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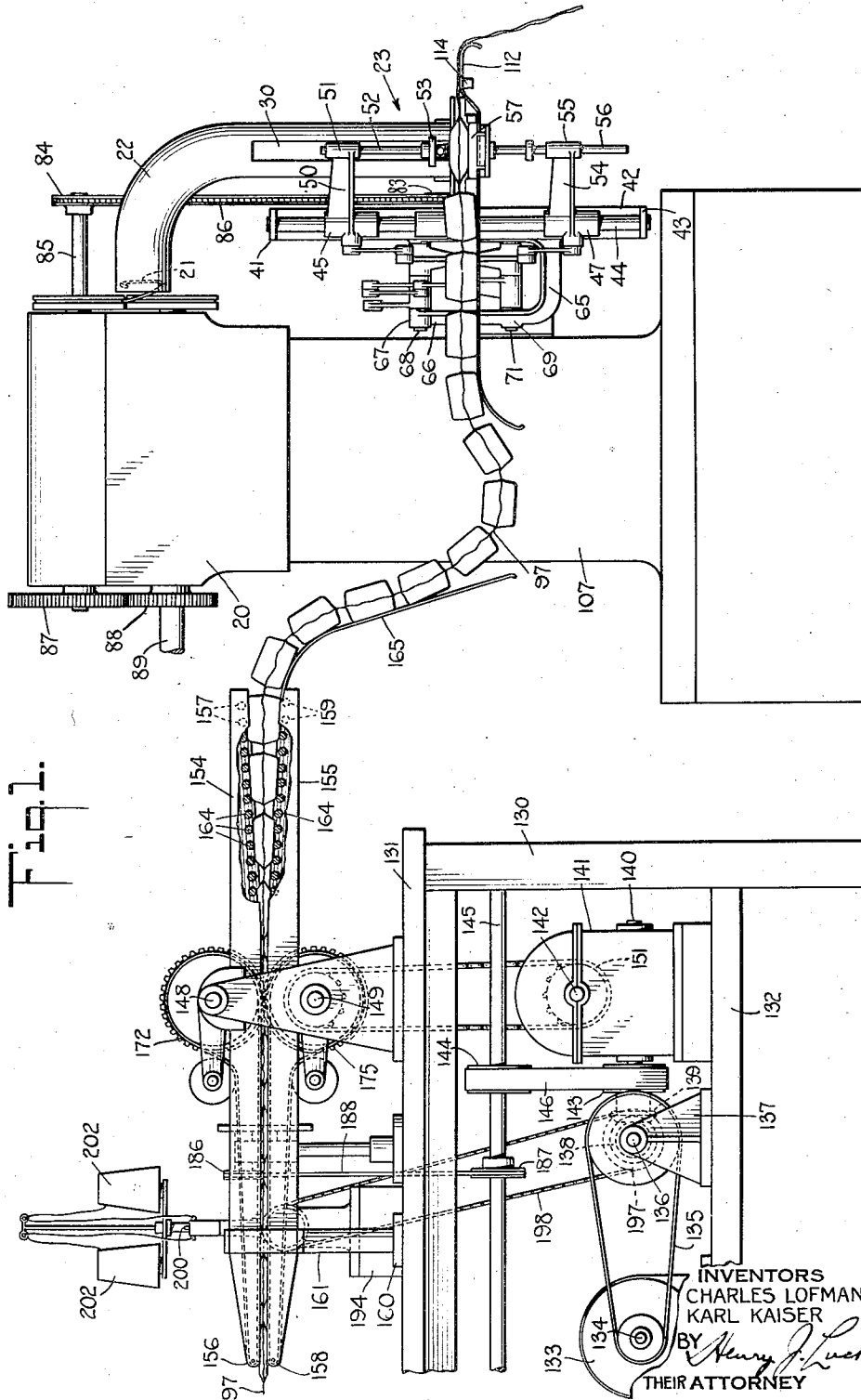
C. LOFMAN ET AL

1,994,043

UPHOLSTERY SPRING INSERTING MACHINE

Filed Jan. 30, 1932

5 Sheets-Sheet 1



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UPHOLSTERY SPRING INSERTING MACHINE

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Fig. 2.

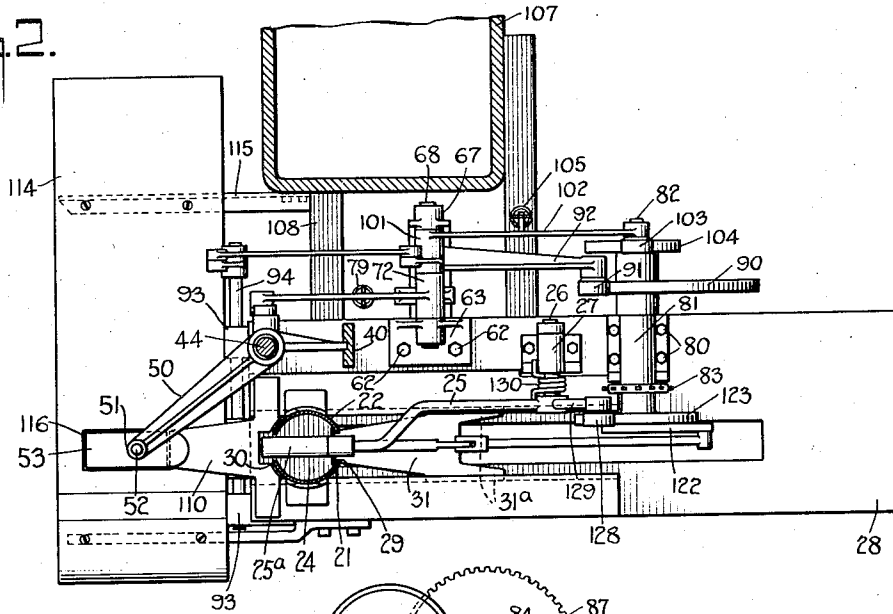
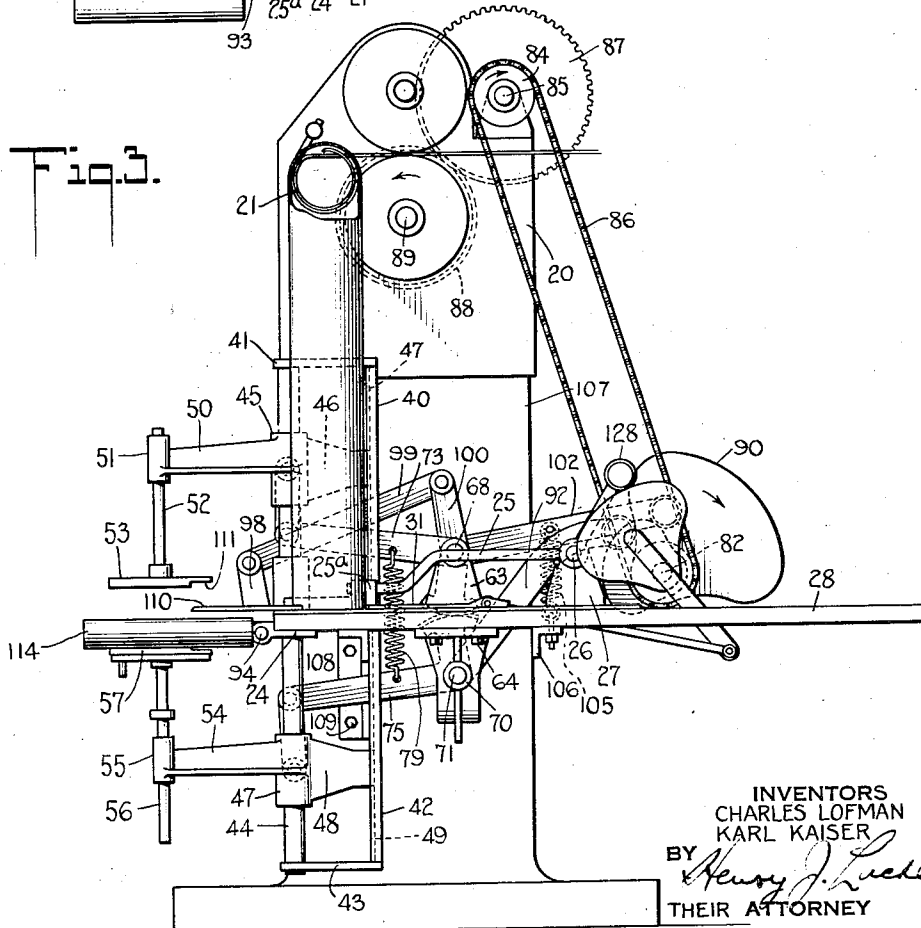


Fig. 3.



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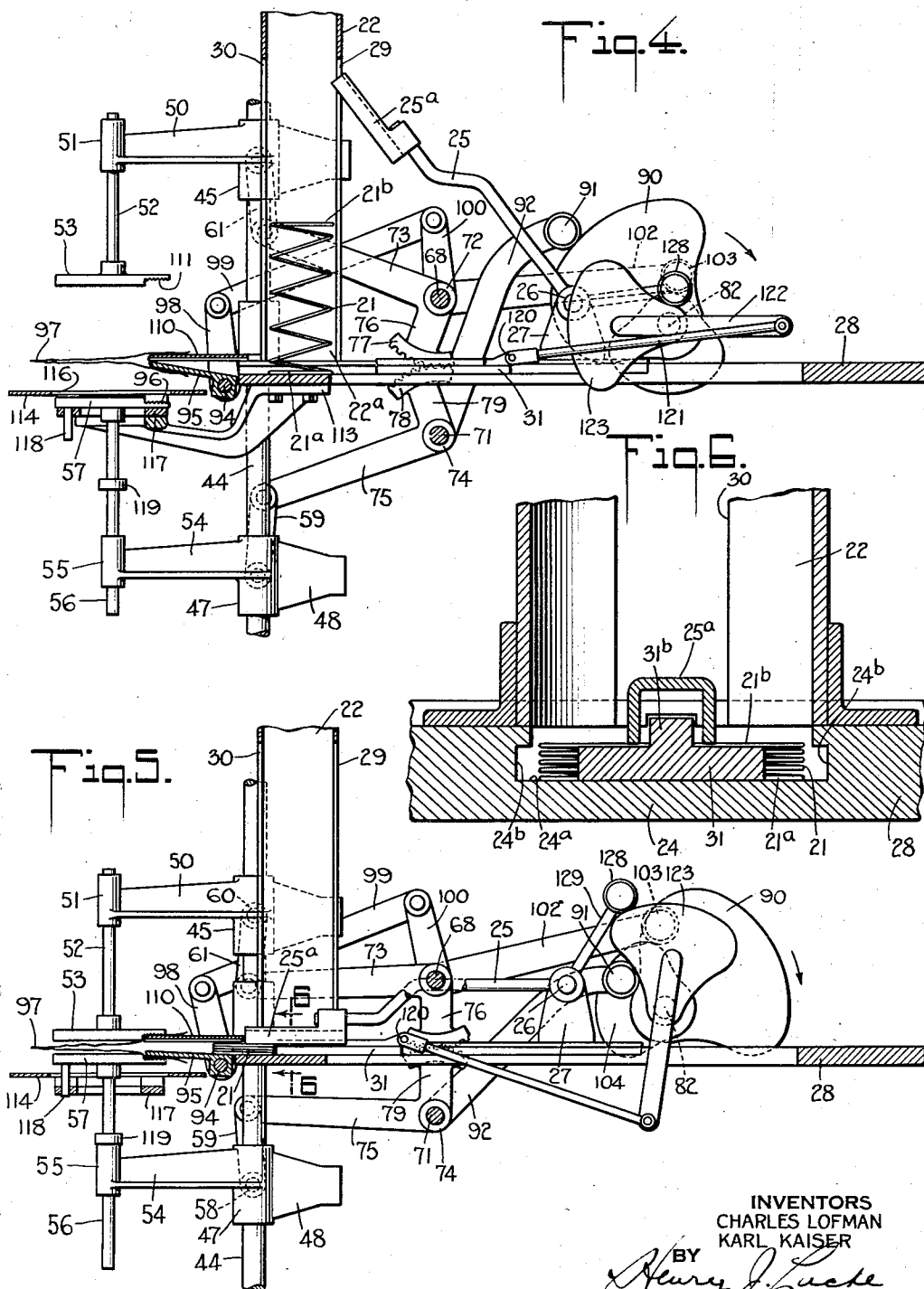
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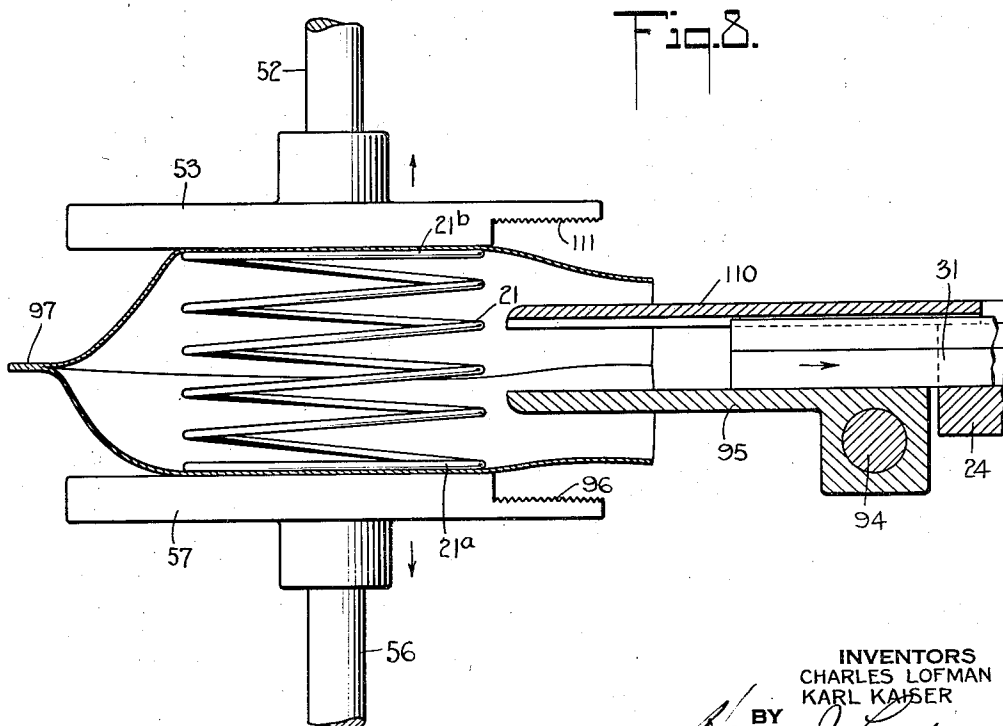
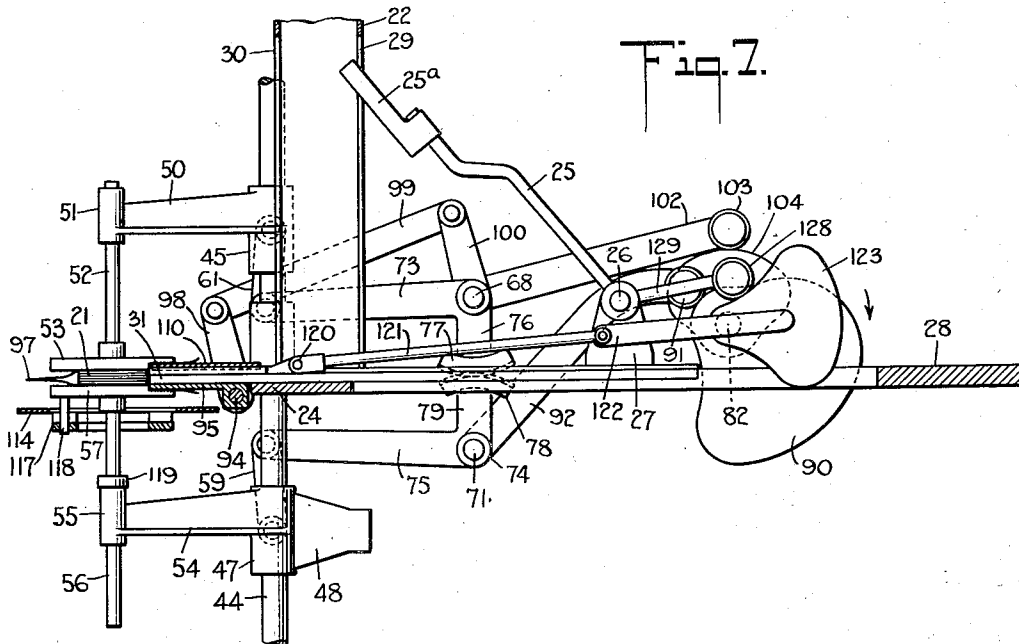
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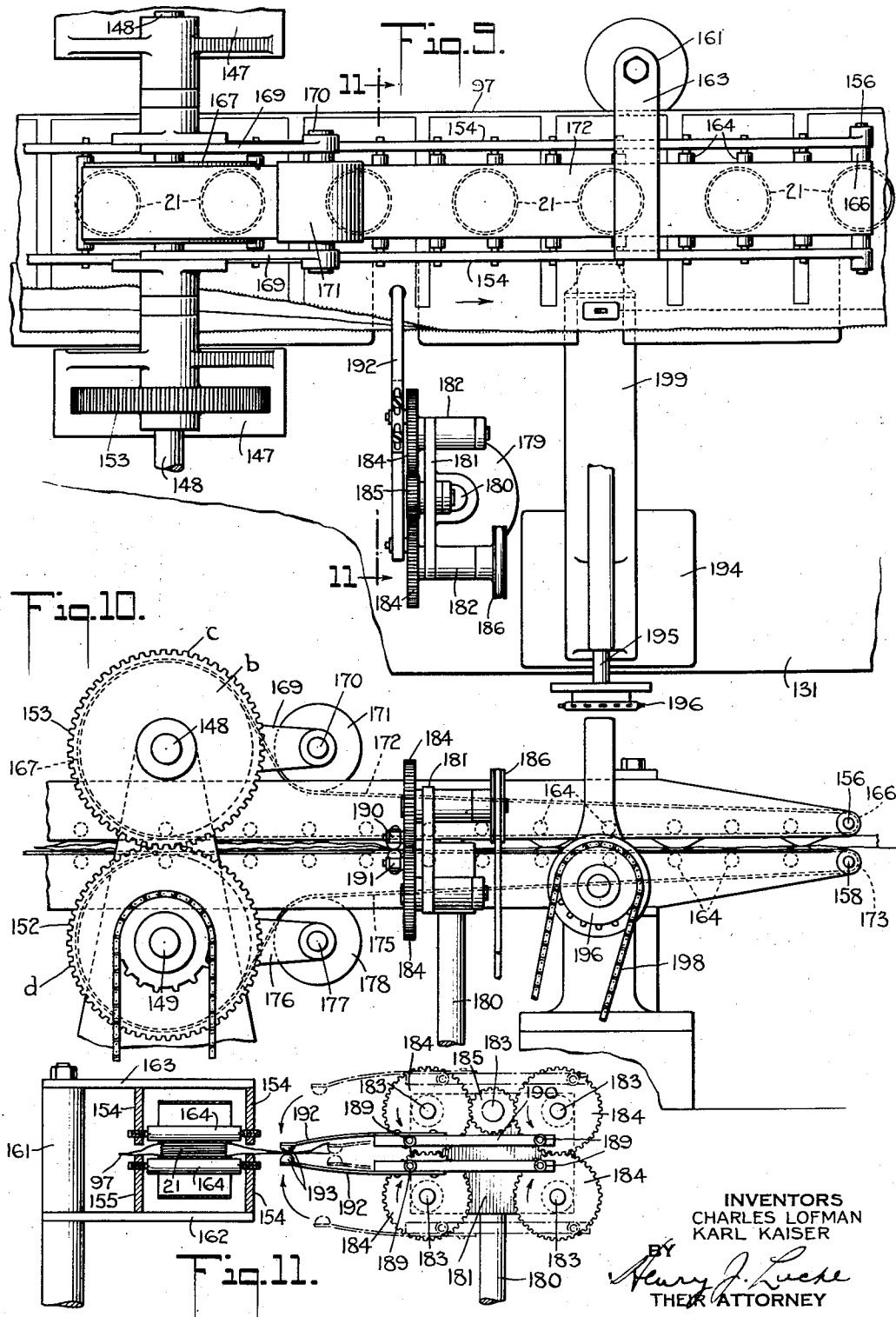
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UPHOLSTERY SPRING INSERTING MACHINE

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UNITED STATES PATENT OFFICE

1,994,043

UPHOLSTERY SPRING INSERTING MACHINE

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Application January 30, 1932, Serial No. 589,816

8 Claims. (Cl. 226—18)

Our present invention relates to upholstery machines and more particularly to an improved upholstery spring inserting machine.

Modern upholstery is no longer built by taking a plurality of individual springs and individually positioning the same in place in the situation in which they are to be used and interconnecting such springs to form a relatively compact mass which is then enclosed in a suitable covering to produce the finished piece of upholstery. In the more modern practice of upholstering, a fabric member of indeterminate length has formed therein along its length transversely located pockets and in each of such pockets is situated a spring, the pockets being afterwards closed usually by sewing. It is desired to produce an upholstered article, the spring containing portion thereof is built up by fitting a length of the fabric above referred to into position and then covering the bank of springs with the usual covering. The formation of the strips of fabric with the springs inserted in the pockets thereof was first produced manually and later machines were developed for speeding up production.

Our present invention relates to machines of the character wherein the strip of fabric is preferably formed of a plurality of plies of fabric stitched along one edge and transversely at a number of points to provide transversely arranged pockets in the strip and such strip is fed manually to a machine which automatically makes and inserts springs in the pockets after which the strip of fabric with the springs in the pockets thereof are fed to sewing means for sealing the open ends of the pockets.

A feature of our present invention is the provision of improved spring receiving means and improved means for inserting the spring individually in succession within the pockets of a fabric pre-sewed with pocket partitions or between superimposed layers of fabric or equivalent.

A further feature of our invention is an improved cooperative association of spring receiving means and means for compressing individual springs successively released from the spring receiving means, coupled with suitable means for inserting the compressed individual springs successively within the pocketed fabric or superimposed fabric layers.

Further features and objects of the invention will appear as the description of the invention progresses.

Fig. 1 is a front elevation, illustrating at the right the conventional spring forming machine

associated with spring receiving and spring fabric inserting mechanism and at the left the fabric-spring compressing mechanism associated with the pocket mouth showing mechanism;

Fig. 2 is a top plan view, partly broken away in horizontal section, of the right-hand end portion of Fig. 1, illustrating in particular the spring compressing, spring inserting and fabric stretching mechanisms;

Fig. 3 is an end elevation of Fig. 2. The parts of the mechanisms illustrated in Figs. 2 and 3 show a spring at the stage of compression within the spring inserting plunger;

Fig. 4 is an end elevation similar to Fig. 3, the parts being illustrated at a stage in advance of spring compression;

Fig. 5 is a similar end elevation, the parts being illustrated at a stage of the spring in compressed status and in transit of insertion through the guide channel;

Fig. 6 is a vertical central elevation through the delivery end of the spring delivery guide tube, the indicated parts being shown on an enlarged scale. The parts are shown at the stage of compression of a spring;

Fig. 7 is an end elevation similar to Fig. 5, the parts being illustrated at the stage of insertion of the indicated compressed spring within the folds of the fabric, the fabric being subjected to the fabric stretching and holding mechanism;

Fig. 8 is a detail side elevation corresponding to like parts in Fig. 7, but on an enlarged scale, combined spring retaining and fabric stretching mechanism being illustrated at a stage subsequent to spring insertion;

Fig. 9 is a top plan view of the fabric-spring compressing mechanism illustrated at the left of Fig. 1;

Fig. 10 is a side elevation of the delivery end of the fabric-spring compressing mechanism, on an enlarged scale, the view being opposite to that illustrated in Fig. 1; and

Fig. 11 is a sectional elevation taken on line 11—11 of Fig. 9.

Our invention comprises in the more preferred forms the assembly of spring inserting mechanism, associated in any suitable relationship with spring supply means, such as present day so-called spring-coiling machines, whereby the springs are individually successively placed between upper and lower folds of fabric, preferably pre-sewed with pockets, in combination with suitable means for compressing the springs within the respective fabric pockets in the posi-

tion of each spring as inserted by the spring inserting mechanism, in combination with means for positioning the edges of the fabric adjacent to the open mouth of the pockets, and in combination with a sewing machine head or equivalent for wholly or substantially closing the pocket mouths, the feeding of the fabric relative to the spring inserting mechanism being performed manually by an operator, the mouth-closing mechanism being controlled by the operator in correspondence to the rate of operation of spring insertion.

In such more preferred forms of our invention, the drive of the spring inserting mechanism is independent of the drive of the mouth-closing mechanism, although a common source of power may be employed, in which latter event the connection and disconnection of the mouth-closing mechanism relative to the common source is controlled by the operator.

It is advantageous, though not essential, that a spring making machine, such as a present day-so-called spring coiling machine, may be directly associated with our spring inserting mechanism and conveniently driven by the same source of power, whereby springs are intermittently delivered in succession through suitable channel or other means to the spring inserting mechanism.

As indicated above, the mechanisms illustrated in the accompanying drawings are of the above stated preferred types, and accordingly, the detail description of the illustrated mechanisms serve solely as examples of preferred forms of our invention.

Referring to the drawings, and particularly to Fig. 1, 20 indicates any regulation spring coiling machine adapted in general to form intermittently, from wire, usually in reel form, a succession of individual springs of adjustable predetermined effective diameter and length and configuration. A freshly formed spring is indicated at 21 in process of formation.

The chute 22 serves to deliver the intermittently formed springs 21 to our spring inserting mechanism designated generally 23.

Our spring inserting mechanism comprises in essentials suitable means in association with the chute 22 or equivalent for receiving a spring 21 in expanded status, suitable means for compressing the spring, a guide channel for receiving a spring 21 in compressed status, said guide channel including a pivoted mouth jaw or other portion, the upper mouth jaw or portion being preferably stationary to receive the fabric as manually fed by the operator, and suitable means for displacing the compressed spring through the guide channel to thereby deliver the spring in compressed status therethrough, including the pivotal movement of the lower channel jaw, which latter movement effects positive opening of the pocket mouth, and further associated with elements operated in timed relation for positively retaining a layer or other portion of the fabric in stationary relation with respect to the guide channel during the stage of spring insertion.

In the more preferred forms of our invention, the fabric retaining elements serve also to control the degree of compression of the inserted spring within the fabric mouth, after spring insertion.

Repeated operation of the above stated essential functions of our spring inserting mechanism takes place successively for the intermittently

supplied springs, accompanied by manual feeding of the pocketed fabric at intervals corresponding to the spring inserting cycle of operations.

Our spring inserting mechanism in the preferred form as illustrated, comprises, (see Figs. 2, 3, 4 and 5) the supporting plate 24 disposed in suitable adjacency to the outlet 22a of the chute 22 whereby a spring 21 is delivered with its lowermost convolution 21a resting upon the upper face of the plate 24.

The received spring 21 is now subjected to compression, as by means of the compressing lever 25 suitably pivoted, as by means of the stud shaft 26 mounted in the bearing 27 suitably secured to the bed 28, the chute 22 being provided with diametrically arranged and related slots 29, 30, (see Figs. 2 and 4) to permit compressing movement of the lever 25 upon the spring 21 resting upon the plate 24, the effective end portion 25a of the compressing lever 25 engaging the uppermost convolution 21b of the spring 21.

Preferably, as is illustrated in Fig. 6, said end portion 25a is of hollow arcuate formation, and the plate 24 is preferably integral or otherwise rigid with the bed 28, the upper face 24a of the plate 24 being horizontally counter-sunk below the upper face of the bed 28, and also vertically counter-sunk at the opposite sides 24b to form horizontally extending guide-ways for opposite lateral edges 31a of the plunger 31, (see Fig. 2). Also as will appear from an inspection of Fig. 6, the plunger 31 is provided with an upper extension 31b, serving as a rib, the hollow arcuate end portion 25a of the compressor lever 25 enabling the rib 31b to pass therethrough, in the spring feeding movement of the plunger 31, as appears more fully hereinafter.

Certain parts of our coil compressing and coil inserting mechanism are embodied in the corresponding parts of the coil spring inserting machine, as set forth and claimed in the copending application of one of us, Charles Lofman, Serial No. 523,499, filed March 18th, 1931.

Certain other parts of our coil compressing and coil inserting machine peculiar to the present construction are set out in detail in this specification and are specifically set forth in certain of the claims.

Secured to the upper face of the base 28, adjacent to the delivery end of the chute 29 and on one side thereof, is a standard 40 which has secured to or formed integral therewith at its upper end a forwardly extending member 41. Secured to the lower face of the base 28 and in vertical alignment with the standard 40 is a similar standard 42 which extends downwardly to any convenient point and has secured to or formed integral therewith at its lower end a forwardly extending member 43. Secured to the forwardly extending members 41 and 43 and passing through a perforation in the base 28 is a vertically arranged shaft 44 which lies parallel to the upwardly and downwardly extending standards 40 and 42, respectively. Slidably mounted on the upper end of the shaft 44 is a bearing member 45 which has formed integral therewith a rearwardly extending member 46 which engages in a vertical groove 47 formed in the front surface of the standard 49. Slidably mounted on the lower end of the shaft 49 is a bearing 47 which has formed integral therewith a rearwardly extending member 48, which is

slidable in a vertical guideway 49 formed in the forward surface of the downwardly extending standard 42. Formed integral with the bearing 45 and extending forwardly of the machine is an arm 50 provided at its forward end with a bearing 51, in which is adjustably mounted a shaft 52, such shaft 52 being provided on its lower end with an upper presser foot 53 to be hereinafter described more in detail.

Formed integral with the bearing 47 and extending forwardly therefrom is an arm 54 provided at its forward end with a bearing 55 and in such bearing is adjustably mounted a shaft 56 carrying at its upper end a lower presser foot 57 to be hereinafter more fully described.

Pivotally mounted on the bearing 47 at the shaft 58 is one end of a link 59. Pivotally attached to the bearing 45 at the shaft 60 is one end of a link 61. Secured to the base 28 by bolts 62 is a bearing bracket 63. Secured to the end face of the base 28 directly beneath the bearing bracket 63 is a bearing bracket 64. This bearing bracket 64 has formed integral therewith a laterally extending member 65; the outer end of which is formed integrally with an upwardly extending member 66 which member has formed thereon at its upper end a bearing member 67, which bearing member is in alignment with the bearing member of the bearing bracket 63. Secured in the bearing brackets 63, 67, is a shaft 68. Formed in the upwardly extending member 66 is a bearing member 69 which is in alignment with a bearing 70 formed in the bearing bracket 64 and in the bearings 69 and 70 is secured a shaft 71 which lies beneath and extends parallel to the shaft 68. Rotatably mounted on the shaft 68 is a bearing member 72, which has formed integral therewith and extending radially upward therefrom, an arm 73, the outer end of which is pivotally attached to the lower free end of the link 61. Rotatably mounted on the shaft 71 is a bearing 74 which has formed integral therewith and extending radially outward therefrom an arm 75 which is pivotally attached to the upper free end of the link 59. Formed integral with the bearing 72 and extending radially with respect thereto is an arm 76 carrying at its lower end a segmental gear 77 which meshes with a segmental gear 78 carried by an arm 79 formed integral with and extending radially outward from the bearing 74 that is mounted on the shaft 71. The segmental gear 77 and 78 meshing with each other insure that the bracket arms 50 and 54 will move in unison toward and from each other, and therefore there is a positive simultaneous movement of the upper and lower presser feet 53 and 54 respectively toward and from each other. Secured to the arm 73, intermediate its ends, is one end of a coil spring 79, the other end of this coil spring being attached to the arm 75 at a point intermediate its ends and which spring 79 tends to bring the upper and lower presser feet 53 and 57, respectively, toward each other.

Secured to the upper face of the base 28 by bolts 80 is a bearing block 81 and in this bearing block is rotatably mounted the shaft 82. Secured to the shaft 82 is a sprocket wheel 83 which is in alignment with a sprocket wheel 84 carried by shaft 85 which is rotatably mounted in suitable bearings at the top of the spring making mechanism 20. A chain 86 passing over the sprockets 83 and 84 causes power to be delivered from the shaft 85 to the shaft 82.

Secured to one end of the shaft 85 is a gear 87 which meshes with and is driven by a gear 88 secured to the drive shaft 89 of the spring making device 20. Secured to the shaft 82 is a cam 90 which is engaged by a cam roller 91, rotatably mounted at the outer end of an arm 92, which is secured to or formed integral with the bearing 74 which in turn is rotatably mounted on the shaft 71. It is obvious therefore that a rotary movement of the shaft 82 will cause through the cam 90 an arm 92 through the linkage above described a movement toward and from each other at stated periods the upper and lower presser feet 53 and 57 respectively.

At the forward or outer end of the plate 24 are bearings 93, in which is rotatably mounted a shaft 94, which shaft lies parallel to the shafts 68 and 71. Secured to such shaft 94 with its upper face normally extending upwardly with respect to the shaft 94 is a member 95, this member extending forwardly, or to the left as viewed in the drawings, and its forward end extends into the line of movement of the lower presser foot 57. Referring to Fig. 8, for example, it will be noted that the inner, upper end of the lower presser foot 57 is cut away and the cut away portion provided with serrations 96 and which serrations together with the lower forward end of the member 95 serve as a clamping means for one edge of the lower ply of fabric constituting the pocketed fabric 97 and in which it is desired to insert the springs 21. The member 95 and the serrations 96 are shown in Fig. 5 in clamping position. Secured to one end of the shaft 94 is the lower end of a link 98, the upper end of this link being pivotally attached to one end of a connecting rod 99. The other end of the connecting rod 99 is pivotally attached to one end of an arm 100, which arm is formed integral with a bearing member 101 which is rotatably mounted on the shaft 68. Also formed integral with the bearing member 101, and extending radially outward therefrom, is an arm 102, carrying at its outer end a cam roller 103 which engages with a cam 104 carried on the shaft 82. Secured to the arm 102 intermediate its ends is one end of a coil spring 105, the other end of this coil spring being attached to an angle bracket member 106, which bracket member is secured to one side of a supporting standard 107 in any suitable manner and which acts as a partial support for the base plate 28. Such base plate 28 is further supported from the standard 107 by an angle bracket member 108 secured to the standard 107 by rivets 109. Secured to the top face of the front end of the plate 24 is a resilient member 110 which extends forwardly into alignment with the path of movement of the upper presser foot 53 and is associated with the member 95. Referring to Fig. 8, it will be noted that the portion of the upper presser foot 53 that engages with the forward end of the resilient member 110 is cut away and is provided with a plurality of serrations 111, and which serrations engage the upper ply of the fabric constituting the pocketed fabric 97 and in the pockets of which it is desired to insert the springs 21. The normal position of the members 95 and 110 is shown in Fig. 4 where it will be noted that the outer edges thereof are in engagement with each other and define a wedge-shaped structure. Rotation of the shaft 82 causes, by means of the cam 104 and lever 102, a limited rotary movement of the

member 95 relative to the spring member 110, or from the position shown in Fig. 4 to the position shown in Fig. 5, thereby opening the mouth of one of the pockets in the fabric 97 to allow a spring 21 to be inserted in such pocket as will hereinafter be more fully described.

Associated with the members 95 and 110 and with the upper and lower presser feet 53 and 57 is a work table 112. This work table is of relatively resilient material and is supported adjacent to one end on a bracket 113 secured to the end face of the plate 24 by bolts 114 or in any other convenient manner. Such bracket 113 extends forwardly or to the left as viewed in Fig. 7 and extends under and supports one end of the table or work support 114. The other end of the table or work table 114 is supported by a bracket 115 from the standard 107 as clearly shown in Fig. 2. The work table or support is provided with a rectangular opening 116 through which extends the lower presser foot 57 and beneath the rectangular opening and secured to the under face of the work support 114 is a stiffening member 117 perforated to receive as a sliding fit a shaft or rod 118 secured to the under side of the lower presser foot 57 and which acts as a guide for maintaining the relative position of the lower presser foot with respect to the rectangular opening 116. The downward movement of the lower presser foot 57 with respect to the bearing 55 is limited by means of the collar 119 secured to the shaft 56 on which the lower presser foot 57 is mounted.

The plunger 31 slidably mounted in the base 28 has pivotally attached to its rearward end on shaft 129 the front end of a connecting rod 121, the other end of this connecting rod being pivotally attached to one end of a link 122 secured to one face of a cam 123 attached to the shaft 82. Rotation of the shaft 82 therefore will cause a reciprocating motion of the plunger 31 in the guideways formed in the base 28, such movement taking place toward and from the upper and lower presser feet 53 and 57 respectively from a point to the right or rearward of the chute 22 as shown in Fig. 4 to the point indicated in Fig. 7 to thereby cause a movement of a spring 21 from the chute 22 into position in a pocket formed in the pocketed fabric 97, as such fabric is positioned between the upper and lower presser feet 53 and 57 respectively. Associated with the cam 123 is a cam roller 128 rotatably mounted on the free end of an arm 129, the other end of such arm being attached to the shaft 26. Surrounding the shaft 26 between the bearing 27 and the attaching point of the arm 129 is a coil spring 130, one end of which engages the lever 25 and the other end of which engages with the bearing member 27. Such spring tends to rotate the shaft 26 in a clockwise direction as viewed in Fig. 7 and therefore tends to move the member 25a upwardly into the position shown in Fig. 7 and to hold the cam roller 128 in association with the cam 123.

The mechanism above described is so constructed and the parts thereof so proportioned that the number of revolutions of the main drive shaft 89 sufficient to cause the production of one of the springs 21 will drive the shaft 82 one revolution or enough to cause a complete reciprocating movement of the plunger 31. Also the mechanism shown and described is so proportioned as to cause the upper and lower presser

feet 53 and 57 respectively to be moved from the position shown in Fig. 4 to the position shown in Fig. 5 prior to the time that the plunger 31 will move the spring 21 from the position shown in Fig. 4 to the position shown in Fig. 7, it being understood, of course, that prior to such movement, the spring 21 is compressed and therefore it is essential that the compressing mechanism 25a operated by means of the cam 123 will be moved from the position shown in Fig. 4 to the position shown in Fig. 5 and that the compressing means 25a will have reached the position shown in Fig. 5 prior to the time the plunger 31 starts its forward movement, or movement to the left as shown in Figs. 4, 5 and 7.

Assuming, therefore, the device to have been constructed and assembled as above described and assuming that the power has been turned into the main shaft 89 from any suitable source of power and that the succession of springs 21 are being gradually formed, such springs will move from the position shown in Fig. 1 through the sheet 22 and the first spring for example, will assume the position shown in Fig. 4. As such spring reaches the position shown in Fig. 4 and it being assumed that the shaft 82 is rotating in the direction of the arrow shown in Fig. 4, the cam 123 engaging with the cam roller 128 rotates the shaft 126 to bring the compressing means 25a from the position shown in Fig. 4 into the position shown in Fig. 5 in such movement compressing the spring, as shown in Fig. 5. It is assumed that the operator will, at this time, or just prior thereto, move the strip of fabric 97 laterally so as to insert the free ends of the resilient member 110 and the pivoted member 95 into the open mouth of one of the pockets formed in such fabric, the position of such fabric at this time being clearly shown in Fig. 4. Simultaneously with the movement of the compressing means 25a, and due to the rotation of the shaft 82, the cam 104 engaging with the cam roller 103 will rotate the shaft 94, rotating the member 95 from the position shown in Fig. 4 into the position shown in Fig. 5. Also, simultaneously with such movement and again due to the rotation of the shaft 82, the cam 90 engaging with the cam roller 91, through the linkage above described will cause the downward and upward movement respectively of the arms 50 and 54, thereby bringing the upper and lower presser feet 53 and 57 from the position shown in Fig. 4 to the position shown in Fig. 5 where it will be apparent that the free edges of the strip of fabric 97 defining the open mouth of one of the pockets therein will be clamped between the upper free edge of the resilient free member 110 and the serrations 111 of the presser foot 53 and between the lower surface of the pivot member 95 and the serrations 96 of the lower presser foot 57, thereby preventing lateral movement of the fabric strips 97 with respect to the length thereof during the operation of inserting a spring 21 in the pocket. At this time, in the sequence of operations of the various devices, the plunger 31 is moved forward, or to the left as viewed in Fig. 5, engaging the side of the spring 21 and forcing the same from the position shown in Fig. 4 through the position shown in Fig. 5 and into position shown in Fig. 7, where it will be obvious that such spring 21 now rests in fully inserted position within the pocket formed in the strip of fabric 97. The plunger 31 now starts its movement to the right, as shown in Fig. 7, and such

movement will continue until the plunger 31 is brought back to its initial position as shown in Fig. 4. During this retrograde movement of the plunger 31, the spring compressing means 5 25a moves into the position shown in Fig. 4, to thereby allow the next succeeding spring 21 to fall into position at the bottom of the chute 22. Also, the pivot member 95 is rotated and the upper and lower presser feet 53 and 57 respectively are returned to the position shown in Fig. 10 4. The operator now moves the strip of fabric laterally, or to the left as shown in Fig. 4, moves the strip onwardly in the direction of its length and inserts the resilient member 110 and pivot member 95 into the next succeeding pocket therein where the above operation may be repeated and they may be repeated indefinitely on the strip of material 97.

Associated with the mechanism above described and located at one side of the standard 107 is a work table or bench 130, on the top 131 of which is mounted mechanism to be hereinafter described, and below which on a sub-platform 132 is arranged a driving motor 133 of any suitable character, as for example, an electric motor, which delivers power from its drive shaft 134 through a belt 135 to a shaft 136 rotatably mounted in suitable bearing brackets 137. Secured to the shaft 136 is a bevelled pinion 138 which meshes with a bevelled pinion 139 secured to one end of the high speed shaft 140 of a reduction gear 141, the slow speed shaft 142 of which lies at right angles to the shaft 140. Secured to the shaft 140 between the reduction gear 141 and the bevelled pinion 139 is a pulley 143 that is in alignment with a pulley 144 secured to a shaft 145 journaled in suitable bearings (not shown) on the bench frame work 130. Over the pulleys 143 and 144 runs a belt 146 and by means of which power is transmitted from the shaft 140 to the shaft 145. Mechanism driven by the low speed shaft 140 of the reduction gear 141 and by the shaft 145 will be hereinafter described in detail.

Mounted on the top of the bench 131 and spaced apart but in alignment with each other are bearing brackets 147 and in such brackets is rotatably mounted shafts 148 and 149, such shafts being arranged parallel to each other, as clearly shown in Figs. 1 and 10. Mounted at the end of the shaft 149 is a sprocket wheel 150 which is in alignment with a sprocket wheel 151 secured to one end of the low speed shaft 142 of the reduction gear 141 and over these aligned sprockets runs a sprocket chain 152 and by means of which power is transmitted from the shaft 142 to the shaft 149. Secured to the shaft 149 is a gear 152 which meshes with and drives a similar gear 153 secured to the end of the shaft 148 thereby insuring that the shafts 148 and 149 are driven in opposite directions and at the same rate of speed.

In the space defined by the shafts 148 and 149 and the brackets 147 extends a frame work of any suitable length and comprising pairs of side plates 154 and 155, each pair of side plates being secured at one end by a shaft 156 and at their other end by cross-bars 157, while the pair of side plates 155 are secured together at one end 158 and at the other end by the shaft 159. The pairs of side plates 154 and 155 are spaced apart from each other any suitable distance, as shown in Figs. 1 to 10, for example. Mounted on the bench 131 is a support 160 75 from which rises a standard 161 and laterally

extending from such standard is a member 162 which supports the lower pair of side plates 155 and a member 163 which supports the upper pair of side plates 154. Along the lower edge of the upper pair of side plates 154 and along the upper edge of the lower pair of side plates 155 are arranged a plurality of parallelly arranged rollers 164 and by referring to Fig. 1, it will be noted that such rollers and side plates define a tapered throat at the end of the pairs of side plates adjacent to the standard 107. Also, attached to the lower pair of side plates 155 is a sheet metal guiding member 165 and which acts as a guide for guiding the strip of fabric 97 and the springs contained in the pockets formed therein from the work table 112 to and into the tapered throat defined by the rollers 164 at the end of the pairs of side plates 154 and 155. On the shafts 156 is rotatably mounted a roll 166. On the shaft 148 on either side of the roller 167 are radially extending arms 169, such arms being joined at their free end by a shaft 170 on which is rotatably mounted an idler roller 171. Over the rollers 166 and 167 an endless feed belt 172 and the idler roller 170 engages with the outer face of the feed belt 172 to keep the same in stretched or taut condition. Also, as will be noted, inner surface of the lower reach of the endless belt 172 engages with the rollers 166. Rotatably mounted on the shaft 158 is a roller 173 and secured to the shaft 149 is a roller 174 and over such rollers runs an endless feed belt 175, it being noted from an inspection of Fig. 10 that the upper reach of such endless feed belt 175 rests on the rollers 164. Also mounted on the shaft 149 and on each side of the roller 174 are laterally extending arms 176, such arms being connected at their outer free ends by a shaft 177 on which is rotatably mounted an idler roller 178 and which tends to keep the endless feed belt 175 in tense or taut condition. It is obvious from the above description that if the shafts 149 and 148 are rotated simultaneously in opposite direction and at the same speed with a strip of fabric 97 having a plurality of springs 21 arranged in pockets arranged along the length of such strip bed into the tapered throat as indicated in Fig. 1 the springs are gradually compressed until the strip is engaged by the endless feed belts 172 and 175 and that such strip of fabric 97 will be fed through the device or to the left as shown in Fig. 1 and that the springs 21 are maintained in compressed condition as long as such strips 97 are within the influence of the endless feed belt.

Up to the present time, no particular attention has been directed to bringing the unsewn edges of the plies of fabric constituting the strip of fabric 97 in proper position relative to each other. In other words, no attention has been paid to the edges of the fabric defining the edges of the mouths of the pockets formed in such fabric, but as such edges must be brought into proper registry with each other prior to a sewing operation to be performed thereon to permanently close the mouth of the pockets, we have devised the following means.

Secured to the upper face of the bench 131 and on one side of the pairs of side plates 154 and 155, above described, is a pedestal 179, to which is secured, in any convenient manner, an upwardly extending shaft 180. Secured to the top of the shaft 180 is a member 181 having on one face thereof a plurality of parallelly ar-

ranged bearings 182. Rotatably mounted in the bearings 182 are shafts 183, such shafts being arranged in pairs as clearly shown in Fig. 11 and secured to the ends of some of such shafts 183 are gears 184, such gears being equal in pitch and diameter and the gears of each pair meshing with each other so that the shafts 183 of each pair are rotated in the same speed and in opposite directions. On one of the shafts 183 is secured a pinion 185 which meshes with one of the gears 184 of each pair of gears, thus insuring that the gears of the pairs of gears in engagement with the pinion 185 will rotate in the same direction and at the same speed while the other gears of each of the pairs will also rotate in the same direction as each other, but in the opposite direction from the pairs of gears first referred to. Secured to one of the shafts 183 is a pulley 186 which is in alignment with a similar pulley 187 secured to the shaft 145 and over the pulleys 186 and 187 runs an endless belt 188 and by means of which power is transmitted from the shaft 145 to the mechanism above described as being mounted on the shaft or standard 180. Eccentrically mounted on the face of each of the gears 184 is a crank pin 189, the crank pins of the gears of each pair of gears being jointed by a connecting rod 190 while the other crank pins on the other pair of gears are connected by a connecting rod 191. Adjustably secured to each of the connecting rods 190 and 191 are resilient members 192, each of these members being provided with an inwardly arranged member 193 which is adapted to engage with the strip of fabric 97, as clearly shown in Fig. 11 and the construction above described is such that as the shafts 183 are rotated the members 193 engaging with the strip of fabric at a point within the edge thereof tends to drag out or pull out the upper and lower plies of such fabric strip to thereby bring the upper and lower edges of such fabric defining the open ends of the pockets in such strip of fabric into alignment with each other as clearly shown in Fig. 9. After the free edges of the strip of fabric 97 defining the open edges of the pockets formed therein have been aligned with each other as above described, the fabric passes along the pairs of side plates 154 and 155 and before being released from the influence of the feed belts 172 and 175, such edges are sewn together. For this purpose, I have arranged on the upper surface of the bench 131, a pedestal 194 on which is mounted a sewing machine, shown in somewhat diagrammatic form, such sewing machine having as an attachment thereto or as an integral part thereof, a shaft 195 provided on its outer end with a sprocket wheel 196 that is in alignment with a sprocket wheel 197, secured to the shaft 136 and over such aligned sprocket wheels 196 and 197 runs a sprocket chain 198 and by means of which power is delivered by the shaft 136 to the sewing machine shaft 195. Associated with the sewing machine, indicated by the reference numeral 199, is the usual reciprocating needle bar 200 and a presser foot (not shown) thread or other fastening means being fed to the needles carried by the needle bar 200 from bobbins 201 after first passing through suitable tensioning devices 202.

The mechanism described with respect to Figs. 1 to 8, inclusive, have the various parts so proportioned and so driven that each part performs its proper function in the proper way and at a definite rate of speed and in the operation of

the machine, it is essential that the operator feed the pockets formed in the strip of fabric 97 to the spring inserting mechanism so as to synchronize with movement of the various devices constituting the machine. The mechanism described with respect to Figs. 1, 9, 10 and 11, however, need not be physically connected to the mechanism above referred to, but it is desirable that the alignment operation and sewing operation to complete the article being worked upon be carried out at practically the same speed as that in which the springs are inserted into the pockets of the strip of fabric 97. The sewing machine and the edge aligning devices further are operated together and at a fixed rate of speed and the driving parts are operated to feed the strip of fabric at a speed commensurate with the speed of the sewing machine and edge aligning means. After the sewing operation has been performed, the strip of fabric 97 passes it from the influence of the endless feeding belts 172 and 175 and the strip of fabric then passes to a mechanism for correctly positioning the springs 21 within the pockets formed in the strip of fabric 97. Such spring turning device, however, forms no part of our present invention, but is described and claimed in detail in the co-pending application of one of us, Karl Kaiser, Serial No. 589,815, filed January 30, 1932.

While we have necessarily described the preferred embodiment of our invention somewhat in detail, it is to be understood that the parts comprising the device may be varied within relatively wide limits without departing from the spirit of the invention.

We claim:—

1. In a machine of the character described, the combination of spring inserting means, a support for a pocketed fabric within a pocket of which a spring is to be inserted by said coil inserting means, means for effecting the clamping of the fabric in open position on said support in the stage of spring insertion, said clamping means comprising complementary plates located respectively on opposite sides of the fabric, and means for automatically operating said clamping means.

2. In a machine of the character described, the combination of spring inserting means, a support for a pocketed fabric within a pocket of which a spring is to be inserted by said spring inserting means, means for effecting the clamping of the fabric on said support in the stage during spring insertion, said clamping means comprising complementary plates disposed respectively on opposite sides of the fabric, and means for automatically operating said clamping means simultaneously with the operation of the spring inserting means.

3. In a machine of the character described, the combination of a hollow guide member arranged to receive a pocketed fabric, a portion of the discharge end of said member being stationary, said hollow guide member further including a pivotally mounted discharge portion adapted to be received within the mouth of a pocket, means cooperating with said pivotally mounted discharge portion adapted to engage the fabric exteriorly of the pocket, and coil inserting means, said spring inserting means comprising means for receiving and compressing a spring and a plunger arranged to engage the spring in compressed status for feeding the spring through said hollow guide member.

4. In a machine of the character described,

the combination of a hollow guide member arranged to receive a pocketed fabric, a portion of the discharge end of said member being stationary, said hollow guide member further including a pivotally mounted discharge portion normally biased to restrict the clearance of the discharge opening, a member cooperating with said pivotally mounted discharge portion for clamping therebetween a fold of the fabric, and spring inserting means, said spring inserting means comprising means for receiving and compressing a spring and a plunger arranged to engage the spring in compressed status for feeding the spring through said hollow guide member.

5. In a machine of the character described, the combination of a hollow guide member arranged to receive a pocketed fabric, the upper portion of the discharge end of said member being stationary, said hollow guide member further including a pivotally mounted discharge portion normally biased to restrict the clearance of the discharge opening, a pair of members disposed respectively above and below the fabric when positioned on said hollow guide member, said lower member cooperating with said pivotally mounted discharge opening to clamp the fabric during the stage of spring insertion, and spring inserting means, said spring inserting means comprising means for receiving and compressing a spring and a plunger arranged to engage the spring in compressed status for feeding the spring through said hollow guide member, said upper and lower members serving to hold the spring within the pocket after its insertion by said spring inserting means.

6. The combination of spring inserting means, a hollow support for a pocketed fabric within a pocket of which a spring is to be inserted by

said spring inserting means, said hollow support including a movable portion arranged to engage the fabric within a pocket and a pair of presser members engaging opposing exterior sides of the fabric and cooperating with said hollow support to clamp the fabric during the stage of spring insertion, said presser members serving to restrain the spring after insertion within a pocket.

7. The combination of spring inserting means, a hollow support for a pocketed fabric within a pocket of which a spring is to be inserted by said spring inserting means, said hollow support including a movable portion arranged to engage the fabric within a pocket and a pair of presser members engaging opposing exterior sides of the fabric and cooperating with said hollow support to clamp the fabric during the stage of spring insertion, said presser members being provided with serrations, said presser members serving to restrain the spring after insertion within a pocket.

8. The combination of spring inserting means, a hollow support for a pocketed fabric within a pocket of which a spring is to be inserted by said spring inserting means, said hollow support including a movable portion arranged to engage the fabric within a pocket and a pair of presser members engaging opposing exterior sides of the fabric and cooperating with said hollow support to clamp the fabric during the stage of spring insertion, said presser members being oppositely cut-away to receive said hollow support during the stage of spring insertion, said cut-away portions being provided with serrations, said presser members serving to restrain the spring after insertion within a pocket.

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