May 31, 1932. B. R. SCHNEIDER ET AL 1,861,429

MACHINE FOR INCLOSING METALLIC COILED SPRINGS

Filed May 17, 1929 5 Sheets-Sheet 1

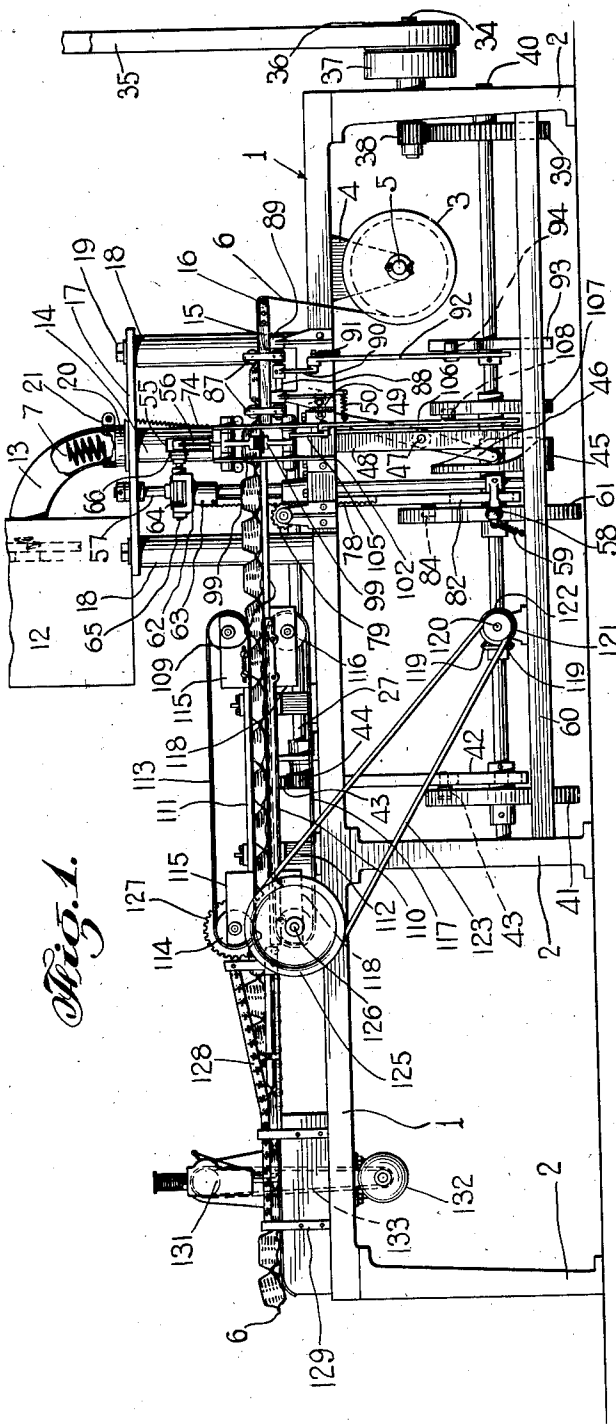


Fig. 1.

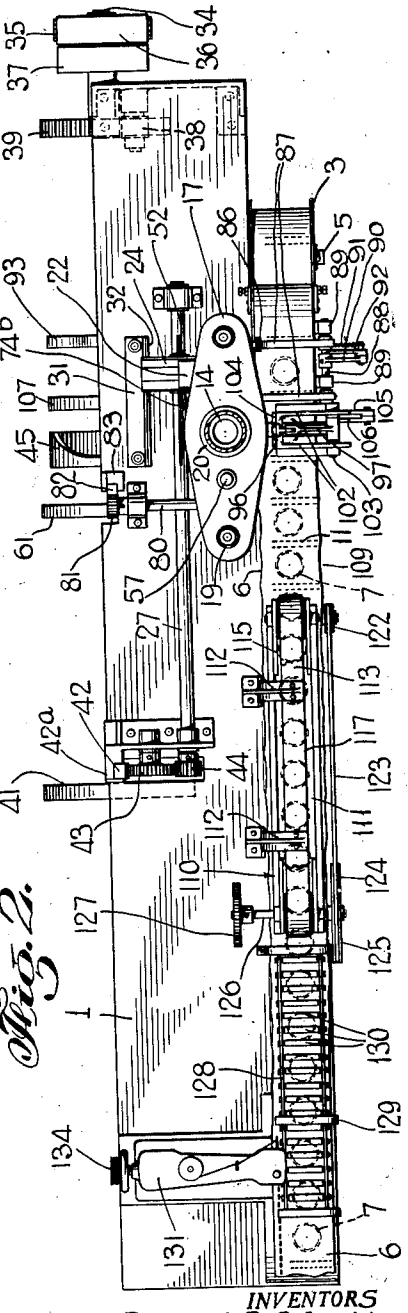


Fig. 2.

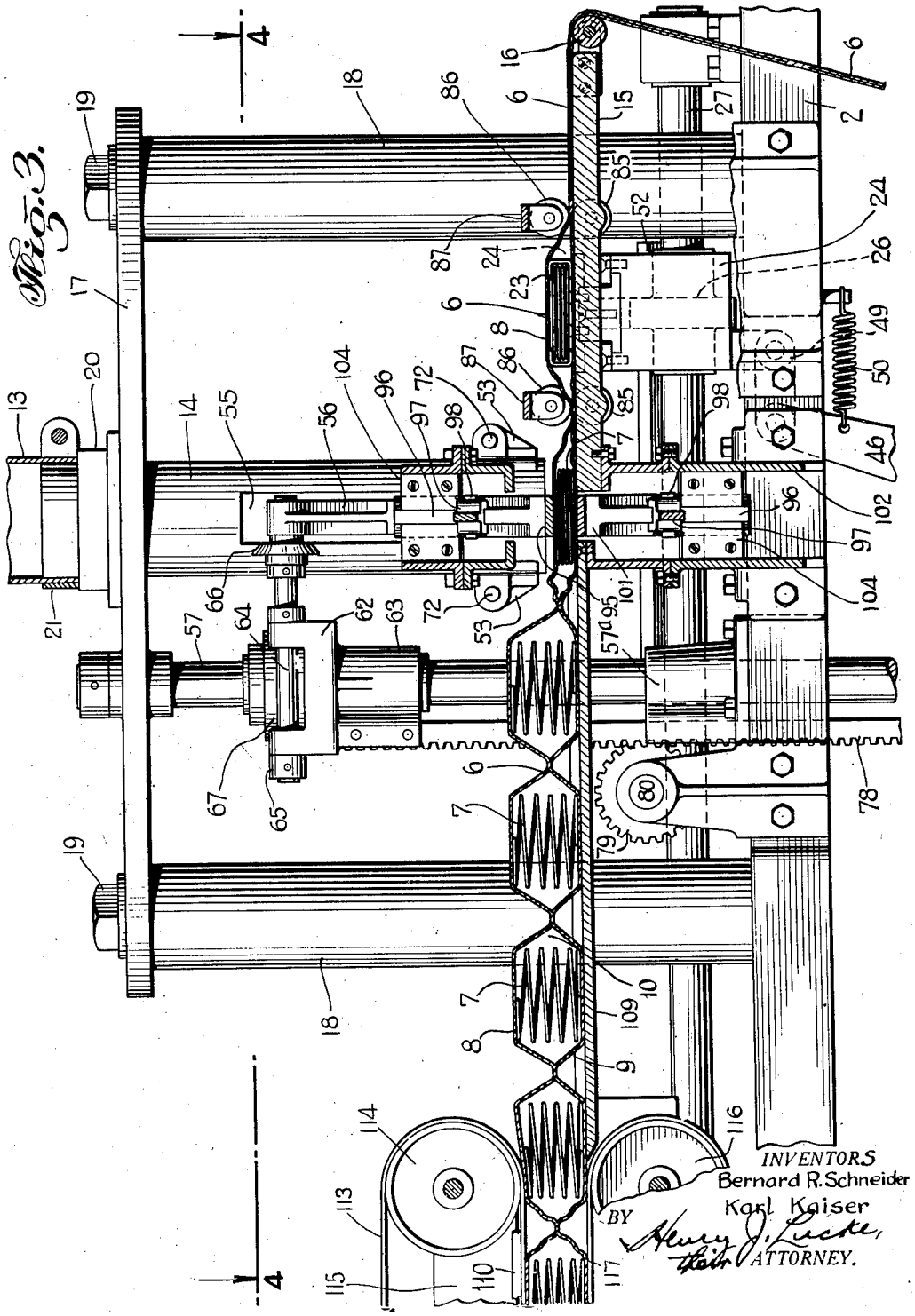
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MACHINE FOR INCLOSING METALLIC COILED SPRINGS

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Fig. 3.



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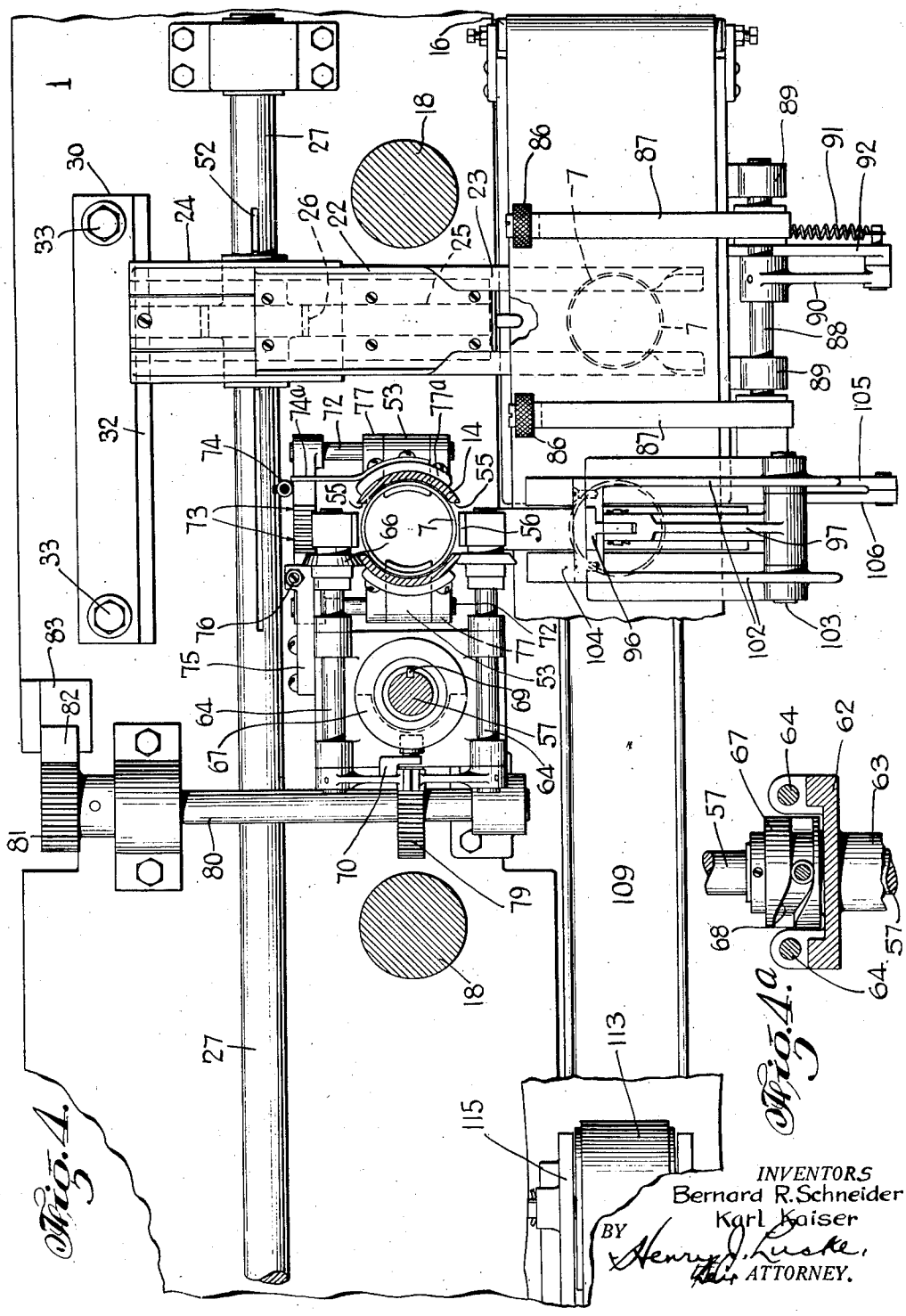


Fig. 4.

Fig. 4a.

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MACHINE FOR INCLOSING METALLIC COILED SPRINGS

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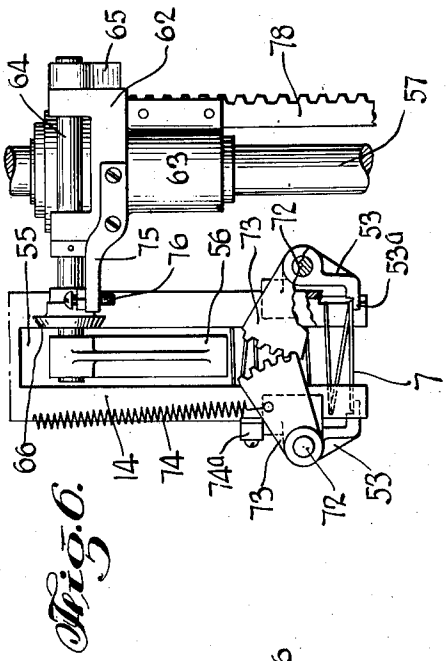


Fig. 6.

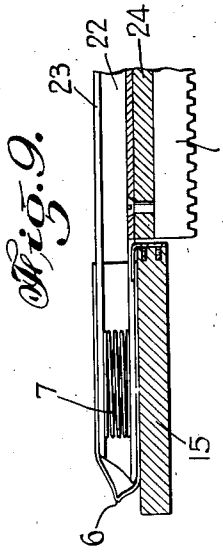


Fig. 9.

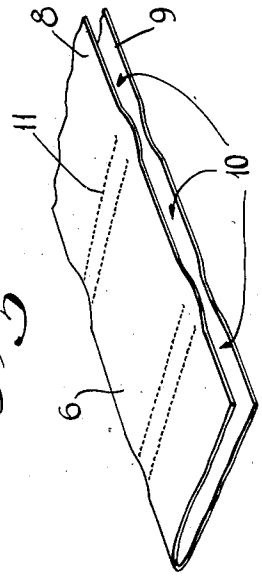


Fig. 10.

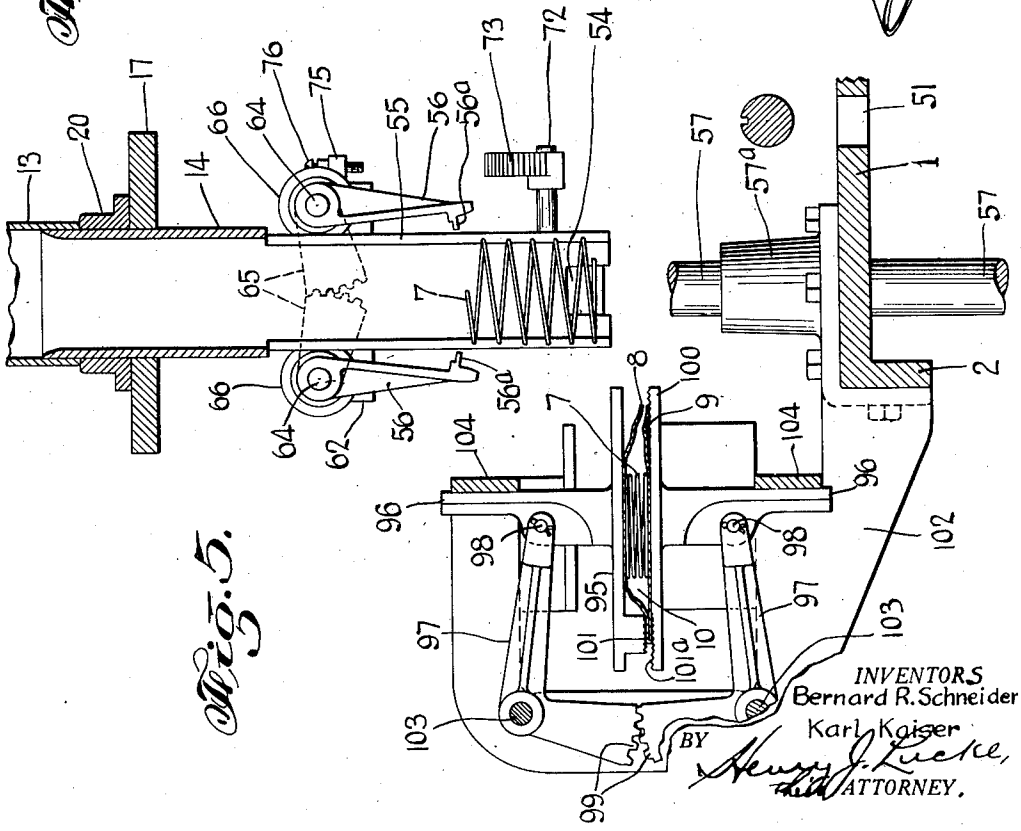


Fig. 5.

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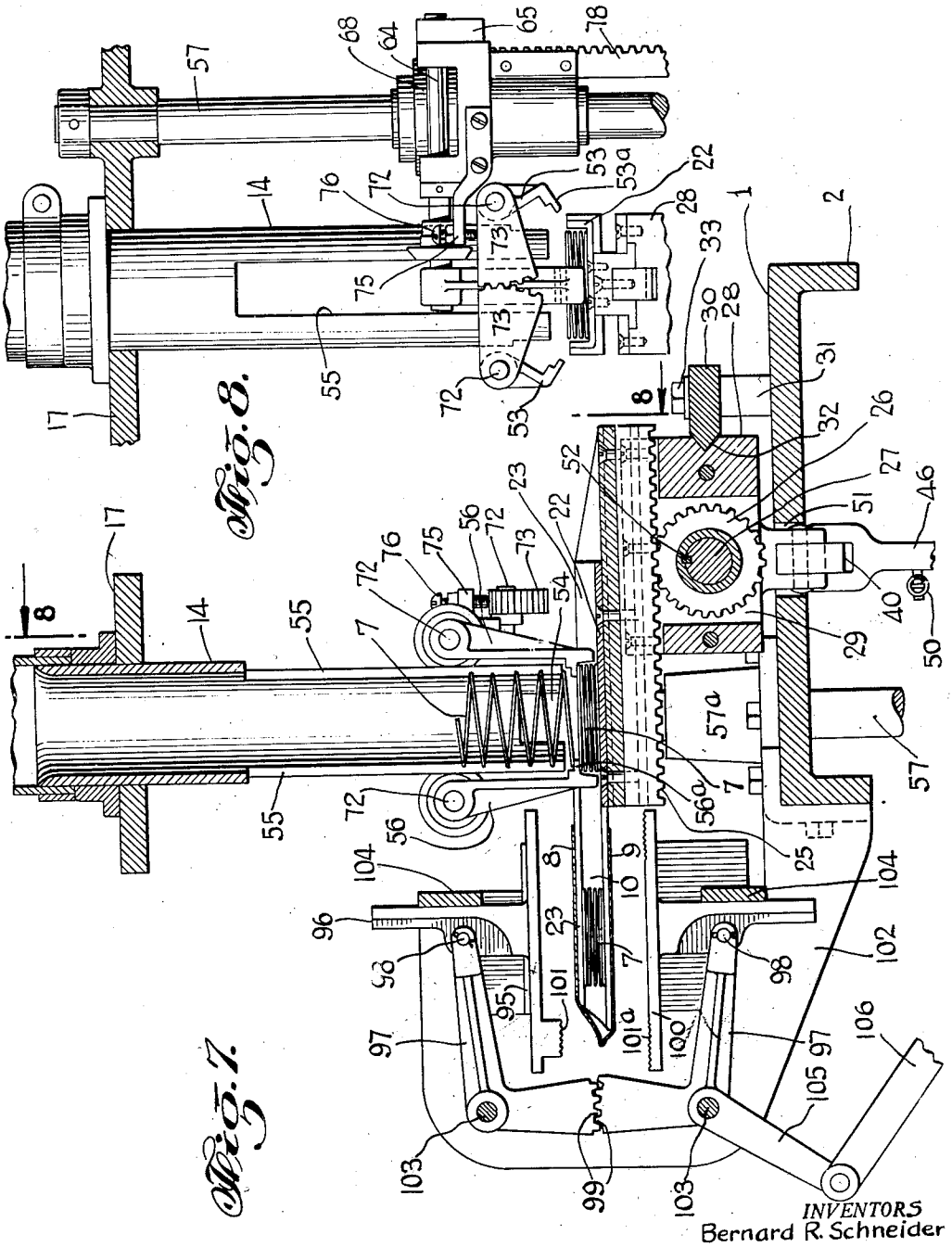


Fig. 8.

Fig. 7.

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1,861,429

UNITED STATES PATENT OFFICE

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MACHINE FOR INCLOSING METALLIC COILED SPRINGS

Application filed May 17, 1929. Serial No. 363,869.

This invention relates to machines for inclosing coiled metallic springs; and particularly to a machine for securing such springs in a suitable covering to facilitate the assembly and the installing in the manufacture of mattressing and the like.

An object of the invention is to provide a machine for inserting and enfolding helical springs in a covering having the form of a strip, bearing pockets arranged side by side along its length. The pockets are preferably wholly closed, whereby the springs are completely encased by the strip.

Another object of the invention is to provide a covering or envelope for metallic coiled springs that is preferably a strip of cloth or other fibrous material, doubled along its length to give two plies or layers, which are secured together at regular intervals to form the pockets into which the springs are inclosed, as is more fully set forth and claimed in the co-pending application of one of us, Bernard R. Schneider, Serial No. 380,688, filed July 24th, 1929, and entitled Strip container for coiled springs, now U. S. Patent #1,777,020, granted September 30th, 1930.

A further object of the invention is to provide a machine of the type indicated with a carrier mounted and operated to receive the springs in succession and thrust them into the pockets of said strip; the carrier being also arranged so that a part of it separates the two layers of the enveloping strip adjacent the mouths of the pockets, thus keeping the mouths of the pockets open and ready to admit the springs when the latter are in proper position.

A further object of the invention is to provide a holding device for preventing displacement of the strip at the time when the springs are inserted into the pockets.

A further object of the invention is to provide a machine of the class described having a gripping and retaining device which engages the strip just before the carrier, after having inserted a spring into the strip, is withdrawn; thus retaining each spring in the particular pocket where it has been deposited by the carrier; and allowing the carrier to make its return stroke empty, to take up the next spring.

A further and particular object of the invention is to provide for the advancement of a covering strip pre-formed with partitions, extending transversely of the strip, the coil carrying element co-operating with the partitions to advance the same from stage to stage upon successive insertion of the individual coils within the covering strip.

A further object is to provide the machine with suitable parts by which each spring is effectively held and controlled as it is transferred to the carrier when the latter is about to commence its working stroke.

A further object of the invention is to provide means for conveying the strip through the machine; and means for finally closing the pockets so that the springs therein are wholly enveloped.

Further features and objects of the invention will be more fully understood from the following detail description and the accompanying drawings, in which

Fig. 1 is a side view of a machine embodying the invention;

Fig. 2 is a top plan thereof;

Fig. 3 is a detail side elevation, on an enlarged scale;

Fig. 4 is a horizontal sectional view on line 4—4 of Fig. 3.

Fig. 4*a* is a detail vertical elevation;

Fig. 5 is a transverse vertical section showing the spring receiving chute, and a device for gripping the cloth covering to retain a spring as the carrier is withdrawn;

Fig. 6 shows the means attached to the spring receiving chute for holding and compressing the springs succesively therein, as viewed from the right of Fig. 6 and the rear of Fig. 1;

Fig. 7 is a view similar to Fig. 5 illustrating the carrier at the stage of inserting a spring into the covering;

Fig. 8 is a detail view showing the spring receiving chute and its stops, the latter in release position.

Fig. 9 shows in vertical section a portion of the covering strip, with a spring enclosed therein;

Fig. 10 is a perspective view of a part of said strip, before a spring has been inserted.

In the drawings the same numerals identify the same parts throughout.

The numeral 1 indicates the top of the frame of the machine, and 2 the legs thereof. At 3 is shown a reel consisting of two disks fixed to a shaft 5 loosely mounted in the bearings 4 to afford free rotation of the reel as required for paying out the covering strip 6, wound thereon.

Before being wound on the reel 3, the strip 6 which may be of stout cloth or other suitable material, is doubled along its length, as illustrated in Figs. 9 and 10, to make two plies or layers 8 and 9. These layers, the upper 8 and the lower 9, are not attached along their free edges, but in the longitudinal folding of the strip the opposite edges of the latter are brought into proximity. Pockets are formed side by side between the upper layers 8 and the lower layer 9 by lines of stitches 11, extending transversely to the length of the doubled strip. The lines of stitchings 11 do not extend to the free edges to afford an unrestricted path from one pocket to the next, for the purpose of inserting the springs successively within the pockets, as will appear more fully hereinafter.

Suitable means or a separate machine is provided for shaping the springs and for delivery to the top as indicated at 12. The fashioned spring is delivered by the curved conduit 13 to the vertical chute 14. This chute terminates just above a shelf 15 over the top 1 of the framework of the machine.

The strip 6 runs from the reel 3 over a guide roller 16 to the upper surface of the shelf. The chute 14 is just a little to the rear of the shelf 15, and the latter projects at the front of the top 1. The chute is supported by an elevated plate 17 held up by standards 18 on the top 1, and secured to the standards by suitable fastening devices 19. The upper end of the chute 14 passes through a bearing 20, see Fig. 3, in the plate 17, and telescopes within the lower end of the elbow 13. A clamp 21 encircles this end and the elbow may be split to enable the clamp when it is tightened to secure the parts together. To avoid a shoulder at the upper end of the chute 14 this end may be internally beveled or counterbored inside the conduit 13.

Coming from this conduit the springs drop down the chute 14, are temporarily arrested and compressed to shorten them and then discharged upon a carrier 22, see Figs. 2, 4 and 7. This carrier is channel-shaped for the greater part of its length, having side flanges 23 the upper edges of which are bent over inward along the forward half of these flanges; the body of the carrier is a plate or block 24. Upon depositing a compressed spring between the upper inwardly bent faces of the opposite flanges 23 the spring is held by the carrier, to be moved and to be inserted into one of the pockets 10, see Fig. 4. The block 24 carrying the flanges 23 at its upper face, has a rack 25 at its bottom, to be engaged by a pinion 26, keyed to a shaft 27 in the axially extending key-slot 52, see Figs. 4 and 7. The shaft 27 extends along the top 1, parallel to the path of the strip 6 and while the gear 26 is rotated by this shaft, it can also slide along same. This method of mounting the carrier enables it to move parallel to the strip and also transversely thereof. It receives a spring, moves parallel to the strip toward the roller 16, then towards the strip to insert the spring, then feeds the strip until it comes into line with the chute 14. It is then withdrawn leaving the spring in the strip and is returned to its above stated first position to receive another spring from the chute. The carrier thus moves in a continuous path along the four sides of a square. An important feature of its movement is that its front end is never entirely pulled out from between the open edges of the layers 8 and 9. This feature applies particularly in the illustrated embodiment of the invention on the return movement of the coil carrier, on which return movement the coil carrier is brought into adjacent relationship with the succeeding coil to be inserted, such succeeding coil being held in compressed status by suitable means co-operating with the chute 14, as appears more fully hereinafter. Hence it can always insert the spring without catching at the mouth of any of the pockets 10, or receiving any additional movement or additional means for opening any pocket when a spring is to be inserted.

To enable the gear 26 to move the carrier parallel with the strip 6, we secure to the bottom of the plate 24, below the rack 25 a block 28, with a recess 29 for the gear 26. At its rear end the block engages a guide 30 mounted on supports 31 affixed to the top 1 and having a beveled edge which is slidably received in a groove 32 in the rear of the block 28. Fastening devices 33 hold the guide in place on the posts 31. The guide 30 prevents tilting of the carrier about the shaft 26 as an axis.

To operate the various parts of the machine, see Figs. 1 and 2, a shaft 34 is mounted at one end of the framework below the top 1. This shaft is turned by a belt 35 engaging a pulley 36 on the shaft; and if desired, the shaft may also carry an idler pulley 37. The shaft 34 also carries a drive gear 38, engaging a gear 39 on a shaft 40, running lengthwise of the machine at the back thereof below the top 1. On the shaft 40, at the end remote from the gear 39, is a cam 41, for reciprocating a vertical rack 42, the cam having the form of a disk with an endless groove, not shown in its face, to receive a projection indicated at 43 on the rack 42, the groove

having the necessary shape to give the desired path of operation. The rack passes up through an opening in the top 1, is engaged near its upper end by a guide 42*a* on the top, and meshes with a gear 43, journalled above the top 1 and meshing with a gear 44 on the shaft 27. Hence continuous rotation of the shaft 40 will produce reverse rotation or oscillation of the shaft 27 and gear 26 upon axial reciprocation on the shaft 27 in the key-slot 52 effects reciprocation of the carrier 22 to move into and out of the pockets 10 and the advancement of the covering strip in the machine. The movements of the carrier parallel to the strip 6 are produced by a cam 45 on the shaft 40, rocking a lever 46 pivoted at 47 on a part 48 at the front of the framework of the machine. This lever is attached by a link 49 to the block 28, and a spring 50, see Fig. 3, joined to the lever and the top 1 acts to keep the lower end of the lever in contact with the cam 45. The top 1 is recessed at 51, see Fig. 7, to enable the link 49 and carrier to be pinned together. Rotation of the shaft 40 thus gives the carrier the movement above described in four different directions, from the chute 14 as a starting point, and back again.

At the lower end of the chute 14 we mount one or more pivoted stops 53 having angular free ends 53*a* extending toward one another, see Figs. 7 and 8, to arrest each spring as it drops into the tube from the elbow 13, see Figs. 3 to 6. The chute is recessed at 54 adjacent each stop to allow the stop to project into it. Between the notches or recesses 54 the chute has slots 55 to afford entry of the ends of compressor arms or members 56. These arms are moved up and down by a vertical shaft 57, see Figs. 1 and 3, which can oscillate so that the actuation of this shaft can cause the arms 56 to be swung so that their lower ends pass into the chute through the slots 55. The shaft 57 has a bearing 57*a* in the top 1, and may be engaged in another bearing in the part 17 above the top, with fixed collars on the shaft above and below the plate 17 to prevent longitudinal movement of shaft 57. At its lower end it carries an arm 58, attached by a spring 59 to a crossbar 60 on two of the front legs 2, see Fig. 1. The spring draws the arm 58 against the periphery of a cam 61 on the shaft 40. The cam 61 carries a peripheral projection to swing the arm 58 out against the force of the spring and oscillate the shaft 57 about its axis.

On the shaft 57 above the top 1 is a head 62, having a neck or bearing 63. This head is loose on the shaft 57, and has bearings at the sides for spindles 64, on one end of which the arms 56 are fixed, see Figs. 1, 3, 4*a*, 5 and 6. The spindles 64 also carry gear segments 65 to unite them at the other end, so that these spindles must rock in unison, and adjacent the arms 56 the spindles carry conical rollers 66 to make contact with the outside of the chute and prevent rotation of the head 62. Just above the head 62 the shaft 57 carries a cam 67 with a groove 68, this cam being keyed to the shaft and slidable thereon as shown at 69. One of the gear segments 65 has an arm 70 with a projection 71 engaging the cam groove 68.

We show the stops 53 affixed to spindles 72, at right angles to the spindles 64, and these spindles are united at one end by meshing gear segments 73, see Figs. 6 and 8. A spring 74 is affixed to one of these segments and to a projection 74*b* on the outer face of the plate 17, above the stops 53, and normally tensions one of the segments 73 upwardly against the stop 74*a*, to normally position the ends 53*a* of the stops in the recesses 54, as shown in Fig. 6. On the side of the head 62 is an arm 75 with an adjustable screw 76, in line with one of the segments 73. The bearings for the spindles 72 on the chute 14 are indicated at 77 (Fig. 4). The downward movement of the head 62 carries the screw 76 against one of the segments 73, to throw the stops 53 outward, to thereby release the coil spring theretofore positioned and compressed by the cooperation of the stops 53 and compressing arms 56 proximate the end of the chute, upon the return movement of the carrier 22, in which return movement such compressed spring is embraced between the opposite flanges 23 and the bottom plate 24 of the carrier 22.

Affixed to the head 62 and neck 63 is a rack bar 78, see Figs. 3, 4, 6 and 8, that is engaged by a pinion 79 on a transverse shaft 80. This pinion 79 is near the front of the machine, and at the back, the shaft 80 carries a gear 81, meshing with a vertical rack bar 82. This bar has a guide 83, and passes down through the guide and the top 1, and carries at its lower end a projection 84 which is received in an endless groove, not shown, in the face of the cam 61. Rotation of this cam will thus raise and lower the head 62, and at the same time oscillate the shaft 57. The rack bar 82 is at the rear edge of the top 1, while the shaft 57 is towards the front, but the same cam 61 actuates both.

The operation here is such that when a spring 7 drops down the chute 14, the stops 53 arrest it because their ends 53*a* projects into the recesses 54, see Fig. 6. At this time the arms 56 are in the position shown in Fig. 5. The cam 61 now operates the arm 58 to turn the shaft 57 in the head 62 and make the cam 67 actuate the gear segments 65 to turn the spindles 64 and swing the arms 56 in through the slots 55. At this time the head 62 is held against turning by the rollers 66 at the opposite sides of the chute 14. The ends 56*a* of the arms 56 now press down on the spring in the chute and compact it as shown in Fig. 7. To produce this result, the

cam 61 lowers the rack 82, and acts through gear 81, shaft 80 and gear 79 to lower the rack 78 and bring down the head 62. At the end of its downward movement, the screw 76 strikes one of the segments 73 to operate the spindles 72 to withdraw the stops 53. The arms 56 can then cause the spring to be delivered to the carrier 22. At this instant the carrier is in the position shown in Fig. 7, inserting one spring into a pocket 10, and with the overturned edges 23 of its flanges 22 forward of the chute, so that on the next movement of the carrier, towards the rear, the arms 56 hold the spring against the bottom plate 24 of the carrier 22 until the edges 23 overlap it. Then the head 62 can be moved upward to lift the arms 56, but the spring remains on the carrier by engagement within the flanges 23 therewith. The cam 67 of course moves up and down with the head 62, being keyed to slide on the shaft 57.

On the shelf 15 are suitable means, see Figs. 1, 2 and 3, to hold the strip 6 against displacement whenever, a spring 7 is inserted. Spaced rollers 85 are mounted on this shelf, and are disposed in recesses, so that they engage the under side of the strip 6 in advance of the chute 14. Cooperating with these rollers are rollers 86 on arms 87. These arms are affixed to a spindle 88 at the front of the shelf 15, supported in bearings 89. Affixed to this spindle is an arm 90, attached to a rod 92. A spring 91 joined to the arm 90 and the shelf 15, tends to keep the lever 87 and rollers 86 raised and the rod 92 is actuated by a cam 93 on the shaft 40. This cam also has an endless groove, not shown, in one face, of such shape that it receives a projection 94 on the rod 92, and lifts this rod at the right instant to lower the levers 87. Said levers are dropped when the carrier commences to thrust a spring into one of the pockets 10.

We further provide a retaining device to keep the spring in the pocket that has received it when the carrier is withdrawn, see Figs. 2, 4 and 5. At 95 is an upper jaw with a shank 96, pinned to a bell crank lever 97. The pin is shown at 98. A similar shank 96 carries a lower jaw 100 and a similar bell crank is pivoted to a similar shank on this lower jaw. The two bell cranks have gear teeth 99 at the end of one arm to connect them and make them move together. They are mounted between brackets 102, on pivots 103. The jaw 95 has a projection 101 with a milled end, and the jaw 100 has a similar milled surface 101*a*. The two jaws are brought together to hold the spring 7 compacted when the carrier is drawn back out of each pocket 10, and at the same time the two milled or roughened surfaces 101 and 101*a* pinch the closed edge of the strip between them and hold it fast. The brackets or plate 102 are united at the rear by cross bars or plates 104, which back up the shanks 96 and serve as guides in the up and down movement thereof. The lower bell crank has a rigid arm 105, pinned to a rod 106, operated by a cam 107 on the shaft 40. This cam has an endless groove, not shown, in one face, receiving a projection 108 on the link 106, the groove being shaped to cause the jaws 96 and 101 to operate as required. Plates or brackets 102 are secured to the top 1 at the lower ends and one is fast at its upper end to the shaft 15, while the other is secured at its upper end to the end of a channel 109 in line with the shelf 15, see Fig. 3.

After the carrier is withdrawn, each spring may expand somewhat in its pocket 16, and the strip with the springs therein is drawn towards the end of the machine remote from the belt 35. The other end of the channel 109 may be supported in any suitable way and in line with this channel is a second channel 110, see Figs. 1 and 3. Above the channel 110 is a plate 111, extending lengthwise thereof, and mounted on posts 112 secured to the top 1. The strip runs from the channel 109 into the channel 110, beneath the bar 111, and beneath this bar runs a conveyor belt 113, mounted on pulleys 114. The pulleys are rotatably carried in supports 115 affixed to the sides of the bar 111, or mounted in any other feasible manner. Similar supports 118 which may be attached to the plates 115 carry the journals or shafts for a pair of pulleys 116, over which runs a belt 117. The upper part of this belt runs on the bottom of the channel 110. One pulley 116 is rigid with a grooved wheel 124 mounted on the same shaft therewith; and this wheel is driven by a bevel gear 119 on the shaft 40, engaging a bevel gear on a shaft 120 in a bearing 121 on the crossbar 60. The shaft 120 carries a grooved pulley 122, connected to the grooved edge of the wheel 125 by a belt 123. The shaft 126 carrying the grooved wheel 118 and pulley 116 may be extended and bear at its opposite end a hand wheel 127.

The belt 123 draws the strip with the enclosed springs through the channels 109 and 110. Passing under the plates 111, the springs are compressed slightly, and the belt 113 moves with the strip, the lower side of this belt preventing friction between the plate 111 and the strip. The handwheel 127 allows the belt 117 to be moved independently of the driving pulley 124. When this wheel is rotated the pulley 124 is caused to slip within the belt 123.

Beyond the belts 113 and 117 is a compressor frame 128. It is mounted on posts 129 on the top 1 and comprises a pair of straight lower bars, a pair of belt upper bars, one upper and one lower bar being at each side of the strip. The upper and lower bars of the frame 128 converge towards a sewing machine or similar fastening apparatus 13. The upper bars and lower bars carry transverse

rollers 130 between which the strip 6 travels. The apparatus 131 is operated by a motor 132, connected by a belt 133 to a pulley 134 on the apparatus 131. This machine stitches up the open mouths of the pockets 10. The frame acts to compress the springs 7 in the strip, the rear ends of the upper bars extending a little past the sewing device for this purpose, while the lower bars terminate just in front of the apparatus 131. The open edges of the pockets project a little to one side of the frame 128 so that they can easily be worked by this apparatus 131 as indicated in Fig. 2.

In operation, each spring as it drops down the chute 14 is arrested and compacted. It is delivered to the carrier 22, and passes under the edges 23, as the carrier moves back. The carrier now moves to the right, as viewed in Fig. 1, its front end keeping between the edges 8 and 9. Next it enters a pocket, the holding device comprising rollers 86 engaging the strip 6 to prevent displacement. Moving to the left, the carrier comes adjacent the gripping and retaining device, whose jaws 95 and 101 hold the cloth and inserted spring as the carrier is withdrawn and moved to its position relative to the chute for receiving another spring, and repeating these movements as often as required. The feeding of the strip and the springs enclosed in the pockets to the succeeding parts of the machine is effected by the intermittent movement of the carrier 22 while positioned in a pocket and moved by its actuating mechanism above the shelf 15. The strip with the inclosed springs, as it comes from the machine, can be cut anywhere between the pockets to the desired length, and used for mattresses, cushions, seats, etc., in the making of mattressing furniture and the like.

A suitable retarding device to prevent too rapid unwinding of the reel 3 may be added if desired.

The various cams on the shaft 40 of course operate in the order and for the extents of movement required for the various parts to which they are connected.

It will be understood that the carrier 22 and its associated mechanism may be operated by power applied manually. It will also be understood that the feeding of the strip may be effected by suitable mechanism independently but synchronously relative to the movement of the carrier 22. The springs may be inserted manually and the strip fed by the belts 117, 123.

While preferred embodiments of our invention are set forth, we may of course resort to other constructions without going beyond the spirit of the invention, and we desire the appended claims to be construed to cover our invention in its broadest aspects.

We claim:—

1. A machine for inclosing coil springs within a covering strip comprising means for supplying a covering strip to the machine, and a carrying member for carrying the springs successively into position to be enveloped by said strip and for advancing the covering strip within the machine.

2. A machine for inclosing coil springs comprising means for supplying a covering strip of two layers to said machine, a carrier for inserting the springs between said layers, and means for actuating the carrier so that it separates said layers at one side of the strip to make way for said springs.

3. A machine for inclosing coil springs comprising means for supplying a covering strip to said machine, a carrier to bear the springs into position to be enveloped by said strip and for advancing the covering strip within the machine, and means for engaging the strip and preventing displacement when the springs are delivered to the strip by said carrier.

4. A machine for inclosing coil springs comprising means for supplying a covering strip to said machine, a carrier to bear the springs into position to be enveloped by said strip and means for gripping the strip and for advancing the covering strip within the machine and retaining each spring as the carrier is withdrawn.

5. A machine for inclosing springs comprising a chute to receive the springs, stop means for engaging each spring in turn, means for engaging each spring and compress it while it is held by said stop means, and carrier means receiving each spring in compressed status and serving to bear it into position to be enveloped by a covering strip.

6. A machine for inclosing springs comprising a chute to receive the springs, said chute being slotted, stop means adjacent the slot of said chute, means disposed to project through the slot into the chute and compress each spring in turn against the stop means, and carrier means receiving each spring in compressed status and serving to bear it into position to be enveloped by a covering strip.

7. A machine for inclosing springs comprising a chute to receive the springs, stop means for springs, means for compressing each spring in turn against said stop means, means for causing the springs to be released by said stop means to be delivered by said chute, and carrier means receiving each spring in compressed status and serving to bear it into position to be enveloped by a covering strip.

8. The machine according to claim 7 wherein said spring releasing means are mounted on said spring compressing means.

9. In a machine for inclosing springs, a carrier which is channel-shaped with a portion of its opposite sides bent towards each other to provide inwardly projecting flanges to retain a spring in compressed status in the

carrier, means including a fixed housing for compressing and positioning a spring in compressed status within said housing, and means including oppositely positioned elements supported by said housing for releasing the spring in compressed status from within said housing and for positioning the spring in compressed status within said inwardly projecting flanges.

10. In a machine for inclosing springs the combination of a carrier, a rack attached to the carrier, a shaft provided with a key-slot extending axially thereof, a gear keyed to said shaft in said key-slot, and means for oscillating the shaft and shifting the gear and carrier longitudinally of the shaft to move the carrier transversely and axially of the shaft.

11. A machine for inclosing springs comprising a chute having a plurality of slots therein, stops movably mounted adjacent the chute, a compressing arm movably mounted outside of said chute and adjacent each slot and spaced from the stops, means for yieldably holding each stop in operative position, means for actuating each arm to project it through the adjacent slot to engage a spring in the chute, and means for holding and moving each arm to cause the spring to be forced against each stop and thereby compress the spring.

12. The machine according to claim 11, wherein the means for projecting each arm through the adjacent slot includes a cam, and the means for bodily moving each arm includes a toothed rack to shift said arm.

13. A machine for inclosing springs in a covering strip, comprising movable means for carrying springs in compressed status to said strip and for advancing said strip in the machine, a delivery channel and a conveyor for moving the strip enveloped thereby along the channel.

14. A machine for inclosing springs in a covering strip comprising spring carrier means for carrying springs successively into position to be received by said strip and for advancing said strip in the machine, a delivery channel, a conveyor to carry the strip through said channel, and an endless band above the channel to engage the strip containing the springs as they are moved with the strip in said channel.

15. A machine for inclosing springs in a covering strip comprising two layers between which the springs are inserted, a compression frame through which the strip and the springs are passed said frame having mutually approaching faces for engaging the strip to thereby compress the springs inclosed within said strip upon movement of the strip in said frame, and a device at one end of said frame to secure said layers together.

16. A machine for inclosing springs in a covering strip comprising two layers, means for inserting springs side by side between said layers, means for conveying the strip and springs therein out of said machine, a compressing frame having converging bars and transverse rollers supported by the bars, the strip with the springs passing between said rollers and means for securing said layers as the strip issues from the compression frame.

17. A machine for inclosing springs comprising means for receiving a strip serving to inclose springs, spring carrier means for carrying the springs into position to be received by the strip, and for advancing the strip, pivoted arms having rollers, and means for moving the arms to cause the rollers to engage the strip and prevent displacement when the strip receives the springs.

18. A machine for inclosing springs comprising means for receiving a strip to cover the springs, spring carrier means for carrying the springs into position to be received by the strip, and for advancing the strip jaws for retaining the springs, bell-crank levers carrying said jaws and having gear teeth connecting one lever to the other and an arm to actuate said levers.

19. A machine for encasing springs comprising a slotted chute to receive said springs, stop means adjacent the end of the chute, compressor arms at the sides of the chute, a head carrying said arms, a shaft on which the head is mounted for movement lengthwise of the shaft, a rack attached to the head, a gear to actuate the rack to impart said movement to the head through the rack, gear segments connecting said arms, and a cam on the shaft to cause said segments to move to project the arms into the slotted chute, said shaft being rotatable to operate the cam.

20. A machine for inclosing springs in a strip provided with pockets, means for slidingly supporting the strip for the insertion of the springs, spring carrier means for carrying the springs within the pockets of the strip and for advancing the strip, and means for sewing the strip to fully inclose the springs in said pockets.

21. A machine for inclosing springs in a strip folded upon itself and sewed along a line of stitchings to provide pockets, said line of stitchings terminating at a spacing from the open side of the pockets, means for inserting springs in said pockets, said inserting means having a part traversing said spacing, and means for inclosing the open ends of said pockets.

22. A machine for inclosing springs in a strip provided with pockets, means for slidingly supporting said strip, spring carrier means for inserting springs in compressed status individually in the pockets of the strip and for advancing the strip in the machine, and means for compacting and hold-

ing the inserted springs in compacted condition while said strip is being progressed through the machine, said compacting means comprising mutually approaching faces engaging the strip.

In testimony whereof we have signed this specification this 26th day of April, 1929.

BERNARD R. SCHNEIDER.
KARL KAISER.