

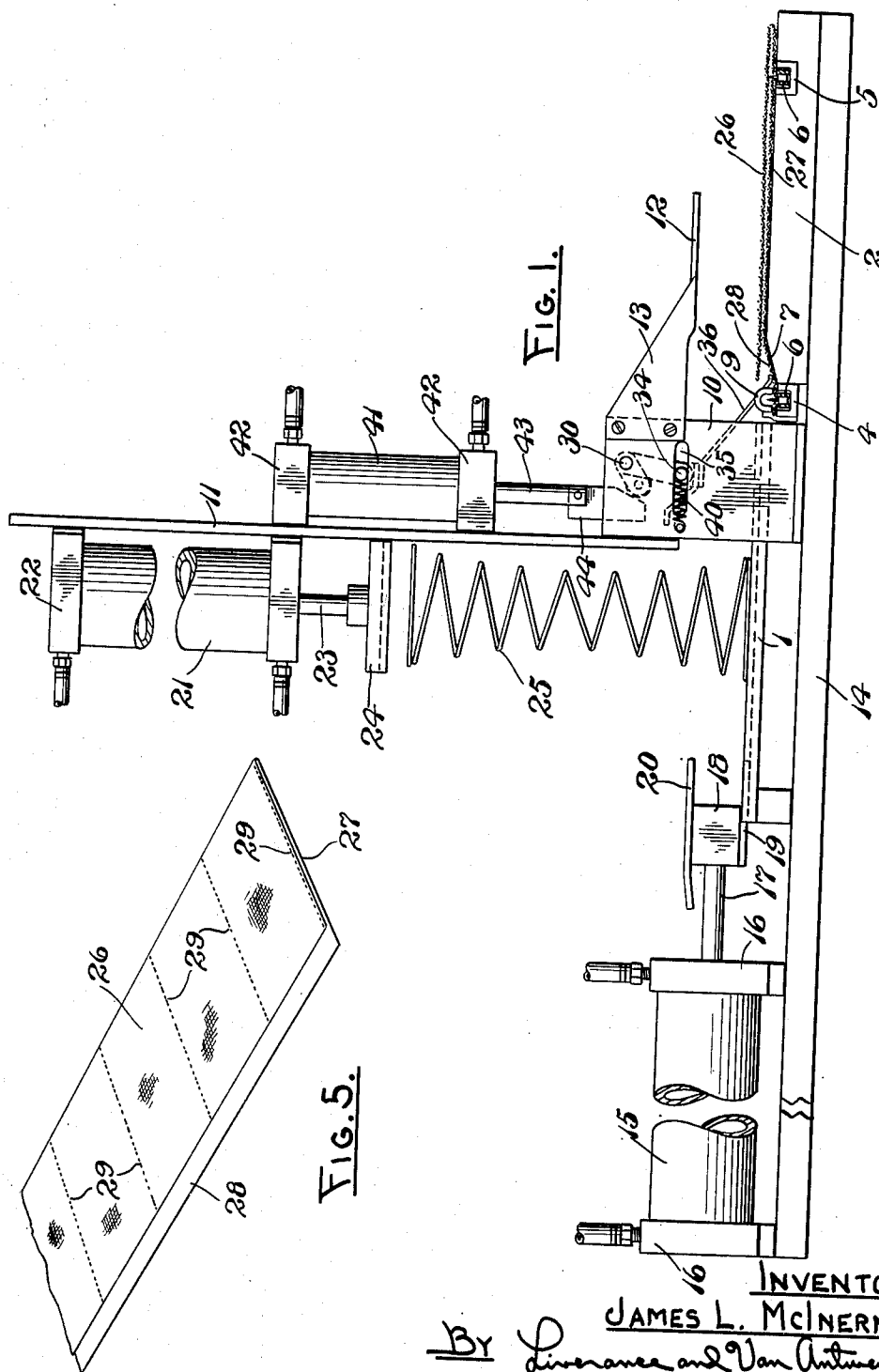
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J. L. McINERNEY
SPRING LOADING MACHINE

2,647,671

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3 Sheets-Sheet 1



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3 Sheets-Sheet 2

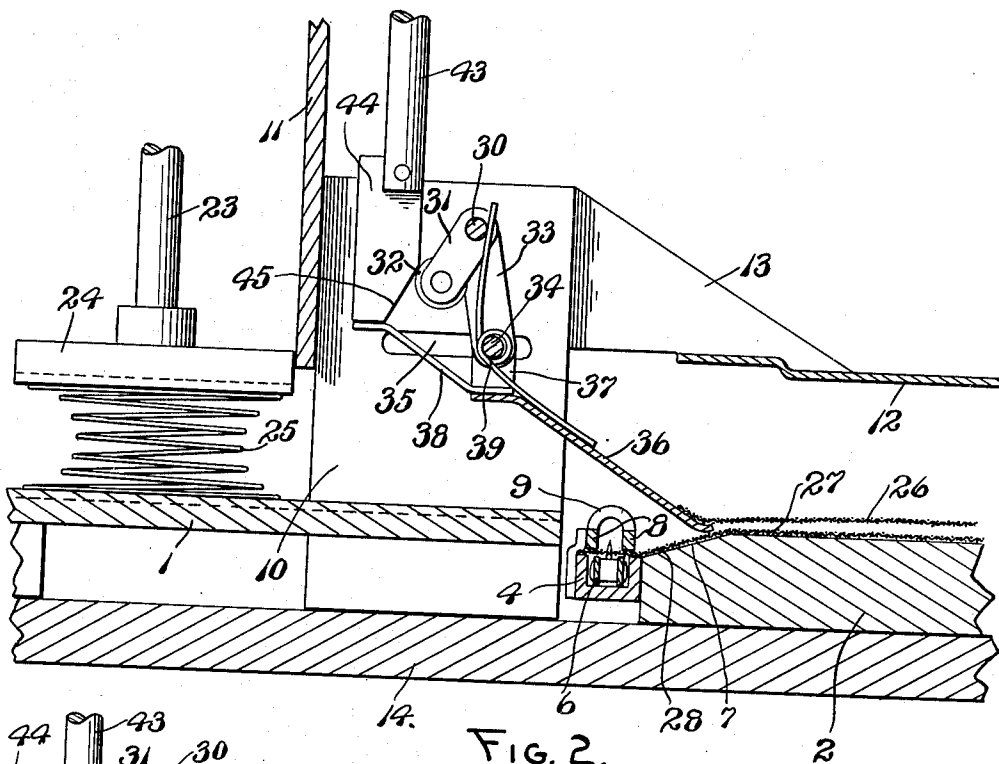


FIG. 2.

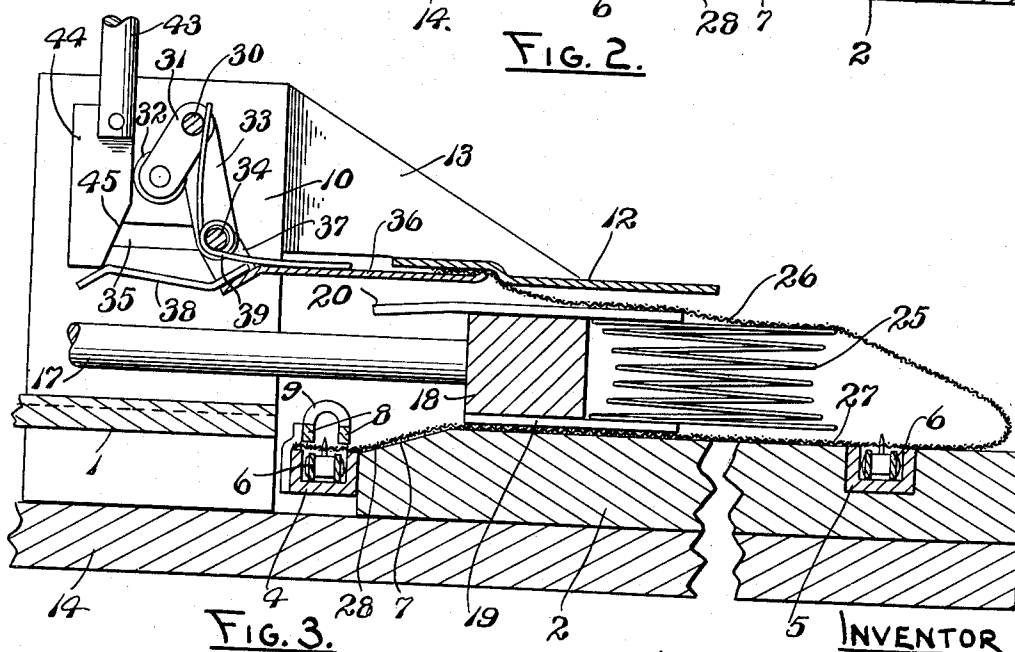


FIG. 3.

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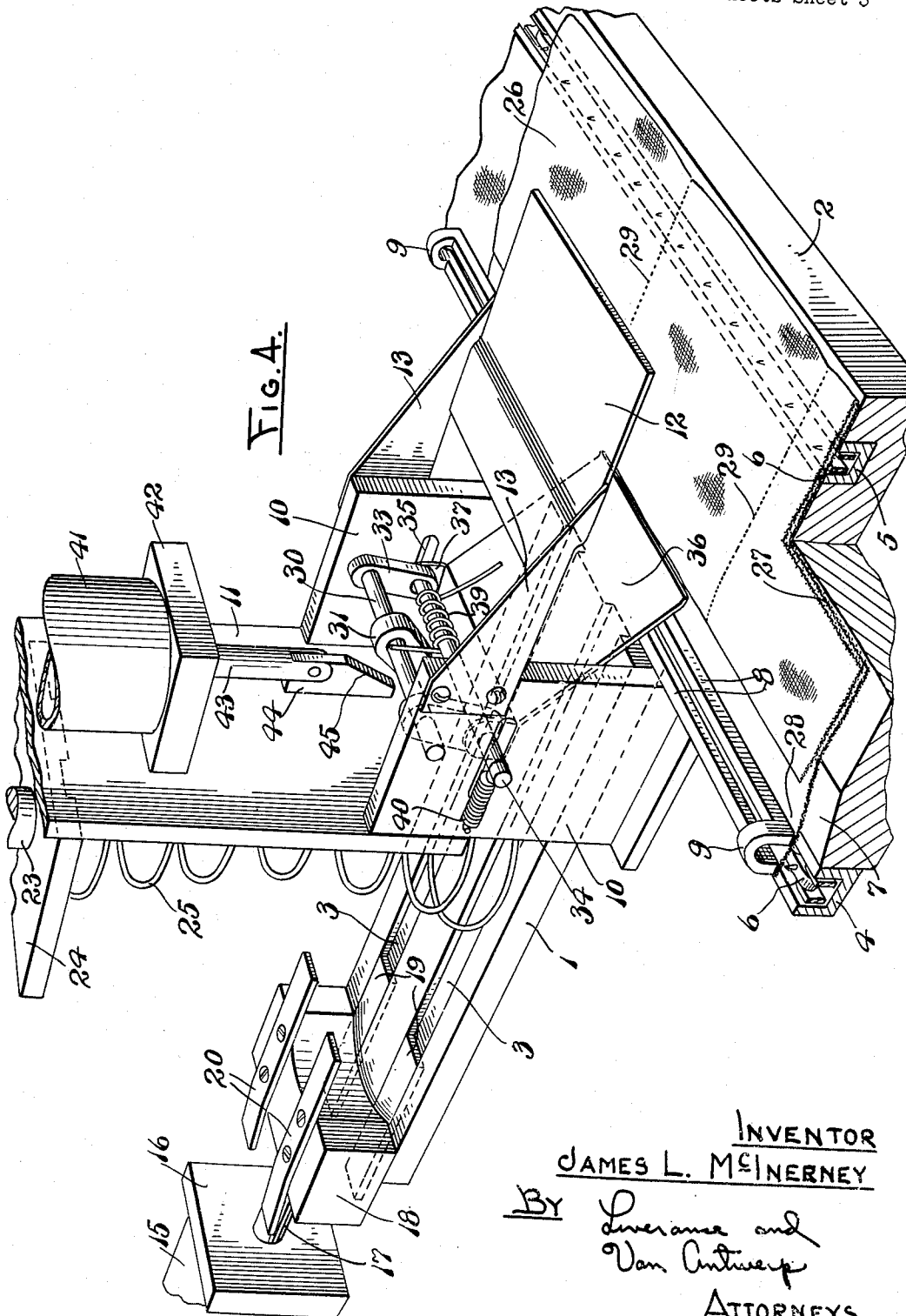
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UNITED STATES PATENT OFFICE

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SPRING LOADING MACHINE

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6 Claims. (Cl. 226—18)

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This invention relates to a spring loading machine.

In the cushion spring art, it is common to load somewhat elongated coiled springs of relatively light strength into pockets of fabric material which receive them, said pockets having a closed and an open end, at the latter of which the springs are inserted, one in each pocket. The open ends of the pockets are closed after the pockets have received their springs and thereafter the springs are turned to lie lengthwise of the pockets, expanding longitudinally therein. In the loading, the springs are compressed and are inserted in the pockets with the longitudinal axes of the springs transversely of the lengths of the pockets. Such cushion spring construction is used in automobile seats, as an example, and may also be used in conjunction with upholstered furniture of many types and characters.

As a complete spring construction of an automobile seat, or of furniture seats or other upholstered parts of furniture, includes a considerable number of the springs, it is desirable that the springs be loaded into the pockets rapidly and with a minimum expenditure of time and without interruptions of the loading due to troubles in the loading operation, which would cause delay and also produce a defective product.

The present invention is concerned with, and has for its object and purpose, the production of a very practical and useful mechanism for loading the fabric pockets, each with a compressed coiled cushion spring, and in a manner such that there is no liability of interruption of the successive loadings of the pockets, or of the production of a defective product. Instead, the machine has proved to be substantially perfect in its operation in all respects and if maintained in proper working condition, secures unbroken continuity of operation and an elimination of any defects in the products coming from the machine, due in any measure to the operations of the machine.

An understanding of the invention may be had from the following description, taken in connection with the accompanying drawings, in which, Fig. 1 is a side elevation of the spring loading machine in accordance with my invention, with the machine at the beginning of a cycle of operation thereof,

Fig. 2 is a fragmentary enlarged longitudinal section through the central portion of the machine, showing the position of the parts in a succeeding operation of the machine, wherein a coiled cushion spring has been compressed and is ready to be inserted into a pocket,

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Fig. 3 is a section similar to Fig. 2, illustrating a further step in the machine operation and the position of the parts during said operation when the compressed spring has been inserted in a pocket,

Fig. 4 is a perspective view of the machine of my invention, some parts being broken away and shown in section, and

Fig. 5 is a perspective view of a consecutive series of fabric pockets, into open ends of which the compressed coiled cushion springs are successively inserted.

Like reference characters refer to like parts in the different figures of the drawings.

In the structure illustrated, a somewhat elongated table 1, disposed horizontally, has in front of it a second horizontal table 2 spaced a short distance from the front end of the table 1 and at right angles to the length thereof. The elongated table 1, at its upper side, is shown as provided with two spaced parallel shallow guide grooves 3 lengthwise thereof. At the edge of the table 2 adjacent the front end of the table 1 and located in the space between them, a channel track or guide 4 is secured; and in the outer front portion of the table 2, a like channel guide 5 is embedded, both guides being disposed lengthwise of the table 2 and at right angles to the length of the table 1. The upper side of the table 2 is substantially flush with the bottom of the grooves 3, in substantially the same horizontal plane therewith. In the channel guides 4 and 5, endless feed chains 6 are mounted for movement, from links of the upper sides of which pointed pins extend upwardly. The inner or rear upper corner portion of the table 2 is beveled to incline downwardly and to the rear, as at 7. The inner or rear channel guide 4 is at a lower plane or level than the channel guide 5 (Fig. 3). Over the rear or innermost chain 6 and its guide 4, spaced horizontal bars 8 are located, connected at their ends by inverted U-members 9, the bars 8 being a short distance above the plane of the upper edges of the adjacent guide 4. Suitable brackets, as shown in Figs. 2 and 3, are used to mount said bars 8 and their connections 9 on the guide 4.

At each side of the front portion of the table 1 a vertical standard 10 is located and secured. A third standard 11 is attached to, extends above and between the upper parts of the side standards 10. A plate 12 of flat metal, having bracket supporting arms 13 at its side edges, is connected to the supporting standards 10. The plate 12 is a distance above the inner portion of the table

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2, as shown, and lies in a substantially horizontal plane parallel to the table 2. The several table members 1 and 2, the standards 10 and the about-to-be-described mechanism for pushing a compressed spring into a pocket, are mounted upon and fixed to an under horizontal support 14 (Fig. 1).

At the end of the support 14 of the mechanism, opposite the table 2, a horizontal cylinder 15, having ends 18, is mounted. To opposite ends of the cylinder compressed air or other fluid under pressure is alternately carried and exhausted to actuate a piston rod 17, which passes through the forward end of the cylinder and, within the cylinder, is connected to the usual piston (not shown). At the outer end of the rod 17, a block or head 18 is secured, which at its lower side is equipped with two guide bars 19, extending beyond the front side of the head, which traverse the guide grooves 3 of the table 1. Two somewhat similar guide bars 20 are secured at the upper side of the block, substantially paralleling the lower bars 19. The piston rod 17 and the block or head 18, in the operation of the machine, are moved in a forward direction for pushing a compressed coiled cushion spring into a fabric pocket; and after the spring has been moved into a pocket, said rod and head are retracted.

At the rear side of the vertical standard 11 a vertical cylinder 21 having ends 22 is mounted, it likewise being adapted to alternately receive and exhaust fluid pressure at its ends. A piston rod 23 extends through the lower end 22 and has a head 24 thereon between which and the table 1, in operation, a coiled cushion spring 25 is located for compression on the downward movement of the head. The under side of the head 24 is provided with grooves for guiding the bars 20. The spring 25 is compressed as shown in Fig. 2 and when thus compressed is engaged by the forwardly moving head 18 on the rod 17 and forced to and over the table 2. The head 18 passes beyond the front end of the table 1 or to an extreme front position, as shown in Fig. 3.

The fabric pockets for receiving springs are preferably provided by folding a length of fabric longitudinally with upper and lower sides 26 and 27, the lower side at its free longitudinal edge extending beyond the similar edge of the upper side in a continuous, narrow section 28. Transverse seams 29 at the ends of the folded fabric and at suitably spaced distances apart in the length thereof provide a fabric structure which has pockets closed at one end, where the fabric is folded, and open at the other end where the projecting portion 28 of the lower side 27 is located. The length of fabric, with its consecutive pockets, is placed upon the chains 6 engaging with the pointed pins thereof (Fig. 1) and is moved in the direction of the length of the table 2. The free edge of the extended section 28 is connected with the innermost chain 6 and is moved underneath the bars 8. This bends the under side 27 of the fabric downwardly to conform to the inclined surface 7 as shown in Figs. 1, 2 and 3 and partially opens the pockets at their open ends.

Near the upper edges of the vertical standards 10, a horizontal rod 30 is mounted for rocking movement, extending therebetween. At the middle portion of the rod 30 an arm 31 is secured which extends downwardly and to the rear (Fig. 2) and carries a roller 32 at its lower end. Two arms 33 are secured to the rod or

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shaft 30, one near each of the standards 10, extending downwardly. Each toward its lower end has a short generally vertical slot therein. A rod 34 extends through the slots in the arms 33 and through horizontal guide slots 35 in the standards 10. A member 36 which is known as a duck-bill, of sheet metal, at its upper end is provided with two upwardly extending ears 37 one at each side edge through which the rod 34 passes. The member 36 extends downwardly and forwardly and at its free lower edge is slightly curved upwardly. It reaches substantially to the inclined zone 7 of the table 2. The duck-bill member 36 has an arm 38 (Figs. 2 and 3) extending rearwardly therefrom. The arm 38 is connected with the rear part of the duck-bill member substantially midway between its side edges. A torsion spring 39 around the rod 34 has one end bearing against the rod 30 and the other against the upper side of the plate 36, the tendency of which is to swing the plate about the rod 34 in a clockwise direction. Coiled tension springs 40 connected with the rod 34 normally tend to move the rod rearwardly in slots 35.

At the front side of the vertical standard 11 a second vertical cylinder 41, with upper and lower ends 42, is mounted which, like the cylinders 15 and 21, is adapted to have a fluid under pressure alternately passed into and exhausted from the opposite ends of the cylinder for reciprocating a piston therein from which a piston rod 43 extends downwardly. At the lower end of the piston rod a cam block 44 is secured which has its lower outer corner cut away to provide an edge 45 at an incline to the vertical. The edge 45 provides a cam which, on the downward movement of the piston rod 43, first rides against the roller 32 and swings the arms 30 and 31 in a counter-clockwise direction thus bodily moving the rod 34 and the duck-bill plate 36 from an inner to an outer or forward position. When this occurs the lower free edge of the duck-bill member 36 enters the space (Figs. 1 and 2) between the free edge of a pocket made by the upper side 26 of the fabric and that part of the lower side of the fabric which inclines downwardly to the rear in conformity with the inclined surface 7. Further downward movement of the rod 43 carries the cam edge 45 beyond the roller 32 and the lower end of the block 44 engages the arm 38 and turns the duck-bill member 36 upwardly, thus lifting the upper side of an open pocket and bringing the fabric 26 of said pocket against the fixed plate 12 between which and the outer edge of the duck-bill plate 36 the fabric is gripped. This occurs substantially at the time that the rod 17 begins to move in a forward direction and after a spring 25 has been compressed to the position shown in Fig. 2. Thus when the head 18 comes to the rear side of the compressed spring and moves it over the table 1 beyond its forward end, the pocket is held open to receive the spring and the head engaging therewith. The spring is held compressed at its rear portion by the forward projections of bars 19 and 20.

The spring forced into the pocket is frictionally engaged by the upper and lower sides of said pocket so that on retraction of the rod 17 and head 18, disengagement of the projecting bars 19 and 20 from the spring occurs and the pocket is spring loaded.

The structure described has proven especially satisfactory and useful. It is in continuous, practical operation. The springs 25 are inserted in

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the pockets rapidly and there is no fouling of the lifting duck-bill member 36 with the under fabric, no requirement to stop the machine for such reason and the product obtained is without defect. After a length of said fabric containing a number of pockets has the pockets loaded with springs, the projecting edge portion 28 is connected with the adjacent edge portion of the upper side 26.

The invention is defined in the appended claims and is to be considered comprehensive of all forms of structure coming within their scope.

I claim:

1. In a machine as described, a horizontal table against the upper side of which an elongated coiled compression spring is adapted to be located, means for compressing said spring, means movable over said table to engage with the compressed spring, including means extending over and additional means extending under the compressed spring to hold it compressed, whereby the compressed spring is moved over the table beyond an end thereof, a second table located adjacent said end of the first table, said second table having a downwardly and inwardly inclined inner top section, said second table being adapted to have an elongated fabric pocket having closed longitudinal edges and an open inner end with upper and lower fabric sides located on the table, the lower side at the open end of the pocket extending toward the first table a distance beyond the edge of the upper side of the pocket at its open end, said edge portion of the lower side of the pocket at its open end bearing against the downwardly and inwardly inclined top section of the second table, means mounted above the first table for horizontal movement and for pivotal movement about a horizontal axis, said means extending downwardly to and bearing against the inclined section of the second table and against the projecting edge portion of the lower side of the pocket, and upon horizontal movement passing underneath the edge portion of the upper side of the pocket and upon upward turning movement lift said upper side of the pocket at its open end for the compressed spring to pass into said pocket, and means for moving said bearing means horizontally for passage underneath the upper side of the pocket and for thereafter turning said means about its horizontal axis of movement to separate the sides of said pocket at the open end thereof.

2. A structure as defined in claim 1, said means movable over the lower side of the pocket and underneath the upper side of said pocket at its open end comprising, a downwardly and outwardly inclined plate, the lower outer edge portion of which bears against the extended edge portion of the lower side of the pocket over the inclined portion of the table and moves thereover underneath the free edge portion of the upper side of the pocket at its open end, and an abutment located horizontally over and spaced from the second table to which the upper side of the pocket is lifted and against which it is gripped by said plate.

3. In a machine of the class described, a hori-

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zontal table, means for compressing a vertically disposed coiled spring located at its lower end on said table, means movable over the table to engage the compressed spring at one side for moving said spring away from its place of compression, means carried by said spring engageable means for embracing the compressed spring at its upper and lower sides to hold it compressed, a second table located at one end of the first table over which second table the spring is adapted to be moved, said second table being adapted to receive an elongated fabric pocket open at its inner end lying thereon with the open end toward said end of the first table, horizontally movable means mounted above said end of the first table and extending to and engaging the underside of said pocket to pass thereover and move underneath the upper side of the pocket at its open end, means for mounting said horizontally moving means for upward turning movement about a horizontal axis, and means for turning said last mentioned means outwardly about a horizontal axis after it is engaged against the underside of the upper side of the pocket to thereby open the pocket for reception of said compressed spring.

4. In a machine of the class described, a pocket opening mechanism comprising, a horizontal base support, spaced vertical standards extending upwardly therefrom each having a horizontal slot therein, a rod extending through the slot, a plate pivotally mounted on said rod extending downwardly and outwardly at an incline to the vertical, spring means between said rod and plate normally turning the plate in a downward direction, and means connected with said rod for moving it in a horizontal direction outwardly in said slots and thereafter turning the plate upwardly against said spring means.

5. A construction as defined in claim 4, and yielding means connected to said rod for normally drawing said rod and plate horizontally in an inward direction.

6. A structure as defined in claim 4, and a horizontally disposed abutment plate extending outwardly beyond said standards and located over said first mentioned plate against the underside of which a free edge portion of said first mentioned plate is brought to bear on upward pivotal movement thereof.

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