C. T. RIPLEY.

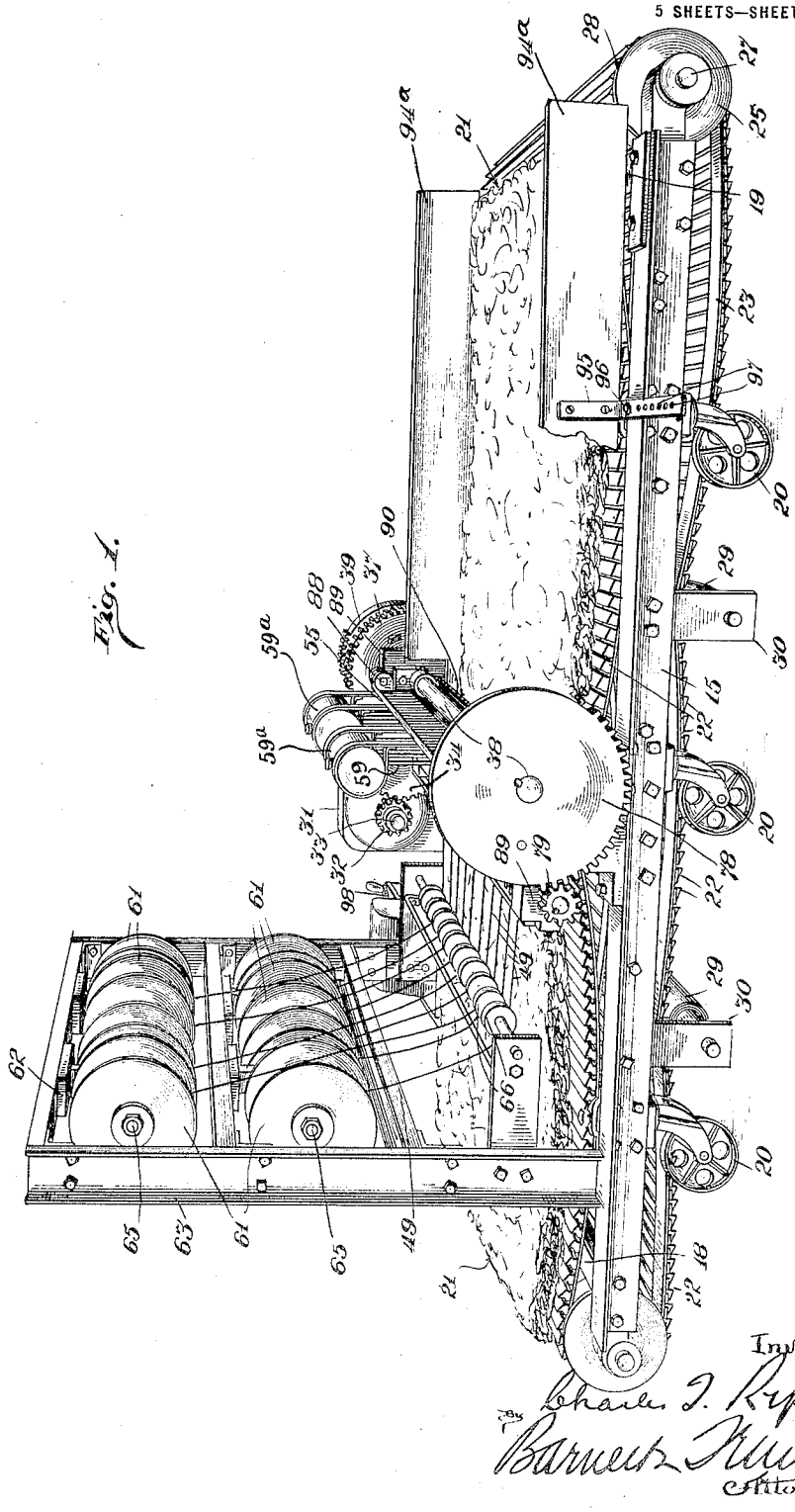
APPARATUS FOR MANUFACTURING RESILIENT PACKING OR FILLING MATERIAL.

APPLICATION FILED JULY 11, 1919.

1,395,299. **Patented Nov. 1, 1921.**

5 SHEETS—SHEET 1.

Fig. 1.



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5 SHEETS—SHEET 2.

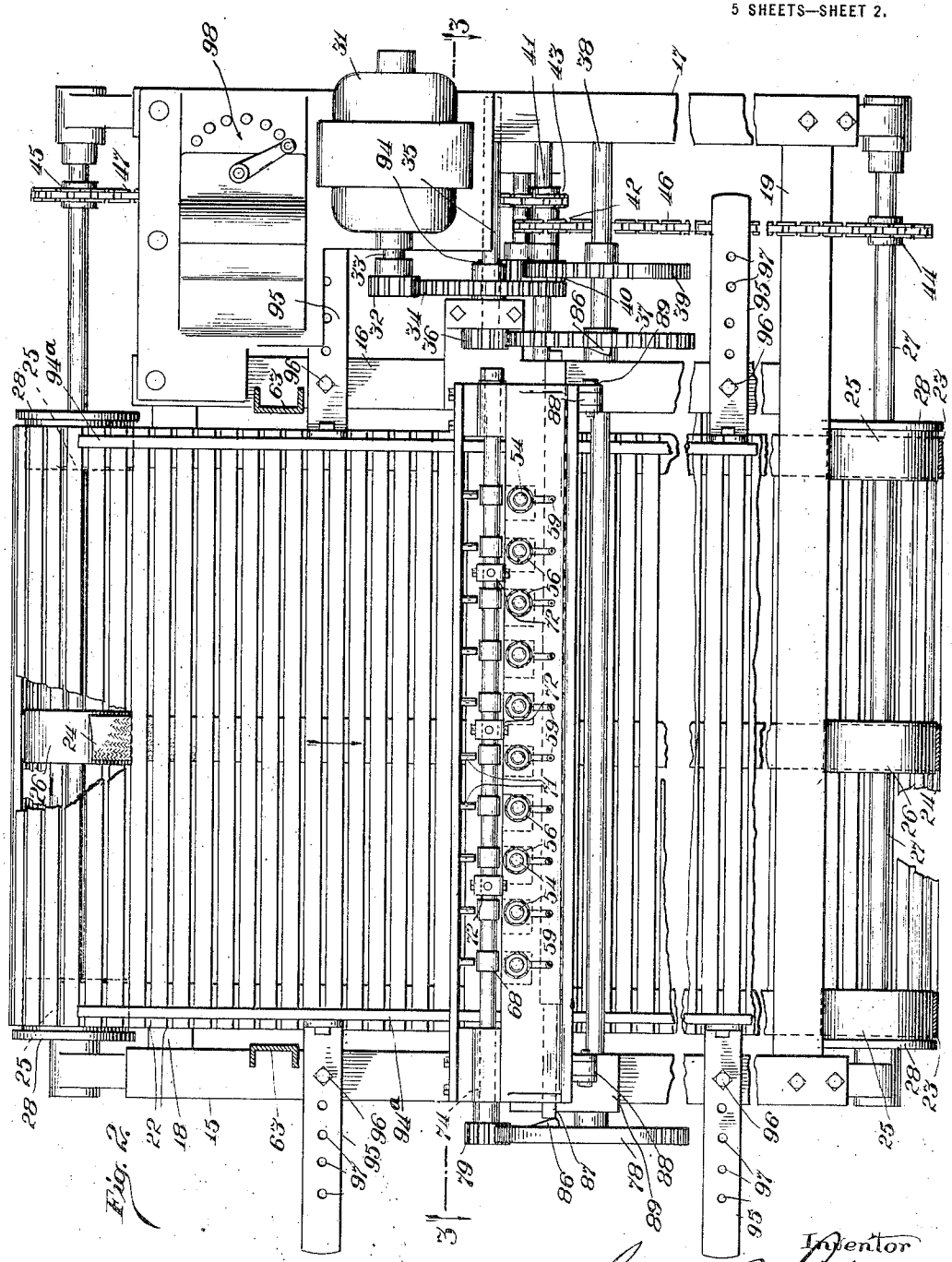


Fig. 2.

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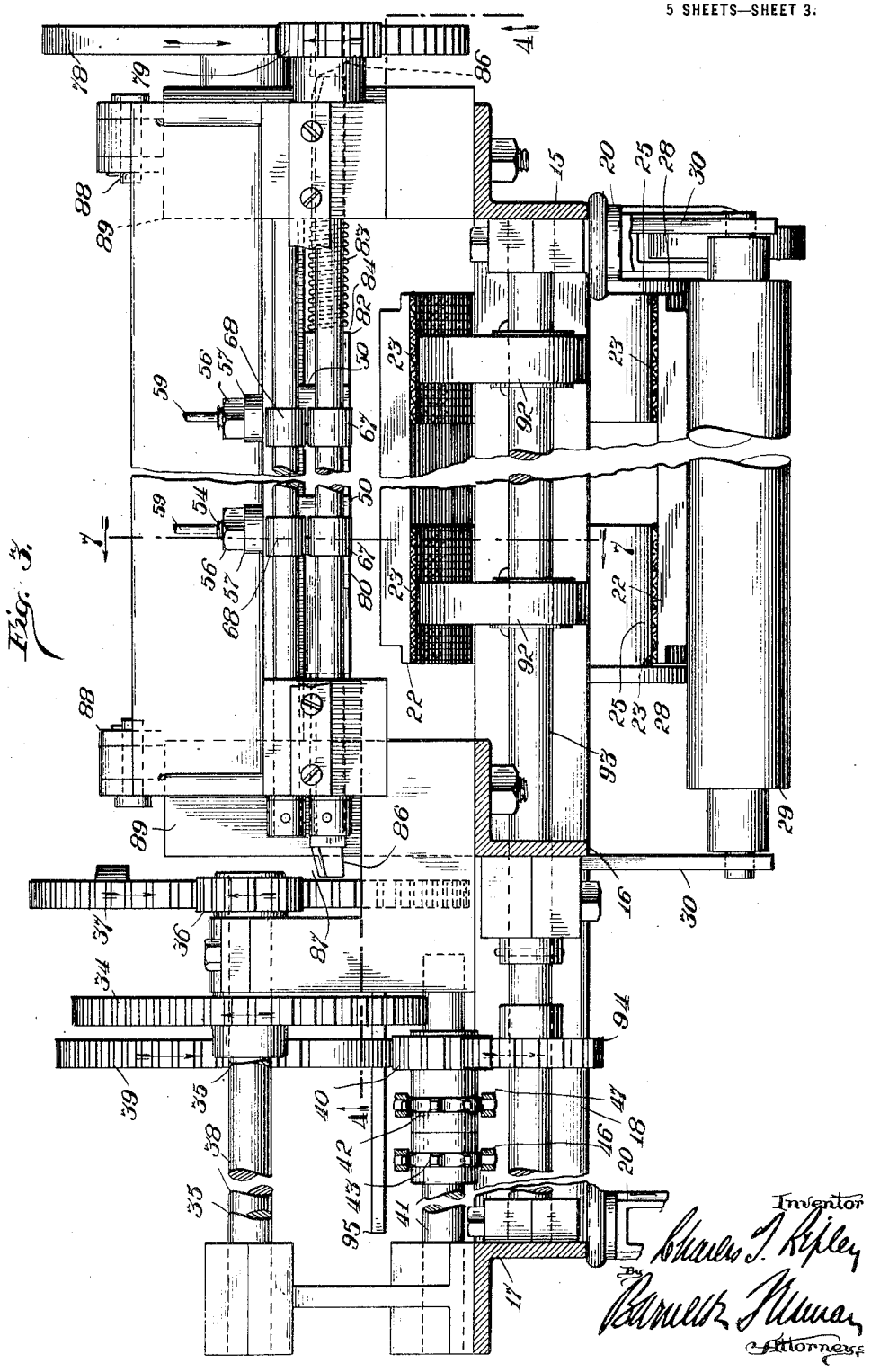
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5 SHEETS—SHEET 3.

Fig. 3.



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5 SHEETS—SHEET 4.

Fig. 4.

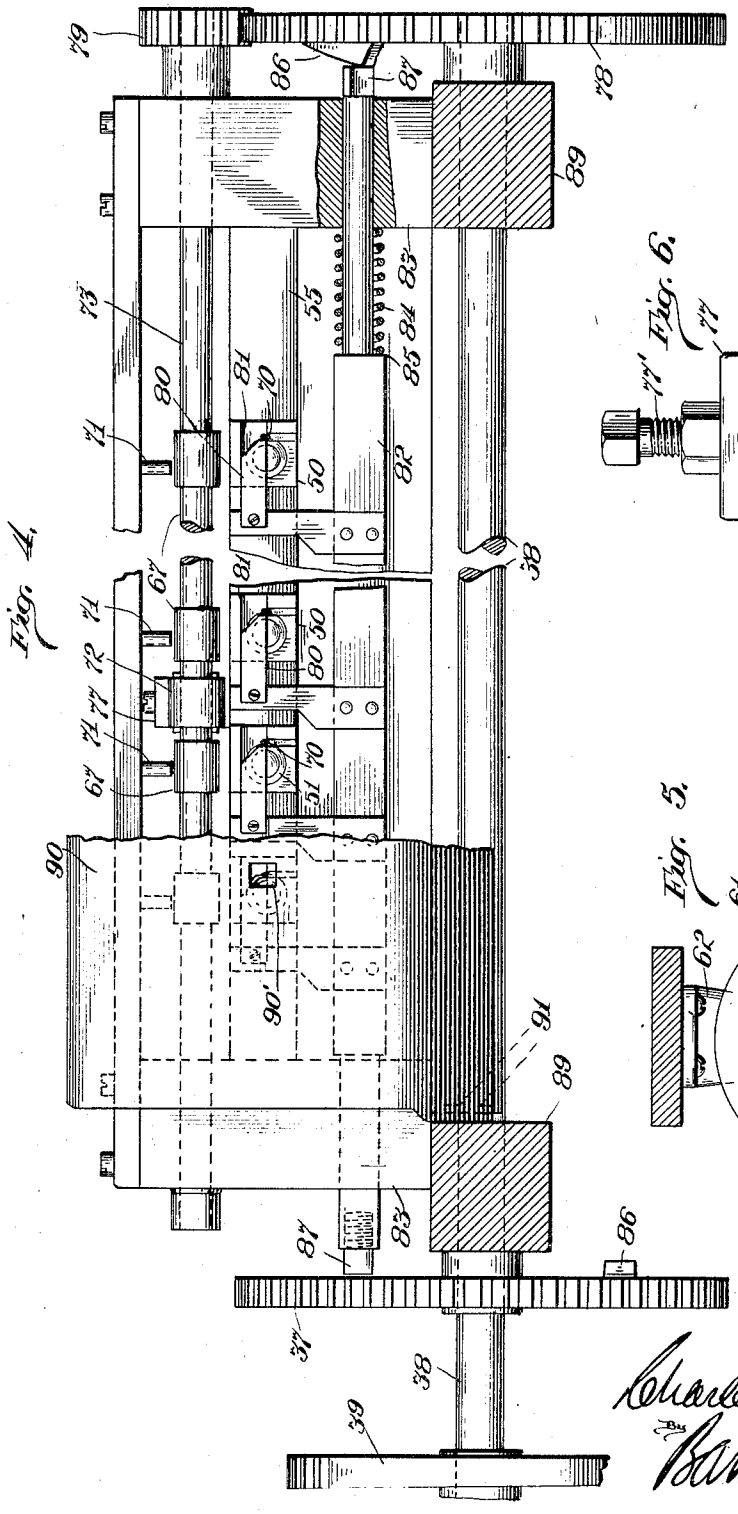


Fig. 6.

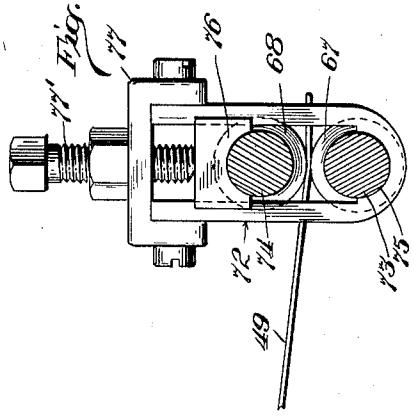
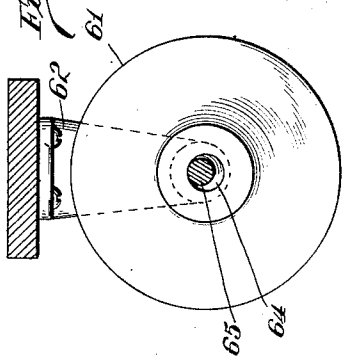


Fig. 5.



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APPARATUS FOR MANUFACTURING RESILIENT PACKING OR FILLING MATERIAL.

APPLICATION FILED JULY 11, 1919.

1,395,299. **Patented Nov. 1, 1921.**

5 SHEETS—SHEET 5.

Fig. 7.

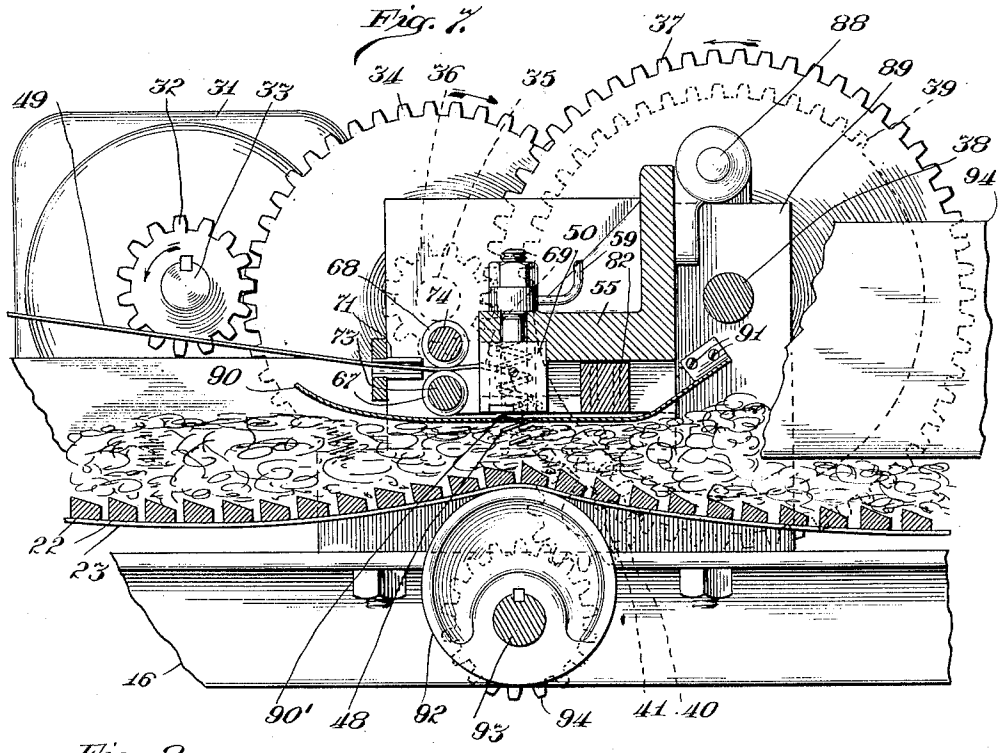


Fig. 8.

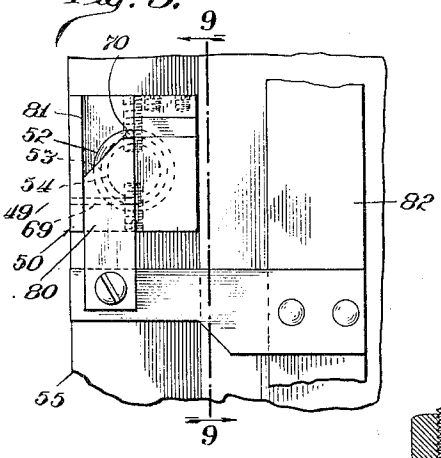


Fig. 9.

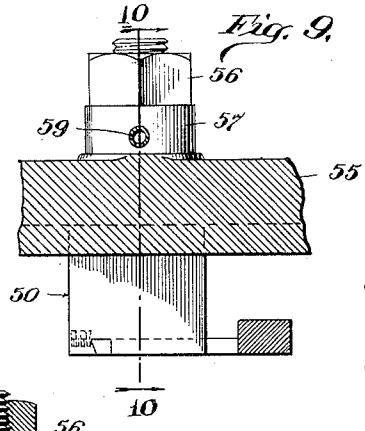


Fig. 10.

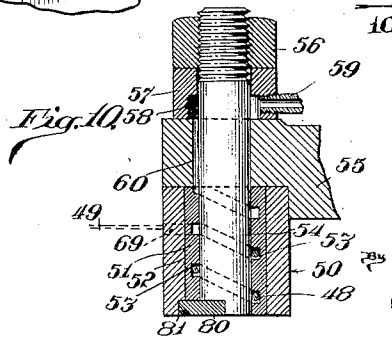
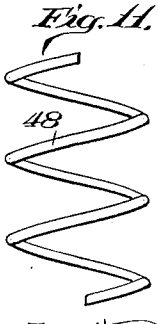


Fig. 11.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR MANUFACTURING RESILIENT PACKING OR FILLING MATERIAL.

1,395,299. Specification of Letters Patent. Patented Nov. 1, 1921.

Application filed July 11, 1919. Serial No. 310,086.

To all whom it may concern:

Be it known that I, CHARLES T. RIPLEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Apparatus for Manufacturing Resilient Packing or Filling Material, of which the following is a specification.

My invention relates to apparatus for manufacturing a resilient packing or filling material by inserting coiled spring elements into a body of thread-like or fibrous or like material so that the resiliency of said material will be increased and made permanent.

One of the objects of the invention is to provide a machine which will expeditiously and economically manufacture a resilient product of the character disclosed in my United States Letters Patent No. 1,298,794, issued April 1, 1919. It will be obvious, however, that the product manufactured in accordance with this invention may be varied as to the number of springs used or as to the character of the material in which the prings are embedded, so as to be suitable for various different purposes.

It is desirable that a product of the above character contain a uniform number of spring coils for each pound of the fibrous or thread-like material passing through the machine so that the resilient quality of a batch will be uniform throughout. It is also desirable that the machine for inserting the spring coils be capable of operating at a relatively high rate of speed so as to produce the maximum amount of the product during a given period of time. I obtain the above results by providing a machine having suitable devices which coöperate with each other to first form the coiled spring elements from wire and then automatically insert them into the material while maintaining a substantially uniform feed of the material through the machine at the place where the coiled springs are inserted into said material.

The coiled spring elements are inserted into the body of the material so that for all intents and purposes they are permanently united with the material. This object is attained by inserting them by a screwing action so that they are interwoven with the thread-like material instead of being merely mixed with it.

One of the specific objects of the invention is to provide a machine of the above character having a novel spring forming device consisting of one or more units with which the spring elements are formed and to provide coöperating mechanism for preventing any substantial relative movement between the thread-like material and the spring forming device during the period in which the spring elements are being inserted into the material.

The invention has for further objects, the novel arrangements, constructions and combinations of parts and devices hereinafter described and claimed for carrying out the above stated objects and such other objects as will appear from the following description.

The invention is illustrated in a preferred embodiment in the accompanying drawings wherein:

Figure 1 is a view in perspective of a machine constructed in accordance with my invention.

Fig. 2 is a plan view of the same with certain parts broken away for the purpose of clearness.

Fig. 3 is a cross-section, through the machine, taken on line 3—3 of Fig. 2 looking in the direction indicated by the arrows.

Fig. 4 is an inverted plan of a die block employed in my invention for forming the coiled spring elements, the figure being taken on line 4—4 of Fig. 3.

Fig. 5 illustrates a reel for holding a supply of wire from which the spring elements are made,

Fig. 6 is a sectional view through the feed roller shafts showing a clamping device employed for varying the pressure on the wire between the feed rollers,

Fig. 7 is a fragmentary section on line 7—7 of Fig. 3,

Fig. 8 is a fragmentary view in elevation of the underside of the die block and a cutter blade which coöperate with one of the die units of said block to sever the wire of the spring element,

Fig. 9 is a section on line 9—9 of Fig. 8 showing the die block in its upright position,

Fig. 10 is a sectional view through the die block taken on line 10—10 of Fig. 9, and

Fig. 11 is a detail view of one of the coiled spring elements formed by my invention.

Like characters of reference designate like parts.

Referring to the drawings, the machine of my invention consists of a frame made up of, preferably, angular side strips 15, 16 and 17 secured together by cross braces 18 and 19. The frame is mounted on a plurality of casters 20 so that the machine as a whole may be readily moved from one place to another. This portable feature is particularly desirable when the machine is employed in connection with the manufacture of journal box packing, as the machine may be moved to a suitable position to receive the cotton or wool waste as it is discharged from the usual waste puller, (not shown) or moved away from the same when it is desired to fill an order for a product in which the spring elements of my invention are not embedded in the waste. When the waste or other thread-like material 21 is discharged from the waste puller it is received (at the right of Fig. 1) by an endless flexible conveyer which carries the material to the opposite, or discharge, end of the machine. The conveyer preferably consists of a plurality of slats 22 secured to flexible belts 23, 24 which extend over positively driven pulleys 25—25 and 26, secured to shafts 27—27 at opposite ends of the frame. The pulleys 25—25 are preferably formed with flanges 28 which prevent any appreciable lateral movement of the conveyer. In the drawings, I have shown the upper surface of the slats 22 inclined toward the rear edge so as to provide a saw tooth construction which will take hold of the layer of relatively light material 21 and insure its proper movement toward the discharge end of the machine. The lower strand of the conveyer is preferably supported at suitable points by rollers 29 which are journaled in hangers 30—30 depending from the frame members 15, 16. The conveyer is driven with an intermittent movement toward the left of Fig. 1 by means of a variable speed motor 31 having an operative connection with the pulley shafts 27—27 through a train of gears consisting of a pinion 32, on the motor shaft 33, meshing with a gear 34 on a compound shaft 35. This shaft also has a pinion 36 fixed thereon which meshes with a gear 37 on a main driving shaft 38. The main driving shaft 38 carries a segment gear 39 (Figs. 1, 2, 3, and 7) which meshes with a pinion 40 on a counter shaft 41, which, in turn, carries sprockets 42—43 connected with sprockets 44, 45 respectively, on the shafts 27—27 by means of chains 46, 47. In order to obtain the desired intermittent movement of the conveyer, I have employed the continuously driven segmental gear 39, but this is for the purpose of convenience only, and I therefore wish it to be understood that any suitable clutch or gear mechanism for effecting a make or break connection between the continuously driven shaft 38 and the intermittently driven counter shaft 41 may be used instead of the segmental gear 39 without departing from the principle of my invention.

During the period that the conveyer is at rest, a plurality of coiled wire springs 48 are formed and embedded with a screwing action in the body of material 21. The said springs are preferably formed by forcing wires 49 through dies in a die block 50. The die block may be provided with any desired number of dies. In the drawings I have shown ten of such dies which are preferably formed, in each case, by inserting a hard metal bushing 51 into a bore 52 of the die block as shown in detail in Fig. 10. The bushing is formed with a spiral internal groove 53 corresponding to the desired pitch of the spring 48. A center core element 54 is fixed in the bushing so as to close the open side of the groove 53. The upper end of the core 54 extends through a die block support 55 and is threaded to receive a nut 56 with which the die block is tightly clamped to the under face of the support 55. A washer 57 is interposed between the nut 56 and support 55 and is formed with a counter-bore 58 which is connected, by means of a flexible tube 59 to a tank 59[a] containing a suitable lubricant. When the wire is being forced through the die, the lubricant is fed into the spiral groove 53 through a duct 60 in the support, connecting the counter-bore 58 with the upper end of the spiral groove.

The wires 49 from which the coiled springs 48 are made are wound on reels 61 supported in brackets 62 secured to a rack 63. Each of the reels is provided with a central bore 64 which is somewhat larger than the bracket shaft 65 so that the wire, being unwound from the top of the reel, will be pulled against the weight of the reel. With this arrangement the wire is maintained sufficiently taut to prevent buckling. The strands of wire pass under guiding sheaves 66 arranged in line with feed rollers 67, 68 which force the wire through the spiral groove 53; the wire entering the groove through a hole 69 in the die block and passing out at the lower end 70 of the groove. In order to avoid the possibility of the wires accidentally slipping off the feed roll 67, I preferably provide a guide duct 71 adjacent each of the rolls to hold the wire in proper position. The pressure, of the feed rollers on the wire, necessary to force the wire through the die is obtained, preferably, by means of clamping devices 72 disposed at suitable points on the feed roller shafts 73, 74. These devices consist in each case, of a, preferably, brass yoke which is provided with a bearing 75 for the lower shaft 73. A bearing block 76 is slidably fitted in the upper end of the yoke and fits over the upper portion of the upper shaft 74. A cap 77 is secured to the upper ends of the

yoke and an adjusting screw 77′ extends through the cap and bears against the top of the bearing block 76. The upper feed shaft 74 and the lower shaft are driven intermittently to feed the wire into the die. This operation is performed by means of a segmental gear 78 secured to the outer end of the continuously driven main shaft 38, previously described. The teeth of the segment 78 mesh with a pinion 79 on the feed shaft 73 and are arranged on the opposite side of the gear 78 with relation to the position of the teeth of the segment 39, providing the intermittent driving connection for the conveyer, so that the springs 48 will be formed and inserted into the body of material while the conveyer is at rest. As soon as the springs 48 are entirely inserted in the material the wires are severed at the discharge opening 70 of the dies by means of cutters 80. These cutters are preferably of hardened metal and are operatively supported in slots 81 formed in the bottom of the die block 50. In the drawings I have shown the cutter secured to a cutter bar 82 which is longitudinally movable in side bearings 83 of the die block support 55. The cutters are normally held in inoperative position by a coiled spring 84 interposed between a shoulder 85 on the cutter bar 82 and one of the bearings 83. The cutting operation is effected by means of a cam lug 86 which is secured to the inner face of the gear 37 and adapted to engage one end of the bar 82. The spring 84 is ordinarily sufficient to return the cutter bar to its inoperative position but in order to insure this action the gear 78 is provided with a similar cam lug 86 adapted to engage the opposite end of the cutter bar. The position of the cutter bar may be adjusted by means of a plug 87 (Fig. 4) which is screwed into the end of the bar 82 adjacent the gear 37. The cutters, die block and feed roller shafts, as it will be seen in the drawings, are all secured to the die block support and this support is preferably hinged as indicated at 88 to upstanding bearing elements 89 secured to opposite sides of the frame of the machine. With this construction the die block and support may be raised so that the under side of the die block 50 may be readily inspected or other associated parts adjusted without removing the wire from the dies.

In order to prevent the material 21 being entangled with the cutter blades 80 and other operating parts of the spring forming device, I provide a sheet metal guard plate 90 which is preferably secured to the bearing members 89 as shown at 91. The guard plate is formed with small openings 90′ adjacent the discharge end 70 of each die through which the coiled springs pass as they are discharged from the dies.

During the time that the coil springs are being inserted into the material the upper strand of the conveyer is held in an elevated position as shown in Fig. 7, so that the material will be pressed against the under side of the guard plate 90. This operation is accomplished by means of eccentrics 92—92 secured to a shaft 93. This shaft carries a pinion 94 which meshes with the gear 40 which, as previously described, meshes intermittently with the sector gear 39. As soon as the springs are inserted the eccentrics are moved to lower the conveyer and a forward movement is imparted to the conveyer. The rapid raising and lowering of the conveyer together with the intermittent forward movement operate to maintain a substantially uniform distribution of the material at the point where the springs are inserted.

In the drawings, I have shown side boards 94^a—94^a supported a short distance above the conveyer by brackets 95 which are bolted to the frame as indicated at 96. The brackets are preferably provided with a plurality of bolt holes 97 so as to permit the boards to be adjusted as desired. Under certain conditions it is desirable to use less than the entire number of spring forming dies, in such event the side boards 94, 94 may be adjusted to direct the material under the die being used. 98 designates a rheostat or transformer for controlling the operation of the variable speed motor 31.

While I have described my invention in connection with certain specific constructions it will be obvious that modifications in the arrangement, constructions and operation of the various parts may be made without departure from the spirit of my invention. I, therefore, do not wish to be limited to the specific structure shown and described except in so far as specific limitations may appear in the appended claims.

I claim:

1. In apparatus of the character described, the combination of a conveyer adapted to receive a body of packing or filling material at one end and discharge it at the other, and means associated therewith for embedding spring elements in said body of material.

2. In apparatus of the character described, the combination of a conveyer adapted to receive a body of packing or filling material at one end and discharge it at the other, and means associated therewith for embedding coiled spring elements in said body of material with a screwing action.

3. In apparatus of the character described, the combination of a conveyer adapted to receive a body of packing or filling material at one end and discharge it at the other, and means associated therewith for forming coiled spring elements and embedding them in said body of material with a screwing action.

4. In apparatus of the character described, the combination of an intermittently mov-

able conveyer adapted to receive a body of packing or filling material at one end and discharge it at the other, means associated therewith for forming coiled spring elements and embedding them in said material with a screwing action, and means for alternately moving the conveyer and operating said forming and embedding means.

5. In apparatus of the character described, the combination of an intermittently moved conveyer adapted to receive a body of packing or filling material at one end and discharge it at the other, and means operable during the interval which the conveyer is at rest for embedding coiled spring elements in said material with a screwing action.

6. In apparatus of the character described, the combination of supporting means for a body of packing or filling material, means for automatically embedding coiled springs in said material, and means for moving one of the aforesaid means with respect to the other and for preventing relative movement between the same during the period that the springs are being inserted.

7. In apparatus of the character described, the combination of a movable conveyer adapted to receive a body of packing or filling material at one end and discharge the same at the other end, a device for automatically embedding coiled springs in said material, and mechanism which moves said conveyer step by step and between steps actuates said embedding device.

8. In apparatus of the character described, the combination of a movable conveyer adapted to receive a body of packing or filling material at one end and discharge the same at the other end, a device for automatically forming coiled springs and by continued action embedding them in said material, and means for arresting movement of said conveyer during the period that the springs are being inserted.

9. In apparatus of the character described, the combination of a conveyer adapted to receive material at one end and discharge the same at the other end, a device intermittently operated to form springs and automatically insert them into said material, and means for elevating said conveyer adjacent said spring forming device whereby the material is supported in elevated position during the period the springs are being inserted.

10. In apparatus of the character described, the combination of a flexible conveyer adapted to receive material at one end and discharge the same at the other end, a device intermittently operated to form springs and automatically insert them into said material, and means for elevating said conveyer adjacent said spring forming device comprising devices adapted to bear against the underside of said conveyer whereby the material is supported in elevated position during the period the springs are being inserted.

11. In apparatus of the character described, the combination of a flexible conveyer adapted to receive material at one end and discharge the same at the other end, a device intermittently operated to form springs and automatically insert them into said material, and means for elevating said conveyer adjacent said spring forming device comprising intermittently operated eccentrics adapted to bear against the underside of said conveyer whereby the material is supported in elevated position during the period the springs are being inserted.

12. In apparatus of the character described, the combination of a flexible belt conveyer comprising slats having their upper surfaces inclined downwardly toward their rear edges and adapted to receive material at one end of the machine and discharge the same at the other, means for imparting an intermittent movement to the conveyer, means for inserting coiled spring elements into said material, and means for elevating the conveyer adjacent said spring inserting means.

13. In apparatus of the character described, the combination with means for supporting a body of packing or filling material, of means for forming a coil spring element and inserting it into said material comprising a die having a spiral groove, means for forcing a wire through said groove, and means for severing the wire.

14. In apparatus of the character described, the combination with a conveyer adapted to receive material at one end of the machine and discharge the same at the other, of means for forming a coil spring element and inserting it into said material comprising a die provided with a spiral groove having receiving and discharging openings for the wire, means for forcing a wire through said groove, and means for severing the wire adjacent the discharge opening.

15. In apparatus of the character described, the combination with a conveyer adapted to receive material at one end of the machine and discharge the same at the other, of means for forming a coil spring element and inserting it into said material comprising a die provided with a spiral groove having receiving and discharging openings for the wire, means for forcing a wire through said groove whereby the discharged portion of the coiled wire enters the said material with a screwing action and means for severing the wire.

16. In apparatus of the character described, the combination with a conveyer adapted to receive material at end one of the machine and discharge the same at the

other, of a spring forming device adapted to form a plurality of springs and insert them into said material comprising a plurality of spring forming dies, intermittently operated feeding mechanism for forcing strands of wire through said dies, and wire cutting devices for severing said wire at the discharge ends of said dies.

17. In apparatus of the character described, the combination with a conveyer adapted to receive material at one end of the machine and discharge the same at the other, of a spring forming device adapted to form a plurality of springs and insert them into said material comprising a plurality of spring forming dies, intermittently operated feeding mechanism for forcing strands of wire through said dies, wire cutting devices, and means for imparting a positive movement to said cutting devices to sever the wires at the discharge end of the dies, and means for adjusting said cutting devices with relation to said dies.

18. In apparatus of the character described, the combination with a conveyer adapted to receive material at one end of the machine and discharge the same at the other, of a spring forming device adapted to form a plurality of springs and insert them into said material comprising a plurality of spring forming dies, intermittently operated feeding mechanism for forcing strands of wire through said dies, wire cutting devices, and means for imparting a positive movement to said cutting devices to sever the wires at the discharge end of the dies, means for adjusting said cutting devices with relation to said dies, and a spring for normally holding said cutting devices in inoperative position.

19. In apparatus of the character described, the combination with an intermittently movable conveyer adapted to receive material at one end of the machine and discharge the same at the other, of a spring forming device adapted to form springs and insert them into said material comprising spring forming dies, feeding mechanism for forcing wire through said dies during the period the conveyer is at rest, and cutting devices for severing the inserted springs from the wire stock from which they are formed; and a pivoted supporting device for supporting said spring forming device above said conveyer whereby it may be raised for the purpose described.

20. In apparatus of the character described, the combination with an intermittently movable conveyer adapted to receive material at one end of the machine and discharge the same at the other, of a spring forming device adapted to form springs and insert them into said material comprising spring forming dies, feeding mechanism for forcing wire through said dies during the period the conveyer is at rest, reels for supporting said wire provided with means whereby the wire is maintained taut intermediate the reels and feeding mechanism, and cutting devices for severing the inserted springs from the wire stock from which they are formed; and a pivoted supporting device for supporting said spring forming device above said conveyer whereby it may be raised for the purpose described.

21. In apparatus of the character described, the combination with an intermittently movable conveyer adapted to receive material at one end of the machine and discharge the same at the other, of a spring forming device adapted to form springs and insert them into said material comprising spring forming dies, feeding mechanism for forcing wire through said dies during the period the conveyer is at rest, reels for supporting said wire provided with means whereby the wire is maintained taut intermediate the reels and feeding mechanism, means for feeding a lubricant into said die, and cutting devices for severing the inserted springs from the wire stock from which they are formed; and a pivoted supporting device for supporting said spring forming device above said conveyer whereby it may be raised for the purpose described.

22. In apparatus of the character described, the combination with an intermittently movable conveyer adapted to receive material at one end of the machine and discharge the same at the other, of a spring forming device adapted to form springs and insert them into said material comprising spring forming dies, feeding mechanism for forcing wire through said dies during the period the conveyer is at rest, and cutting devices for severing the inserted springs from the wire stock from which they are formed; and a guard plate positioned between the material on said conveyer and the said spring forming device.

23. In apparatus of the character described, in combination with means for supporting a quantity of material, a spring forming device adapted to form springs and insert them into said material, feeding mechanism for feeding wire to said spring forming device, reels for containing a quantity of wire, and means for supporting said reels whereby the wire is unwound therefrom against the weight of said reel.

24. In apparatus of the character described, in combination with a conveyer adapted to support a quantity of material, a spring forming device adapted to form springs and insert them into said material, comprising a die block formed with a plurality of dies, and adjustable guiding elements supported above said conveyer to direct the said material under one or more of said dies.

25. In apparatus of the character described the combination with means for supporting the body of packing or filling material, of a die having a spiral groove, a pair of feeding rollers to force a wire through said die and into the material, and means for severing the wire.

26. In apparatus of the character described, the combination with a conveyer adapted to receive a quantity of threadlike material at one end of the machine and discharge the same at the other, means for forming a coil spring element and inserting it into said material, and means for keeping said material in agitation, whereby a substantially uniform distribution of the material is maintained at the point where the said spring is inserted.

CHARLES T. RIPLEY.