Oct. 25, 1927. 1,646,885

S. SUEKOFF

SPRING CUSHION LOADING APPARATUS

Filed Oct. 29, 1925 3 Sheets-Sheet 1

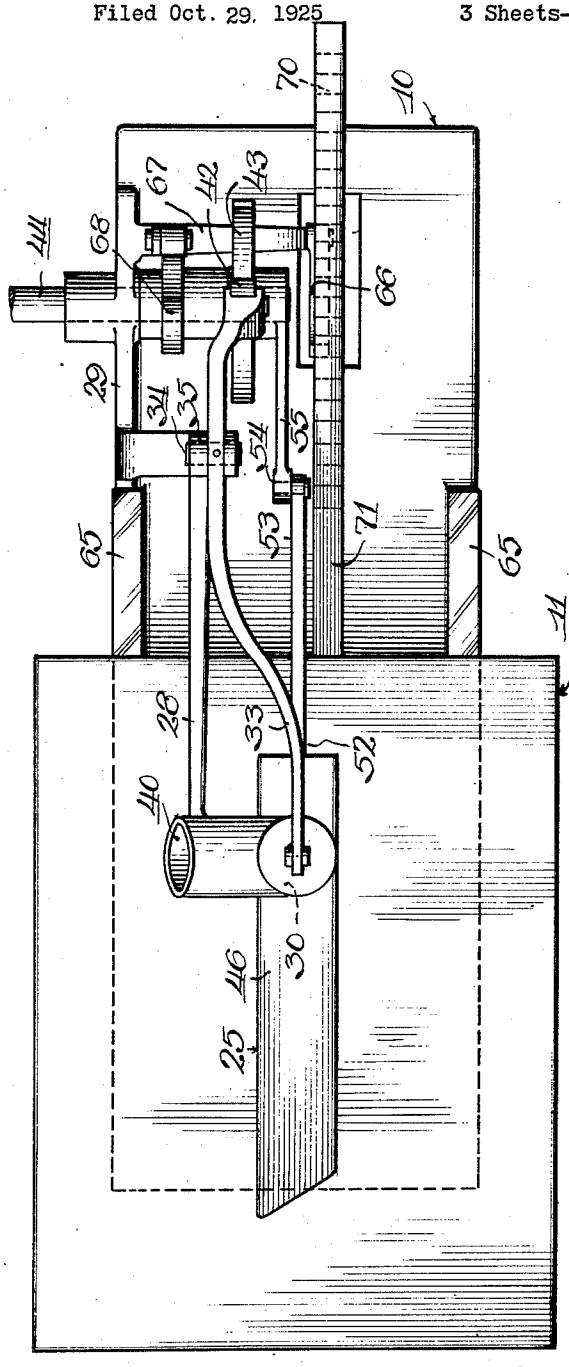


Fig. 1

Witness:
Chas. R. Kousch.

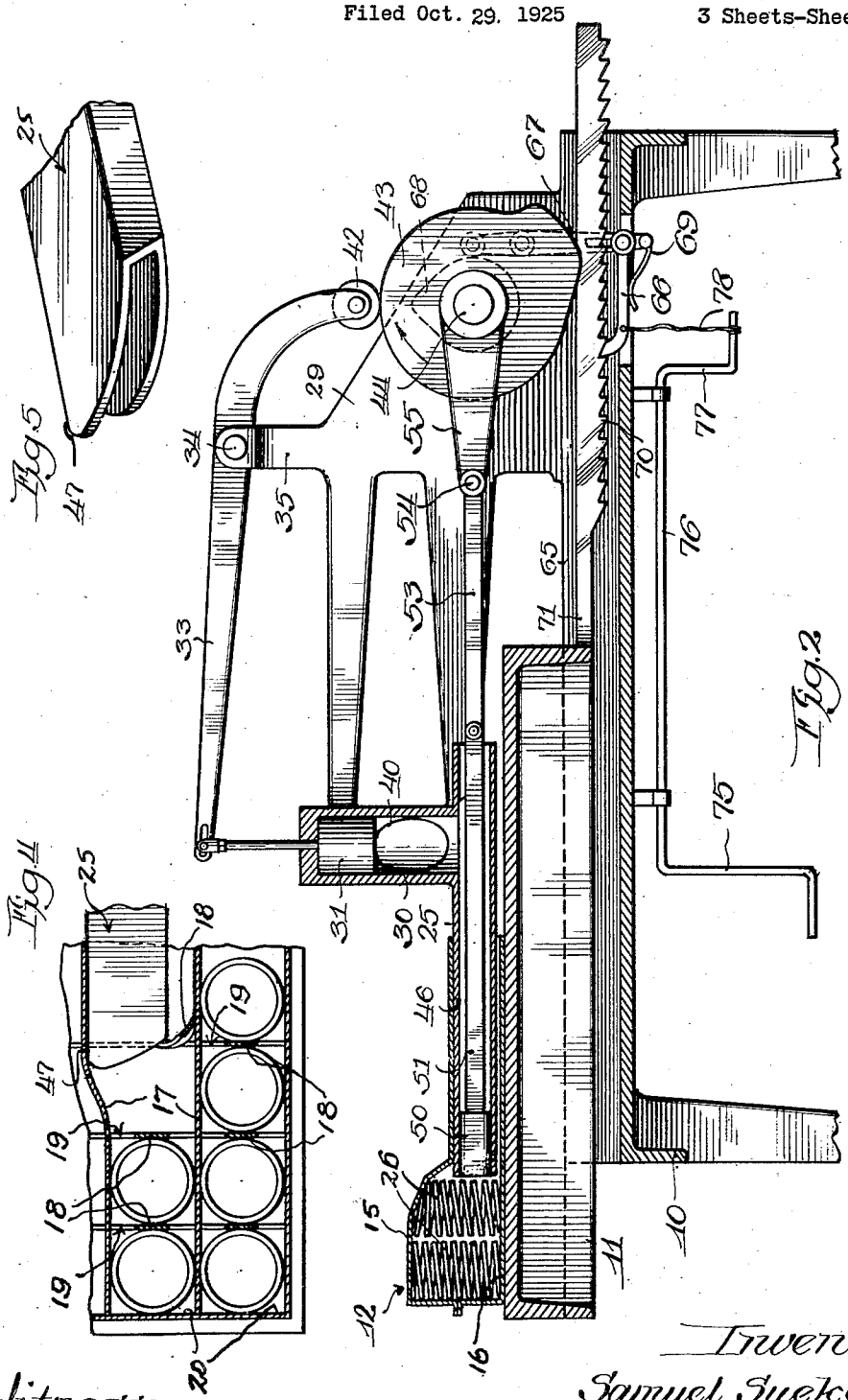
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Witness:
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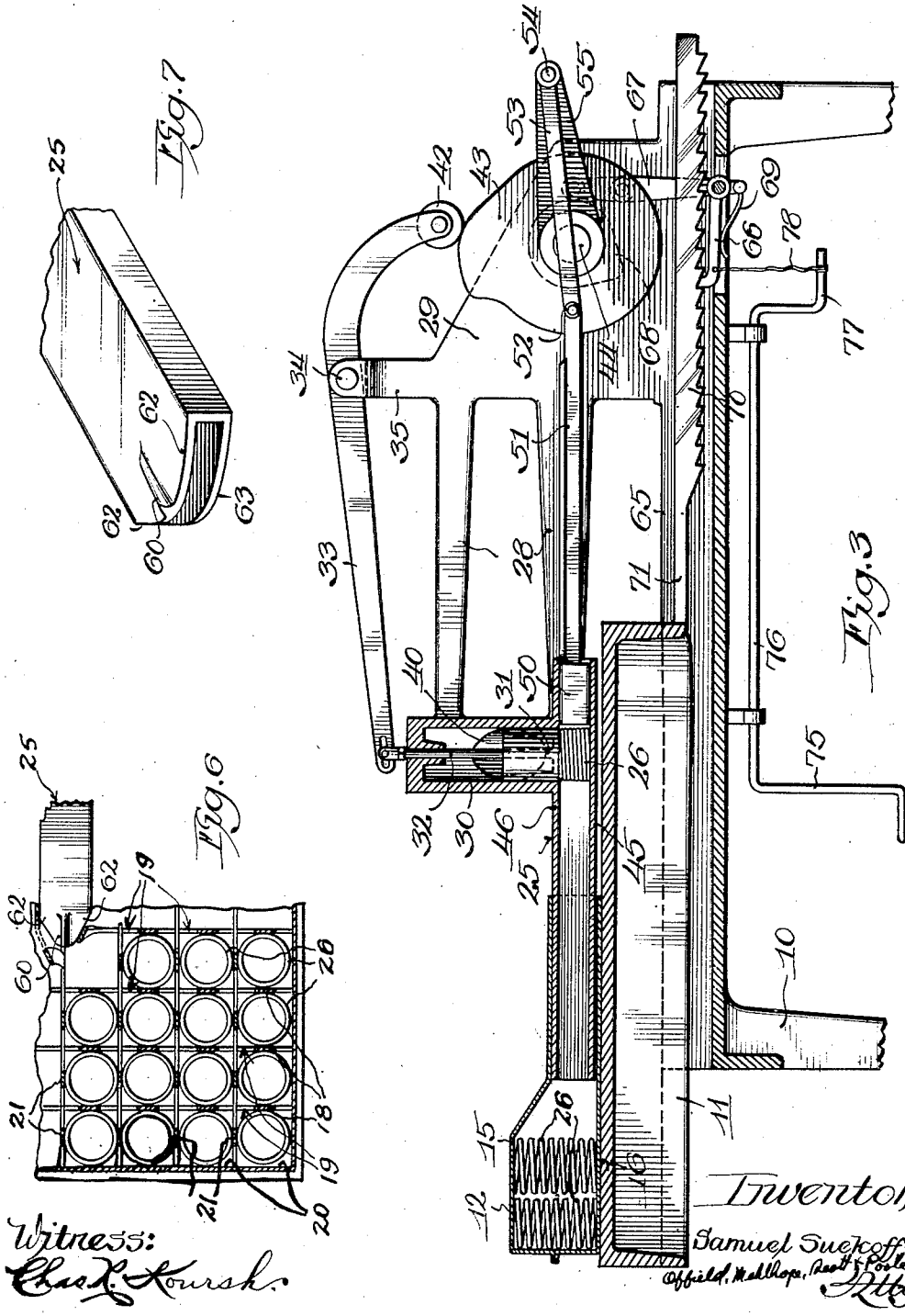
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SPRING CUSHION LOADING APPARATUS

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UNITED STATES PATENT OFFICE.

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SPRING-CUSHION-LOADING APPARATUS.

Application filed October 29, 1925. Serial No. 65,648.

This invention relates to improvements in loading devices for spring cushions, and has for its principal object to provide a new and improved method and apparatus of the character described, whereby coil springs may be quickly deposited in cushion covers of a standard form provided with separate spring cells, by which method and apparatus the hand labor heretofore required in this loading operation is eliminated.

Spring cushions have heretofore been constructed in various forms, but having as a common feature a plurality of alined individual cells, each of which contain a single helical spring. As commonly practiced, the fabric structures have first been made up, including suitable flexible partition members forming cells, and means were provided for inserting or loading the springs in the separate cells after the cushion is substantially complete, this loading operation being usually carried out by means of a loading tool manipulated by hand and adapted to carry one or more of the springs in compressed condition, and inserted through one end of a row of cells. As will be understood by those familiar with the art, it has been the usual practice to hold the collapsed springs in the loading tool with their axes perpendicular to the cushion, in which position they were inserted through openings formed along one edge of each row of cells, until each spring reached its desired cell. The loading tool was then turned by hand to a horizontal position and the spring released in its cell so as to assume its final vertical position in the cell. This manual loading operation, however, is necessarily laborious and slow, and is also objectionable by reason of frequent displacement and slipping of the springs in the loading tool, all of which make hand loading a rather expensive operation. In carrying out my invention I provide a mechanical method of loading standard forms of cushion covers, whereby most of the manual labor is eliminated and the work carried out with greater precision and dispatch than has heretofore been possible.

The invention may be best understood by reference to the accompanying drawings which illustrate one form of apparatus constructed and operative in accordance with my invention. In the drawings

Figure 1 is a top plan view of the loading machine;

Figure 2 is a side view in section of the machine shown in Figure 1 and showing a cushion in the process of being loaded;

Figure 3 is a view similar to Figure 2, but showing the machine in another position;

Figure 4 is a fragmentary view in horizontal section of one form of spring cushion capable of being loaded by my improved method and showing the application of the loading mechanism thereto;

Figure 5 is an enlarged view of one end of the loading tube forming a part of my apparatus, especially adapted for use in connection with the type of cushion shown in Figure 4;

Figure 6 is a view similar to Figure 4, but showing another type of cushion construction to which my improved mechanism may be applied; and

Figure 7 is a view of a modified form of loading tube especially adapted for use with the type of cushion construction shown in Figure 6.

Referring now to the form of apparatus illustrated herein, I provide a base 10, having a carriage 11 movable thereon, upon which is placed the work consisting of a cushion cover 12. The cushion cover may be of several well-known forms made up of fabric such as burlap and having suitable partition members forming the individual cells 20, 20, for receiving helical springs therein. In one form of cushion cover shown in Figure 4 to illustrate the use and operation of my improved apparatus, said cushion cover comprises a top cover 15 and bottom cover 16, having a series of continuous fabric strips or walls 17, 17 disposed in parallel relation to each other in one direction, and a series of tabs 18, 18, arranged in alinement in the opposite direction, but spaced from the adjacent continuous strips or walls so as to afford suitable openings, herein indicated at 19, 19, for insertion of the loading tool with its springs in the usual manner after the cushion cover with its partition members 17 and 18 are made up as a unit. Another form of cushion cover heretofore employed is shown in Figure 6, in which the separate cells for the springs are arranged in a similar manner to that shown in Figure 4, excepting that the continuous strips 17, 17 are

replaced by a series of separate partition strips 21, 21, similar to the strips 18, 18 disposed in the opposite direction. As will hereinafter appear, however, either form of cushion is capable of being loaded by inserting the individual springs along the openings 19, 19 formed along each row of cells.

My invention contemplates the provision of means for automatically depositing the springs in cushions of the general type above described, said springs being first compressed and delivered in proper spaced relation within the cushion. A means for accomplishing this comprises, broadly, a delivery tube 25 disposed in parallel relation above the work table 11. This tube is of the proper width to receive a single helical spring 26 therein and of a height to retain these springs in compressed condition, which is considerably less than the height they attain after they are deposited in the cushion. The tube is suitably supported on the frame 10 by arms 28, 28 projecting forwardly from an upright support 29 at the rear end of said frame. Adjacent the rear end of the tube I provide a vertically disposed passageway 30 cylindrical in shape and of substantially the same diameter as the springs 26. A compressor plunger 31 is reciprocally mounted in this passage and operated by a rod 32 connected to an actuating arm 33 pivoted at 34 to an upstanding support 35 on bracket 29. A delivery chute 40 communicates with the passage 30 at one side thereof, in the form shown this delivery chute being arranged at an angle thereto so as to permit each spring 26 to be fed by gravity from a suitable source, as for instance a spring coiling machine—such machines are well understood to those versed in the art and it is therefore omitted from the drawings. The arrangement is such, however, that the plunger 31 will permit one spring 26 to fall from the delivery chute 40 into the compressing chamber 30 every time the plunger is drawn to its uppermost position, as shown in Figure 2. Or, if desired, my improved form of loading machine may be operated in synchronism with a spring coiling machine so that the springs will be fed from the coiling machine in timed relation with the operation of the plunger 31. The actuating arm 33, connected with the plunger 31, is provided at its rearmost end with a contact member or roller 42, engaging a cam 43 on shaft 44, the latter shaft being rotated by suitable means which need not be shown. The ararngement is such that by each revolution of the cam 43 the plunger 31 moves from its uppermost position, as shown in Figure 2, to its lowermost position, as shown in Figure 3, to compress a spring 26 against the lower surface 45 of the tube 25, and as is also clearly shown in Figure 3 the stroke of the plunger 31 is such as to compress the top of said spring to a position substantially flush with the lower surface of the upper wall 46 of the tube 25.

Means are also provided, operating in synchronism with the plunger 31, for pushing the spring 26 forwardly through the tube 25 after it has been fully compressed. As herein shown, this means comprises a plunger 50 arranged for longitudinal movement within the tube 25 and having suitable operating means, herein consisting of a pitman 51, pivotally connected at 52 to a link 53 which is in turn pivoted at 54 to a crank arm 55 on operating shaft 44. The arrangement is such that the plunger 50 is retracted to the rear end of the tube 25 beyond the compressing chamber 30 before the plunger 31 is actuated to compress the spring 26 in said chamber. Upon further rotation of the cam 43 the arm 33 and plunger 31 are actuated to compress the spring as shown in Figure 3, and while being held under compression of the plunger 31, the other plunger 50 moves the spring forwardly in compressed condition through the tube and ejects the same within the cushion.

Means are also provided for moving the cushion intermittently in a direction longitudinally of the tube so as to automatically space the springs in their respective cells during the loading operation. Any suitable conveyor device operated in timed relation with the spring depositing means may be employed for this purpose. In the preferred form shown this means comprises a work table 11 slidably mounted on guide ways 65, 65 carried by the frame 10 and adapted to be actuated by means of a pawl 66 on rocking arm 67 engaging a cam 68 carried on the drive shaft 44. The pawl is provided with a spring 69 tending to force it into engagement with a rack 70 carried on arm 71 connected with the table 11. The movement of the cam 68 and rocker arm 67 is arranged so as to shift the table 11 outwardly a distance equal to that between adjacent cells 20, 20 in the cushion being loaded. Means are also provided for discontinuing the forward movement of the table when desired, as for instance while changing the position of the cushion for loading a new row of cells. In the form shown this means comprises a manually operated lever 75 connected by rod 76, crank arm 77 and connecting member 78 to move the pawl 66 out of engagement with the rack 70.

Manifestly the usual clutch means may also be provided in connection with the drive shaft 44 for discontinuing the operation of the loading apparatus when it is desired to shift the position of the cushion on the work table to load a new row of cells.

The use and operation of the apparatus above described is as follows: The cushion is placed on the table 11, and the end of the tube 25 is inserted in proper registering position in the cushion to load one row of cells 20, 20, therein. It will be understood that the tube 25 is of considerably less height than the height of the cushion after it is loaded and the springs have been permitted to expand therein. In applying the tube 25 to the work, as for example to the form of cushion shown in Figure 4, said tube is inserted endwise along one side of a row of cells 20, 20, to be filled, the tube passing through the alined openings 19, 19. In this, as well as other forms of ordinary cushion construction a tube of the general form and size herein disclosed may be readily inserted through these openings when the cushion is held in flattened condition, so that the partitions forming the sides of these openings are spread apart as the tube is inserted. I find it preferable, however, to shape the end of the tube in such a manner as to assist in the ready insertion thereof, depending somewhat upon the interior construction of the cushion. Thus in the form of cushion shown in Figure 4, the tube is preferably inserted along continuous side walls 17—17, and for this purpose the end of the tube is formed substantially as shown in Figure 5, with the front end of the tube slanting forwardly to form a leading side wall 47, which is engaged against the adjacent continuous partition or wall 17. Thus the leading edge 47 forms a point which may readily find its way into the openings 19, 19, spreading the continuous wall 17 in one direction, and the oppositely disposed partitions 18, 18, in the other direction, as clearly indicated in Figure 4, and the tube 25 is then inserted substantially the full width of the cushion in position to deposit a spring in the innermost cell 20. In practice, a cushion is manipulated by hand on the work table 11 so that it may be guided over the tube in the proper manner. It will be understood that the interior arrangement of the partitions is clearly discernible from the top of the cushion owing to the sewing lines used for connecting the partitions to the top cover. The cushion is in collapsed condition when it is initially drawn over the tube so that the point 47 may be readily visible as a guiding device for the proper disposition of the cushion by pressing the upper surface of the cushion downwardly so that the contour of the tube underlying the cover 15 may be readily seen.

Thus in the form shown in Figure 4, the lowermost row of cells is loaded first by inserting the end of the tube through the upper openings 19, 19 in said first row and then starting the loading apparatus so as to deposit the first spring in the innermost cell 20. This loading operation consists in a downward movement of the plunger 31 to compress a spring 26 and then a forward movement of the plunger 50 to move the compressed spring forwardly and out of the end of the tube where it is in position to expand in the innermost cell 20. The plunger 50 is then retracted and the compressor plunger 30 is raised so as to permit a second cycle of movement for compressing and ejecting a second spring. During this second cycle of movement the table 11 carrying the cushion thereon is moved outwardly with respect to the tube so that said tube is in position to deposit the second spring in the second cell. This operation is repeated until the first row of cells is loaded, whereupon the cushion is then moved sidewise on the table in position to insert the end of the tube 25 in the second row of cells. Under ordinary conditions it may be desirable to discontinue the operation of the loading device during the manipulation of the cushion as just described. The entire table may also be shifted inwardly toward the apparatus so that the tube will be forced into the cushion, this movement of the table being made possible by disconnecting the pawl 66 from rack 70 and moving the table the proper distance so as to position the tube for depositing the next spring in the innermost cell of the second row. The loading operation may then continue in the same manner as described in connection with the loading of the first row.

I find it desirable to load a cushion by starting at the row of cells along one edge thereof and then working away from the row first loaded, the tube being inserted in the side of each successive row of cells farthest removed from the adjacent row of cells which has been previously loaded.

It will be understood that after the cushion is completely loaded the sides, which have been left open for loading, are closed in the usual manner to form the completed article.

In the modified form of cushion shown in Figure 6 it will be observed that the partitions 21, 21, arranged in parallel relation to the direction of movement of the tube, are separated longitudinally of each other so that it may not be quite so easy to guide the ordinary form of tube through the openings 19, 19, since some of the separate partitions 21, 21, may be folded across the path of the tube and thus be caught over the advancing end thereof. Accordingly, when such form of cushion is used I provide a guiding device such as illustrated in Figure 7, in which an upstanding projection 60 is placed substantially centrally of the top 46 of the tube and with the front upper and lower margins 62 and 63 of the tube curving rearwardly therefrom. The projection 60 serves as a guide

which is readily visible from the top of the cushion while the latter is being drawn thereover and which may therefore be guided to follow closely the inside of the seam line along which the row of partitions 21, 21 are joined to the top cover 15. This arrangement insures the proper parting or spreading of the side partitions 21 in one direction and the other series of partitions 18 in the opposite direction, as clearly indicated in Figure 6. In other respects the loading operation is carried out in the same manner as already described in connection with the form of cushion shown in Figure 4.

It will be understood further that my apparatus may be applied to other forms of cushions for loading the same at various stages of the manufacture thereof, or for loading individual cells or compartments subsequently incorporated in a cushion structure. In all such structures the tube may be utilized for spotting a spring at any desired point within the structure, provided, of course, there is sufficient room for insertion of the tube. I do not, therefore, wish to be understood as limiting myself to the particular form of apparatus shown herein, or the application to the specific forms of cushions described and shown, but many variations in the form of apparatus and diversified uses thereof will present themselves to persons skilled in the art, without departing from the spirit and scope of my invention.

I claim as my invention:

1. In a spring cushion loading apparatus, a cushion holder, a tube extending over said holder and adapted to receive a coil spring at one end in compressed condition, means for moving said spring through said tube and ejecting the same in position to expand at the end of said tube, and means for moving said holder longitudinally of said tube.

2. In a spring cushion loading apparatus, a tube of substantially less height than the thickness of the cushion to be filled, said tube being adapted to receive a coil spring at one end in compressed condition, guide means on the end of said tube adapted to cooperate in spreading the aligned partitions in the cushion for affording entrance of said tube, and means for moving said spring through said tube and ejecting the same in position to expand at the other end of said tube.

3. In a spring cushion loading apparatus, a tube of substantially less height than the thickness of the cushion to be filled, said tube being adapted to receive a coil spring at one end in compressed condition, guide means on the end of said tube visible by flexing of the cushion, said guide means being adapted to cooperate in spreading the aligned partitions in the cushion for affording entrance of said tube, and means for moving said spring through said tube and ejecting the same in position to expand at the end of said tube.

4. In a spring cushion loading apparatus, a tube of substantially less height than the thickness of the cushion to be filled, said tube being adapted to receive a coil spring at one end in compressed condition, guide means on the end of said tube projecting upwardly therefrom to be visible by flexing of the cushion, said guide means being adapted to cooperate in spreading the aligned partitions in the cushion for affording entrance of said tube, and means for moving said spring through said tube and ejecting the same in position to expand at the end of said tube.

5. In a spring cushion loading device, a tube having means at one end for spreading the vertical partitions of cushion cells to permit ingress of said tube with its greatest width perpendicular to the normal position of said partitions, and means for feeding coil springs in compressed form through said tube and ejecting the same in position to expand at the end of said tube in position parallel with said vertical partitions.

6. In a spring cushion loading device, a tube having means at one end for spreading the vertical partitions of cushion cells to permit ingress of said tube with its greatest width perpendicular to the normal position of said partitions, means for compressing coil springs in said tube with their axes parallel with said vertical partitions, and means for feeding said springs in compressed form through said tube and ejecting the same from one end thereof in position to expand in said cushion.

7. In a spring cushion loading apparatus, a cushion holder, a tube extending over said holder and adapted to receive a coil spring at one end in compressed condition, means for moving said spring through said tube and ejecting the same in position to expand at the end of said tube, and means for moving said cushion holder relative to said tube in timed relation with said spring ejecting means whereby successively ejected springs will be spaced from each other in said cushion.

8. In a spring cushion loading apparatus, a cushion holder adapted to support a cushion flatwise thereon, a tube extending flatwise over said holder and adapted to receive a coil spring at one end in compressed condition, means for moving each of a series of such springs through said tube and ejecting it in position to expand at the end of said tube, and means for moving said holder and tube relative to each other so that the end of said tube registers with horizontally spaced portions of said holder.

9. In a spring loading apparatus, a tube, means for compressing helical springs to be maintained in said tube in compressed condition with their axes arranged transversely

of the axis of said tube, means operable in timed relation with said compression means for forcing said springs in compressed condition through said tube and ejecting them from one end thereof, and work-carrying means operable in timed relation with said compression and ejecting means for moving a cushion cover so that springs will be deposited therein in spaced relation from each other.

Signed at Chicago this 21st day of October 1925.

SAMUEL SUEKOFF.