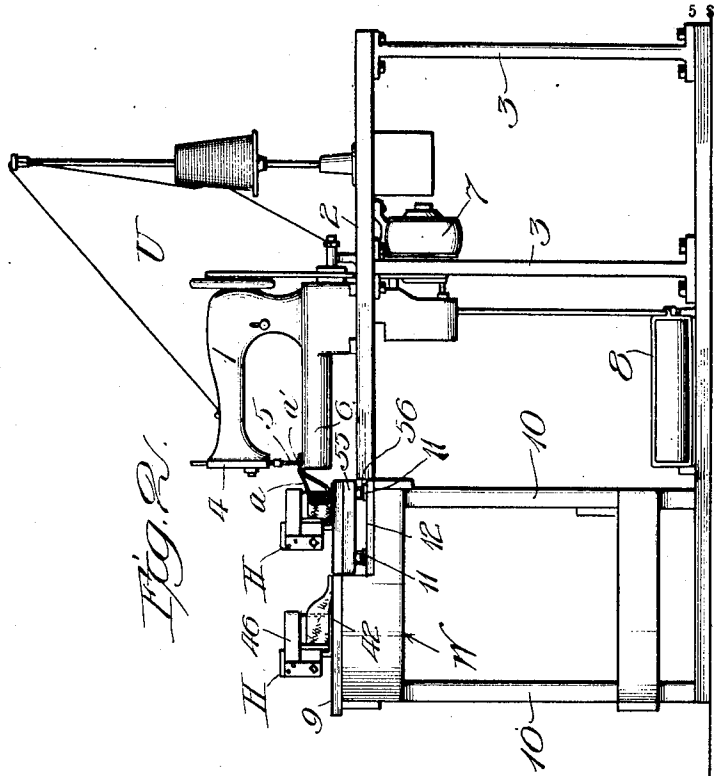


Fig. 2.

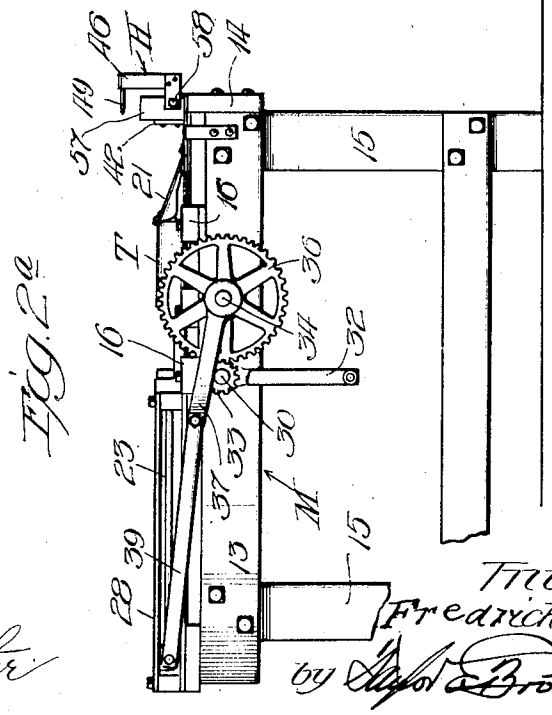


Fig. 2a

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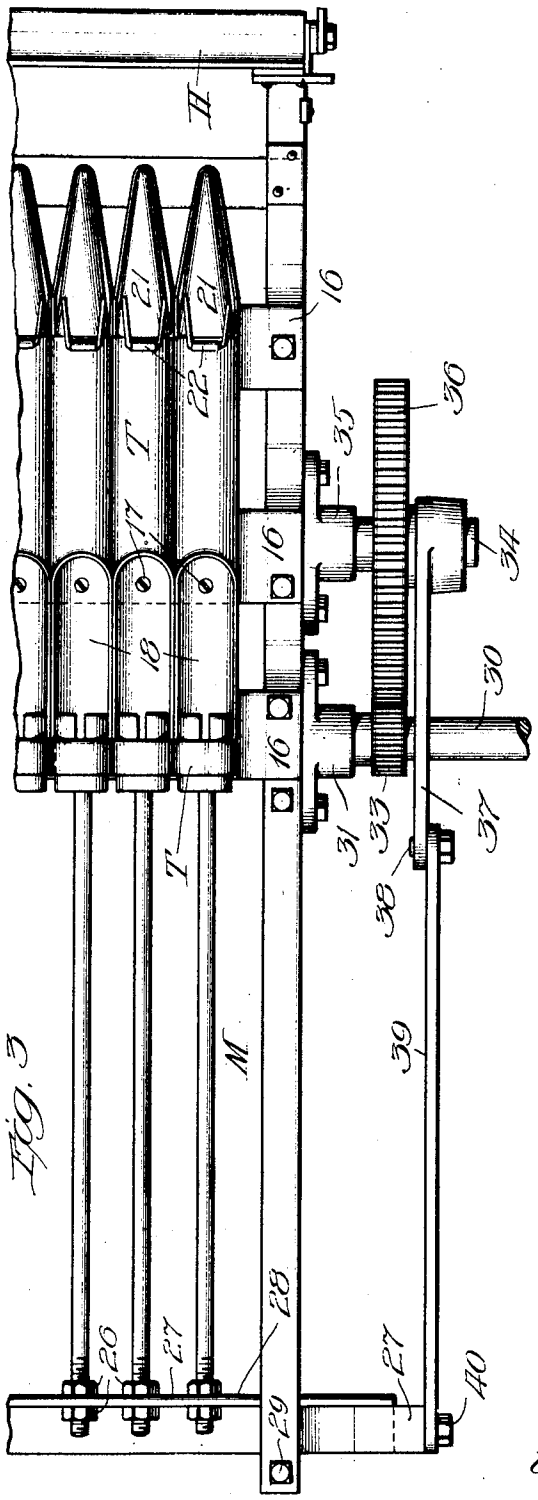


Fig. 3.

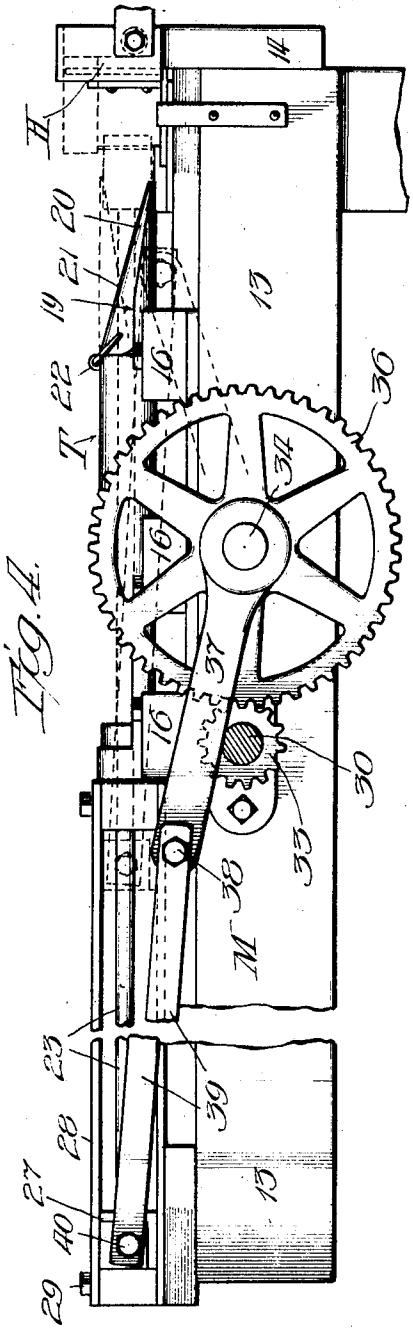


Fig. 4.

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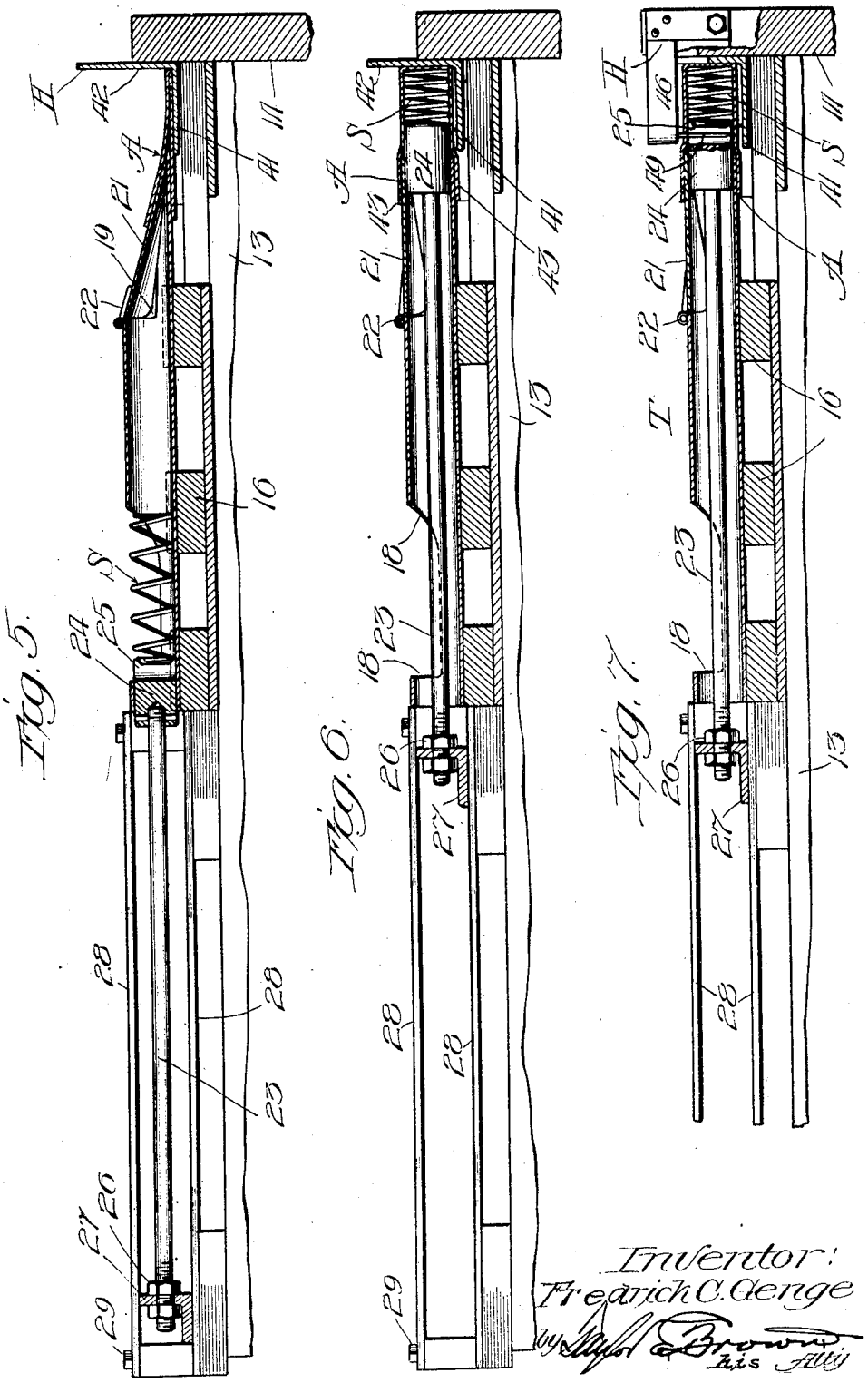
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5 SHEETS—SHEET 4.



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1,370,533. **Patented Mar. 8, 1921.**

5 SHEETS—SHEET 5.

Fig. 9.

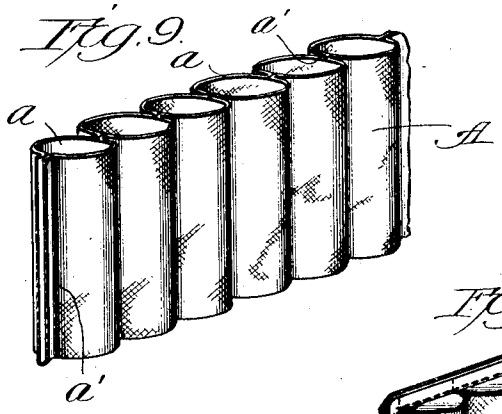


Fig. 10.

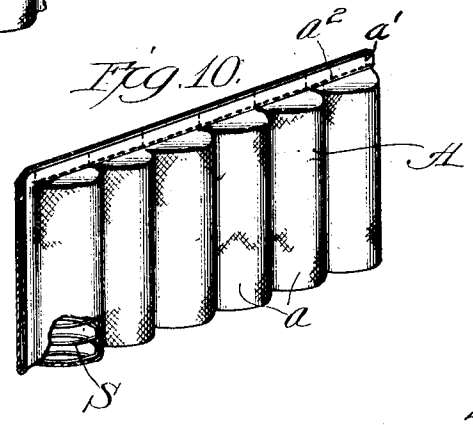


Fig. 11.

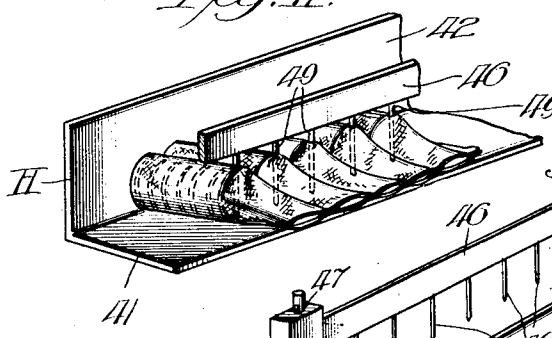


Fig. 12.

Inventor:
Friedrich C. Genge
by Alfred C. Brown his Atty

UNITED STATES PATENT OFFICE.

FREDRICK C. GENGE, OF CHICAGO, ILLINOIS.

METHOD OF AND MACHINE FOR FILLING CONTAINERS WITH SPRINGS.

1,370,533. Specification of Letters Patent. Patented Mar. 8, 1921.

Application filed April 30, 1919. Serial No. 293,772.

To all whom it may concern:

Be it known that I, FREDRICK C. GENGE, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Methods of and Machines for Filling Containers with Springs; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to a method of filling pockets of fabric with springs and then closing the pocket ends, and means for carrying out the method.

In making mattresses, cushions or the like, wherein a plurality of spring contained pockets are employed, surrounded usually with upholstery filling and the whole incased in the outer or finished covering (one such structure being illustrated and described in the patent to James Marshall, No. 685,160 dated October 22, 1901,) the pockets are filled by hand labor, which is slow at best and expensive. Where the spring is snubbed, that is, somewhat compressed in the pocket when closed, the machine operator who sews the pocket, in addition to handling the fabric at the open end of the pocket and guiding it to the machine needle, also has to compress the spring in the pocket and hold it so compressed or snubbed during the sewing operation. This is a somewhat difficult operation, and is expensive, requiring skilled workmen.

One of the objects of my invention is to reduce the cost of filling springs into pockets and closing the pocket over the spring when under tension by performing these operations by the use of means by which the work may be performed with accuracy and greater speed. Another object is to greatly reduce the cost of manufacture of such spring contained pockets.

Another object of the invention is to provide in a machine, means for filling the springs in a plurality of pockets, means for compressing the springs therein, means for holding the spring compressed in the pocket and retaining it therein while being handled by the operator, thereby increasing the extent of the free, opened end of the pocket to afford adequate material for conveniently handling said pocket during the sewing operation, and means for holding, and guiding, a plurality of spring filled pockets during the sewing operation.

These and other objects and advantages of my invention will more fully appear as I proceed with my specification and by reference to the accompanying drawings.

In said drawings:

Figures 1 and 1ª illustrate in a plan view the two parts of a machine embodying and adapted to carry out my improved method, Fig. 1ª illustrating the pocket filling element and Fig. 1 the pocket closing element of the apparatus.

Figs. 2 and 2ª, are end elevations of the same, respectively.

Fig. 3 is a plan view, enlarged, of a portion of the pocket filling element.

Fig. 4 is a side elevation of the same, enlarged.

Fig. 5 is a sectional view, enlarged, of one of the pocket filling tubes, the position of the parts showing the first step in the operation.

Fig. 6 is a similar view, enlarged, showing the second stage of the operation.

Fig. 7 is a similar view showing the final stage of the operation.

Fig. 8 is an end view of one form of the spring filled pocket holder.

Fig. 9 is a perspective view of a plurality of the pockets without springs.

Fig. 10 is a similar view showing the pockets filled with springs, and closed.

Fig. 11 is a similar view showing springs in the pockets before the pocket ends are closed.

Fig. 12 is a perspective of the work holder for the spring filled pockets, showing the locking pins raised.

The form of machine which I have chosen to illustrate my invention is peculiarly adapted for handling a strip of fabric which is folded along its longitudinal, median line and then sewed transversely by parallel lines of stitches to form a plurality of pockets, each having one end closed and the other end open. Such a structure is illustrated as a whole by the letter A, in Fig. 9, the open end pockets being indicated at *a* and the line of transverse stitches at *a'*. Each pocket *a* is designed to contain a coiled spring S, see Fig. 10, of such a length that when the open end of the pocket is closed by

a longitudinal line of stitches, the spring will be under tension or "snubbed" as it is termed.

Fig. 10 illustrates the strip A of pockets *a* with a spring S in each pocket, and the pockets closed by the line of stitches a^2, one only of the pockets being broken away to reveal the spring S. Having then in mind the fabric structure comprising a plurality of pockets, open at one end, illustrated in Fig. 9, I will proceed with the general description of my invention,—attention being invited first to Figs. 1 and 1^a.

The strip A is first placed upon the pocket filling element, the open end of each pocket covering the end of a filling tube, and the closed bottom of the pockets being located near an abutment in a work holder extending transversely across the pocket filling element. The springs S are then placed singly, one in each tube and forced by a suitable plunger through the tube longitudinally. The pocket bearing tube end is so constructed as to be opened or spread circumferentially within the pocket, stretching the latter to afford a better frictional hold upon the tube and acting as a sort of mandrel or tubular support, thus enabling the plunger to force the spring out of the tube and into the pocket, the pocket having assumed a cylindric or distended shape about the tubular support. The abutment against which the pocket end rests, coöperates with the last part of the stroke of the plunger which moves the spring through the tube, whereby the spring is compressed longitudinally, in the bottom half of the pocket. A pin containing bar mounted on the work holder is then actuated to force the pins into the pockets to lock the springs in this compressed position in the pockets, there being one pin for each pocket. The work holder containing the strip A having a plurality of pockets with a compressed spring in each pocket, may then be removed from the pocket filling element and placed upon the pocket closing element of the apparatus.

The removal of the filled work holder will readily and simultaneously with the act of removal, strip the open ends of the pockets from the tube ends, the fabric of the strip and pockets not for the time being in contact with the compressed, inclosed springs, being free to assume the collapsed position of the pocket ends shown in Fig. 11. An empty work holder will then be placed in the pocket filling element, a new empty strip of pockets and a plurality of springs used to repeat the operation just described.

The filled work holder is then laid upon a carriage provided with suitable tracking wheels to coöperatively engage a suitable guide track on the work table, so that the work holder may be easily moved along the pocket closing element, herein shown as a sewing machine, whereby a line of stitches may be sewn in the fabric longitudinally of the work holder, and transversely across the collapsed pockets of the strip to close these pockets. The pin containing bar is then raised, thereby withdrawing the pins from the pockets. The springs in the pockets will then immediately expand (but not to their full length) to fill the now completely closed pockets. The completed spring filled strips are then removed, the empty work holder placed upon the work table in juxtaposition for being conveniently transferred again to the pocket filling element, and another work holder filled with a strip containing compressed springs placed on the movable top of the work table, and the operation repeated.

The sewing machine unit is suitably located adjacent to the work table on the track, while the pocket filling element is located conveniently at the opposite side of the work table, as clearly illustrated in Fig. 1 and Fig. 1^a. Thus, by the method of my invention, and with these three work units, and one set of work holders, two machine operators may coöperate to turn out many thousands of strips per day more than two sewing machine operators would do by the method first described, having the pockets hand filled and the springs compressed by hand while closing the pockets.

Now referring more in detail to the various parts of the elements of the apparatus or machine embodying my invention, I point out that the sewing machine element or unit, U, as a whole, may be of any conventional pattern or type provided the sewing needle is arranged so as to coöperate with the traveling work holder on the work table. I have shown, as the unit U, a sewing machine 1, mounted on a table W, which is supported by suitable standards 3, 3. The sewing machine 1 is provided with a needle head 4, a needle 5 therein and a work supporting arm 6. It may be operated by a suitable motor 7 controlled by a foot lever switch 8.

The work table, designated as a whole by W, comprises a top 9 supported by suitable standards 10, 10, and has track or guide ways 11, 11, the latter preferably upon a depressed portion 12 of the table top. The tracks 11, as shown, extend longitudinally of the table W, and the latter is not only in juxtaposition to the sewing machine unit U, but in such position that the work to be stitched and carried on the work holder, which latter is designated as a whole at H, may be moved longitudinally across the path of the needle 5, when the work holder H is moved upon the track 11.

The pocket filling element designated as a whole at M, comprises a table frame consisting of side and end bars 13, 14, re-

spectively, mounted upon suitable leg supports 15. Intermediate its ends are transversely arranged supporting bars 16, 16, secured upon which, by screws 17, or otherwise, are a plurality of tubes designated as a whole at T. These tubes, from center to center, correspond with the distance from center to center of the pockets *a* of the strips S′, the longitudinal axes of the tubes being parallel and in the same horizontal plane.

As clearly shown in Figs. 3, 5, 6 and 7, the tubes T are hollow metal cylinders, open at each end. A cutaway portion 18 in the top of each tube near one end affords convenient means whereby springs S may be inserted within the tubes. Near the front end each tube is cut away as shown at 19 (Figs. 4 and 5), a part of the margin being cut on a slanting line as clearly shown at 20, Fig. 4. A cover 21, pivoted to the tube by a spring hinge 22, is shaped complementally with the cut away part 19, so that the cut away end and the cover of the tube form the closed, tapered tube end shown (see Figs. 3 and 4). The spring hinge 22 tends to keep the cover 21 down and the forward tapered end of the tube closed, as shown in Fig. 5.

A plunger rod 23 carries on its forward end a plunger 24 of a diameter to permit of its easy movement within the tube. Its forward end is recessed to form an open, vertically extending slot 25 for the purpose hereinafter mentioned. When the spring S is placed in the tube T, the plunger 24 should be in the position shown in Fig. 5, with the spring end resting against the face of the plunger. Each plunger rod 23 is connected by suitable nuts 26 to the sliding cross head or angle bar 27, which travels in guide ways on either side of the machine member frame, said guide ways comprising spaced apart flat bars 28, 28, secured to the frame by bolts 29, 29, or other suitable means.

The means for actuating the plungers 23 simultaneously comprises a crank shaft 30 journaled in a bracket 31 bolted to the side 13 of the frame. The crank shaft carries a crank 32 and a spur pinion gear 33. A stub shaft 34 supported from the bracket 35 likewise bolted to the side 13 of the frame, carries a large spur gear wheel 36, which gear is in mesh with and is rotated by the gear pinion 33. An arm 37 mounted on the shaft 34 extends toward the rear of the machine and above the shaft 30. The rear end of this arm 37 is pivotally connected at 38 to the forward end of a link bar 39, the rear end of which link bar 39 is pivotally connected at 40 with the cross head or bar 27.

When the crank arm 32 is rotated by the operator, rotary motion is communicated to the shaft 30, pinion 33, gear 36 and shaft 34. The arm 37 will then be moved from the position shown in full lines to that shown in dotted lines in Fig. 4. A similar crank arm, gearing operating means is provided upon the opposite side of the machine, thus more perfectly equalizing the strain and causing both cross head bars 27, 27 to travel together. I prefer also to place a crank operating handle 32 on both sides of the unit, so that the operator may work the plungers from that side where he happens to be at the time. It will be understood, of course, that power applied to either handle 32 will simultaneously operate all of the plungers in the tubes.

The strips A are placed in the work holder H and the open end of the pocket *a* stretched partly over the tapered end of the tube as plainly seen in Fig. 5. That part of the holder H which thus contains the strip A comprises a supporting shelf member 41 and a vertical abutment member 42. When the plunger 24 pushes the spring S forward, the spring S in turn raises the spring hinged cover 21, thus distending the open mouth of the pockets *a* until there is good frictional contact, as indicated at 43. The mouth of the pocket *a* is, of course, now in tubular form and ready to receive the spring S. The further forward movement of the plunger 24, being continued, results in not only forcing the spring fully into the pocket but also in compressing the spring in the closed end of the pocket, as fully disclosed in Fig. 6, the abutment 42 of the work holder H coöperating to this end. In this position, the spring occupies practically about one half of the pocket space.

To hold the spring in this contracted position, while the open end half of the pocket is withdrawn from the tube end and while the open end of the pocket is being closed up by the sewing machine stitches, or otherwise, I have devised the locking means on the work holder, which I will now describe,—attention being more specifically directed to Fig. 12. The abutment and shelf members 41, 42, are parts of a strip of angle iron, of a length substantially of the width of the pocket filling element M. At either end of the shelf member 41, a stud or post 44 is mounted in a bracket hub 45. The pin bar 46 is apertured at each end to enable it to have sliding bearing upon the two vertical posts 44, 44, a cotter pin 47 in each post end limiting the amount of upward movement of the pin bar 46. Springs 48, mounted one on each post, normally hold the pin bar in the raised position shown in Fig. 12. Pins 49 are mounted in the bar 46 so as to depend from the under side thereof, as shown, said pins being spaced at the same distances apart as are the pockets *a*, and the tubes T, so that when the bar 46 is depressed, against the tension of the springs 48, into the position

shown in Figs. 7 and 11, the pins 49 will pierce the filled pockets *a*. To hold the bar 46 in this lowered position, I have provided a simple form of locking arrangement comprising a bracket arm 50 secured by rivets 51 or otherwise to the back of the abutment member 42, and carrying a spring tension sliding latch or bolt member 52. One end of the bolt has a hand hold 53 while the other end is tapered or rounded on its top at 54. This end 54, as shown, lies in the plane of the path of movement of the bar 46. When said bar is depressed, its lower edge impinges upon this tapered or rounded end of the bolt 52, forcing it back against its spring until the bar 46 passes it, whereupon the spring tension forces it forward again, so that its lower surface will rest upon the top of the bar 46, preventing upward movement of the bar 46 until the bolt 52 is manually withdrawn, thus locking the spring filled pockets and the pins in the position illustrated in Fig. 11. Thus the work holder H may be bodily removed from the machine M (the ends of the pockets *a* being readily stripped from the ends of the tubes T), and placed upon the work table W. Any suitable devices for coöperating with the tracks 11 of the work table W, may be placed upon the under side of the bearing member 41 of the holder H, but I prefer to use a simple wagon 55 having track wheels 56, which engage the tracks 11. When the holder H is placed on the wagon 55, it may be readily moved lengthwise, of the tracks, so that the open ends of the pockets *a* may be closed by stitching a^2 as the pockets pass the needle 5.

In some instances, I may use the form of holder H illustrated in Figs. 2 and 2^a, wherein the abutment member is riveted to a bar 57 and the pin holding bar 46 is pivoted at 58, so as to swing from the raised position shown in Fig. 2^a to the pocket engaging position shown in Fig. 2.

When the plungers 24 have been moved forward to the limit of the stroke, the pins 49 are applied, and in order that the springs S shall remain in the contracted position, I prefer to place the pins against that convolution of the spring which bears against the plungers 24. To this end, I have made a vertically disposed slot 25 in each plunger, recessed in from the face of the plunger. Thus all the springs S are equally compressed, each is held in its compressed position between the abutment 42 and the pin 49, and when the work-holder is withdrawn from the pocket filling element, the pins 49 will be readily disengaged from the open ended slots or recesses 25 in the plungers 24.

I claim as my invention:

1. The method of filling pockets with springs, which consists in first placing the open end of a fabric pocket over a hollow, mandrel-like support, then spreading said support to expand the pocket to its full diameter, then forcing a coiled spring longitudinally through the support and into the pocket, then compressing the spring within and longitudinally of the pocket, then locking the spring so compressed in the pocket between the closed end of the pocket and the locking device, whereby an appreciable amount of the length of the pocket will lie outside the locking device, then stripping the pocket from the support, then closing the open end of the pocket and finally in removing the locking device.

2. The method of filling strips of pockets with springs, which consists in first placing a strip of fabric containing such pockets in a work-holder with the closed pocket ends against an abutment, then placing the open end of the pockets over a tubular, mandrel-like support, then placing a coiled spring in the tubular support and forcing said spring lengthwise to spread the end of the support to stretch the fabric pocket and hold it frictionally over the support end, thereby defining the diameter of the pocket for the entrance of the spring, then forcing the spring into the pocket until it is compressed to substantially its limit of compression between the forcing means and the closed pocket end which rests against said abutment, then piercing said pocket with a locking pin secured to said work-holder whereby the spring is held in its compressed position between said locking pin and the closed end of the pocket, then simultaneously stripping the open pocket ends from the supports and removing the work-holder with the pockets therein, then passing the workholder longitudinally past a sewing machine unit whereby the open ends of the pockets will be closed by a line of stitches transversely of the pockets, and then releasing the strip from the workholder by removing the locking pins, thereby permitting the springs to expand to fill the pockets, now closed at both ends.

3. An apparatus for filling pockets with springs and for closing said pockets with the springs under tension, comprising mechanism for placing the springs in the pockets and compressing the springs while therein, mechanism for holding said springs in compressed condition in said pockets, and mechanism for closing the pockets.

4. An apparatus for filling fabric pockets with springs and closing the pockets with the springs under tension, consisting of a pocket filling element, a work-holder element and a pocket closing element, the pocket filling element comprising a tubular receptacle for the spring, adapted at one end to engage the open end of the pocket

to be filled and means for forcing the spring through the tubular receptacle and into the pocket.

5. An apparatus for filling fabric pockets with springs and closing the pockets with the springs under tension, consisting of a pocket filling element, a work-holder element and a pocket closing element, the pocket filling element comprising a tubular receptacle for the spring, adapted at one end to engage the open end of the pocket to be filled and means for forcing the spring through the tubular receptacle and into the pocket, said work holder having an abutment adapted to coöperate with the pocket filling means to place the spring under tension and with means for locking the spring in the pocket under tension.

6. An apparatus for filling fabric pockets with springs and closing the pockets with the springs under tension, consisting of a pocket filling element, a work-holder element and a pocket closing element, the pocket filling element comprising a tubular receptacle for the spring, adapted at one end to engage the open end of the pocket to be filled and means for forcing the spring through the tubular receptacle and into the pocket, said work holder having an abutment adapted to coöperate with the pocket filling means to place the spring under tension and with means for locking the spring in the pocket under tension.

7. In a machine for filling springs into casings, a tubular spring holder formed at one end to receive the open end of a casing, a hinged member at said end, a plunger in the tubular holder and means for moving the plunger longitudinally in the holder to eject the spring and force it into the casing.

8. In a machine for filling springs into casings, a tubular spring holder formed at one end to receive the open end of a casing, a hinged member at said end, means for yieldingly holding the hinged member closed, a plunger in the tubular holder and means for moving the plunger longitudinally in the holder to eject the spring and force it into the container.

9. In a machine for filling springs into casings, a tubular spring holder formed at one end to receive the open end of a casing, a hinged member at said end, a plunger in the tubular holder, means for moving the plunger longitudinally in the holder to eject the spring and force it into the container, and an abutment against which the closed end of the container rests.

10. In a machine for filling springs into casings, a tubular spring holder formed at one end to receive the open end of a casing, a hinged member at said end, means for yieldingly holding the hinged member closed, a plunger in the tubular holder, means for moving the plunger longitudinally in the holder to eject the spring and force it into the container, and an abutment against which the closed end of the container rests.

11. In a machine for filling springs in casings, a tubular spring holder, a plunger movable longitudinally therein, means for actuating the plunger, the ejector end of the holder being adapted to be entered in the open end of the casing, and a hinged element in said ejector end adapted to be raised by the movement of the plunger to stretch the casing and frictionally hold it upon said ejector end.

12. In a machine for filling springs in casings, a tubular spring holder, a plunger movable longitudinally therein, means for actuating the plunger, the ejector end of the holder being adapted to be entered in the open end of the casing, a hinged element in said ejector end adapted to be raised by the movement of the plunger to stretch the casing and frictionally hold it upon said ejector end, and an abutment against which the closed end of the casing rests.

13. In a machine for filling springs in casings, a tubular spring holder, a plunger movable longitudinally therein, an inlet for the spring, the ejector end of the holder being adapted to be entered within the open end of the casing and provided with a movable element adapted to be raised by the movement of the plunger to frictionally hold the casing, means for forcing a spring through the holder and into the casing under compression, and means for locking the compressed spring in the casing.

14. In a machine for filling springs in casings, a tubular spring holder, a plunger movable longitudinally therein, an inlet for the spring, the ejector end of the holder being adapted to be entered within the open end of the casing and provided with a movable element adapted to be raised by the movement of the plunger to frictionally hold the casing, means for forcing a spring through the holder and into the casing under compression, and means for locking the compressed spring in the casing, said means including a locking pin passing through the casing.

15. An apparatus of the class described comprising in combination with a pocket having an open and a closed end, a member reciprocable in alinement with the pocket and adapted to force a spring therein and to compress the same until the rear end of the spring passes the open end of the pocket, mechanism movable into position to positively retain said spring in such compressed position while the open end of the pocket is being closed, and movable to

permit a decrease in the compression of the spring after the pocket is closed, and mechanism for closing the pocket.

16. An apparatus of the class described comprising in combination with a plurality of pockets each having an open and a closed end, a member reciprocable in alinement with the pockets and adapted to simultaneously force a spring into each pocket and to compress each spring in its associated pocket until the rear end of the spring passes the open end of its pocket, mechanism movable into position to positively retain each spring in compressed position in each pocket while the open ends of the pockets are being closed, and movable to permit a decrease in the compression of said springs after the pockets are closed, and mechanism for closing the pockets.

17. An apparatus for filling fabric pockets with springs and closing the pockets with the springs under tension, consisting of a pocket filling element, a work-holder element, and a pocket closing element, the pocket filling element comprising a tubular spring receptacle adapted for engagement with the open end of the pocket and means for forcing the spring from the receptacle into the pocket and simultaneously placing said spring under tension.

In testimony that I claim the foregoing as my invention I affix my signature in the presence of two witnesses, this 28th day of April, A. D. 1919.

FREDRICK C. GENGE.

Witnesses:

TAYLOR E. BROWN,

B. L. MACGREGOR.