Oct. 1, 1935. C. D. GILMORE 2,015,927

MACHINE FOR JOINING UPHOLSTERY SPRINGS

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Fig. 1.

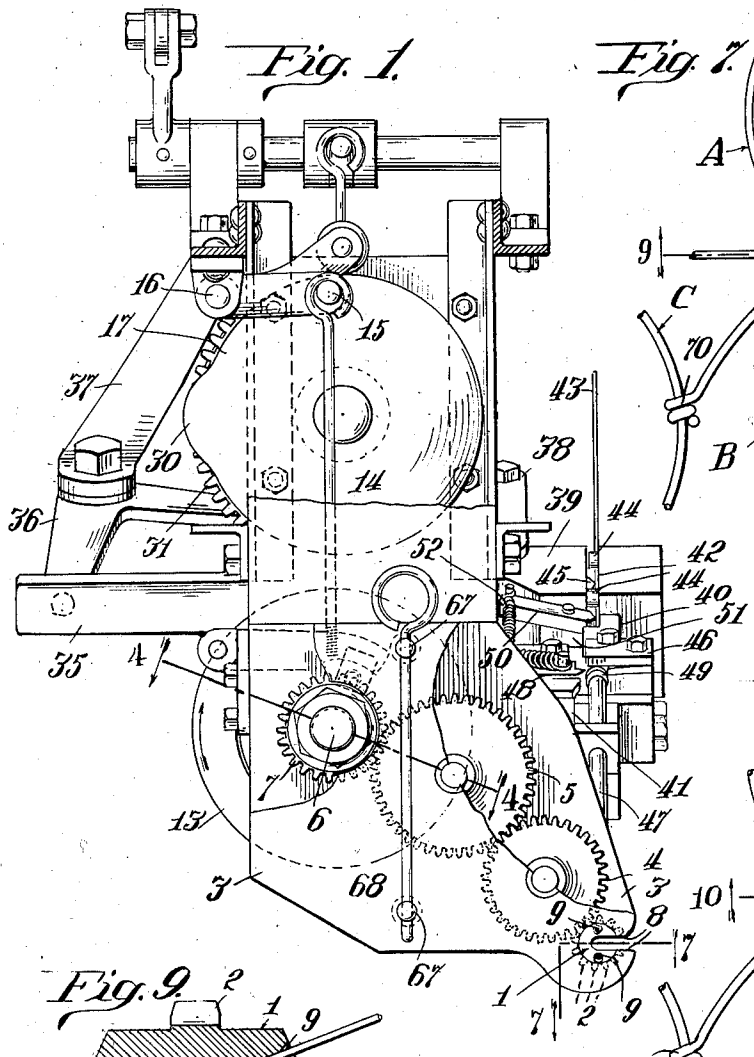


Fig. 7.

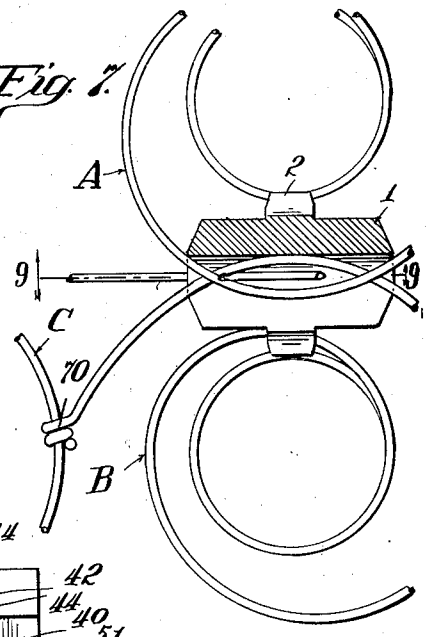


Fig. 8.

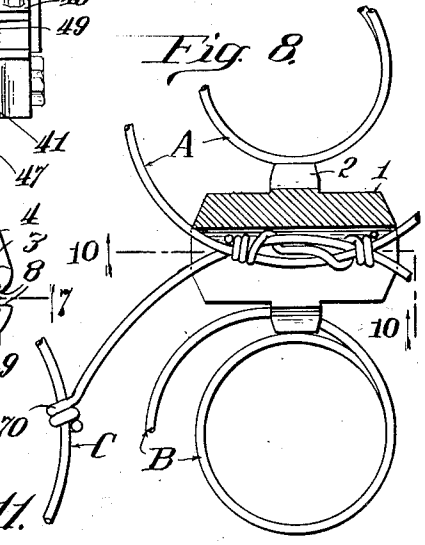


Fig. 9.

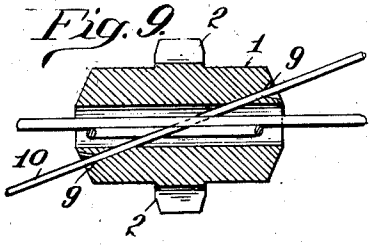


Fig. 10.

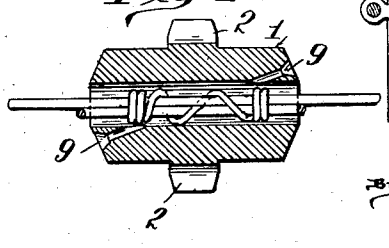
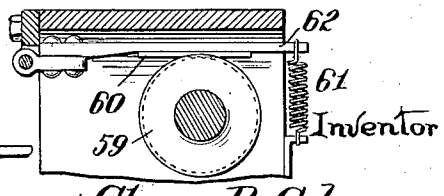


Fig. 11.



Inventor

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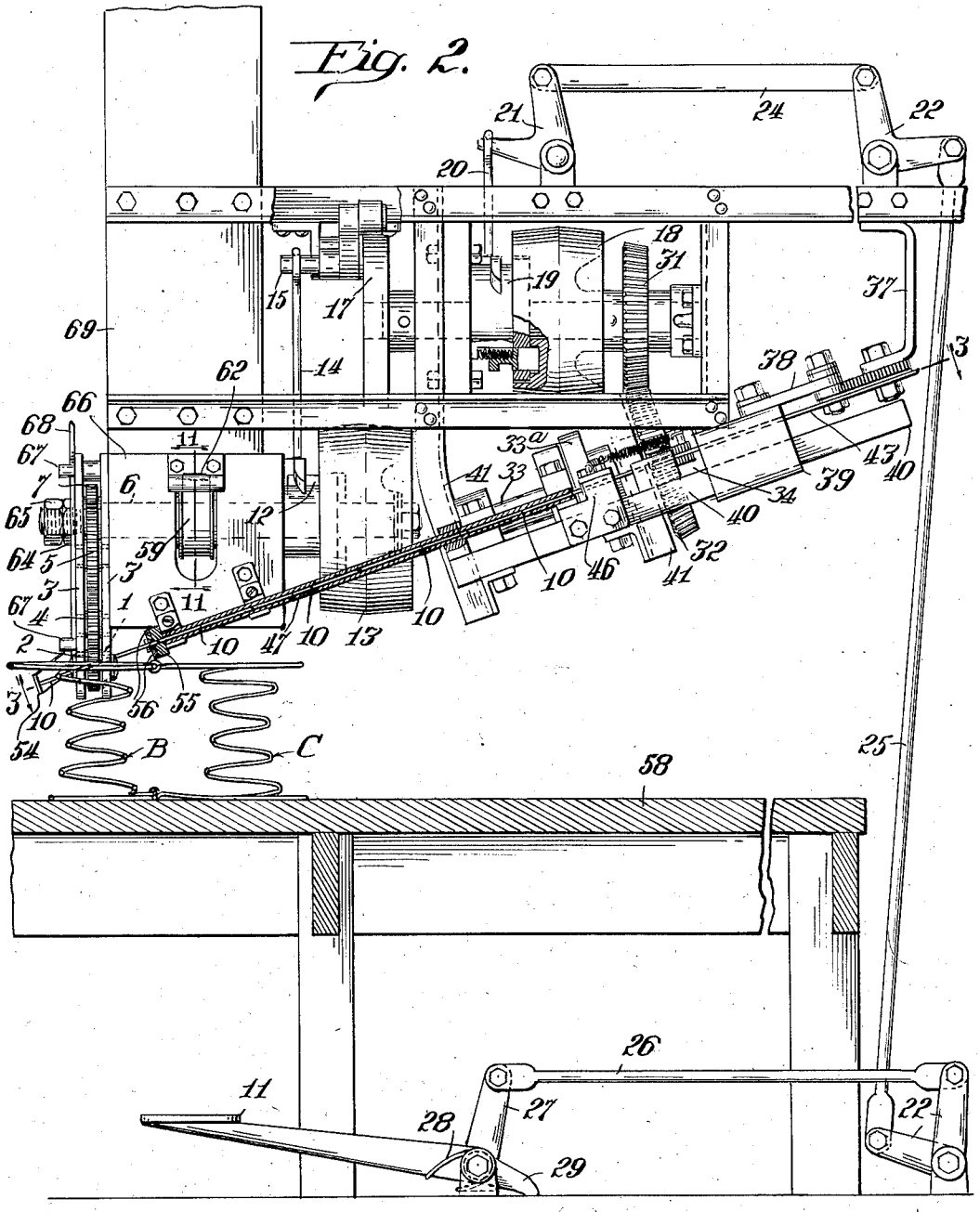
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MACHINE FOR JOINING UPHOLSTERY SPRINGS

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Fig. 2.



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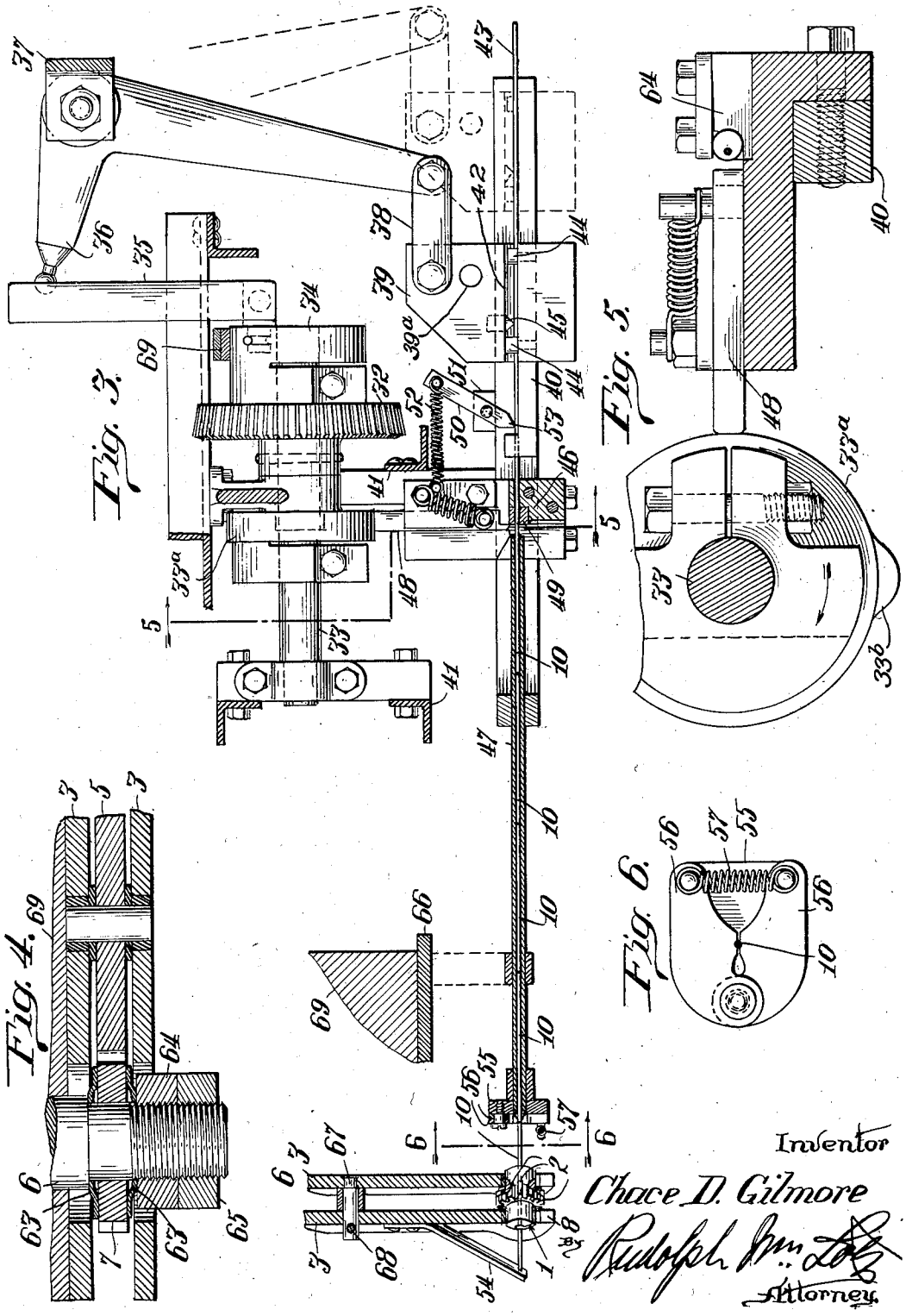
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MACHINE FOR JOINING UPHOLSTERY SPRINGS

Filed March 31, 1934 3 Sheets-Sheet 3



Patented Oct. 1, 1935 2,015,927

UNITED STATES PATENT OFFICE

2,015,927

MACHINE FOR JOINING UPHOLSTERY SPRINGS

Chace D. Gilmore, West Chester, Pa., assignor to Peerless Springs, Incorporated, West Chester, Pa., a corporation of Pennsylvania

Application March 31, 1934, Serial No. 718,466

23 Claims. (Cl. 140—3)

The present invention has for its main object to provide a machine for producing the particular type of wire tie forming a double hinge joint between two overlapped upholstery springs as illustrated, described and claimed in Letters Patent of the United States to Oliver Hetherington No. 1,888,666.

The main object of the present invention is to provide a machine which will produce the type of tie referred to above, speedily and efficiently, and which is so positioned as to permit the disposition underneath the same, of spring assemblies for mattresses and cushions which are to be equipped with said hinge joints or ties.

A further object of the invention is to provide a machine of the type specified which includes mechanism for feeding the necessary lengths of wire to the tie-forming mechanism of the machine, precedent to each operation of the last-mentioned mechanism.

Other objects of the invention will be understood from, or specifically set forth in the following specification:

In the accompanying drawings illustrating a suitable embodiment of the invention:—

Fig. 1 is a view in side elevation of a machine for wire-tying springs together in the manner indicated, a portion of the feeding mechanism for said machine being shown and parts of the latter broken away.

Fig. 2 is a front elevation of said machine, shown partly in section.

Fig. 3 is a plan sectional view of the machine and the feeding mechanism therefor taken on the line 3—3 of Fig. 2.

Fig. 4 is a fragmentary detail plan sectional view on an enlarged scale taken on the line 4—4 of Fig. 1.

Fig. 5 is a detail sectional view on an enlarged scale taken on the line 5—5 of Fig. 3.

Fig. 6 is a detail sectional view on an enlarged scale taken on the line 6—6 of Fig. 3 and showing a wire-engaging brake device of the wire feeding mechanism.

Fig. 7 is a fragmentary detail plan section on an enlarged scale taken on the line 7—7 of Fig. 1 and showing two springs and piece of wire in place in the tie-forming head preparatory to operation of said head.

Fig. 8 is a view similar to Fig. 7 showing the completed tie at the moment of cessation of operation of the tie-forming head.

Fig. 9 is a detail sectional view taken on the line 9—9 of Fig. 7.

Fig. 10 is a detail sectional view taken on the line 10—10 of Fig. 8.

Fig. 11 is a fragmentary vertical sectional view on the line 11—11 of Fig. 2 and illustrates a brake-mechanism employed.

Referring first to Fig. 7, it will be noted that a pair of springs A and B are positioned so that their terminal convolutions at top or bottom of a spring assembly (which includes other springs exemplified by the springs C) are disposed partially in overlapped position so as to present an opening bordered by arcuate portions of said terminal convolutions, and that these overlapped portions are disposed in a recess in a head or member (1), which is rotatable about its own axis and about the said overlapped portions of said terminal convolutions.

Said member (1) is equipped with spur gear teeth (2) and is journalled in bearings in the parallel vertical plates (3) constituting a part of a machine frame and which are equipped with suitable bearings for the trunnions of spur gear wheels (4 and 5) and also with openings through which a drive shaft (6) projects, which is equipped with the spur gear wheel (7) meshing with the spur gear wheel (5) for effecting rotation of member (1), the gear teeth of which mesh with the spur gear wheel (4). The several spur gear wheels 4, 5, and 7 rotate, respectively, in the direction of the arrows shown in Fig. 1. In the instance illustrated, the gear ratio between the driving gear wheel (7) and the member or head (1) is such as to cause the latter to revolve at three times the speed of the drive-shaft (6).

The said recess of the head of the member (1) is radial and extends from end to end of the same, its inner wall being semi-cylindrical and concentric with the axis of rotation, thereof.

The said plates (3) are equipped with recesses (8) in their front edges which are flush with the recess in the member (1) which receives the overlapped convolutions of springs as shown in Figs. 7 to 10 inclusive.

As shown, particularly in Figs. 9 and 10, the said member (1) is equipped at opposite end portions of the recesses therein and opposite ends of said member (1), with openings (9) which extend angularly of the axis of said member (1) and in the plane of said axis which is the vertical plane of the same when disposed in the position shown in Figs. 1 and 7 to 10 inclusive, and is perpendicular to the flat walls of the recess in said member.

The said openings are provided to receive a piece (10) of wire which passes through said

openings (9) and through the openings bordered by the overlapped arcuate portion of the terminal convolutions of the springs A and B and, at its end portions, is tied about said end convolutions at the points at which they cross each other.

The said member (1) is rotated through a definite number of revolutions at each of the tying operations, the number of revolutions depending upon the gear ratio between the shaft (6) and the member (1) and the number of turns or windings of the end portions of the wire (10) desired to be disposed about the said convolutions of the springs A and B. The shaft (6) rotates through one revolution at each operation of the machine as determined by depression of the foot lever (11) shown in Fig. 2 which controls a conventional punch-press clutch (12) interposed between the drive pulley (13), or its equivalent, and the said drive-shaft (6) in an operative manner, said punch-press clutch being thrown into operating position by depression of the foot lever (11) and being self-releasing at the completion of one revolution of the member (13) so as to restore the member (1) to the normal position shown in Fig. 1 at the completion of said single revolution of the shaft (6).

The said clutch (12) is controlled by the plunger (14) which is connected with the pin (15) of an arm of a rock-shaft (16), said plunger (14) being actuated by a rotatable cam (17), shown in detail in Fig. 5; said cam (17) is rigid with the drive-shaft of the wire-feeding mechanism which carried the pulley (18), or an equivalent power applying member, which is thrown into shaft-actuating position by means of a conventional punch-press clutch (19) controlled by the reciprocable plunger (20) connected by means of bell-crank levers (21, 22 and 23) and links (24, 25 and 26) with the foot-lever (11) and the arm (27) actuated by the same, a spring (28) being associated with the lever (11) to maintain the same normally in the position shown in Fig. 2 and cooperating with a stop-arm (29) for this purpose.

In order that the head or member (1) may be always restored to its normal position, as shown in Fig. 1, the drive-shaft (6) is equipped with a brake-drum (59) against which a brake-shoe (60) bears under the influence of a spring (61) engaged with one end of the bar (62) which carries said brake-shoe. Said brake mechanism insures cessation of rotation of the shaft (6) at the instant of release of the clutch (12).

Occasionally, the machine becomes jammed by reason of slippage of the wire (10) so that a greater length, thereof, at one end is coiled about the springs A and B than at its other end and the coil or coils pile up upon each other to greater diameter than the width of the radial slot in the head (1). Other causes contribute to such jamming and when the same occurs, there is need for preventing stripping of the several gear elements (2, 4, 5, and 7) and such means, in the instant case, consists of a pair of dished steel washers (63) which are compressed against opposite faces of the gear wheel (7) on the shaft (6), the latter being equipped with annular shoulder against which one of said washers bears under the influence of the nuts (64 and 65) mounted upon the threaded end of the shaft (6), (see Fig. 4).

The said nuts (64 and 65) and the washers (63) constitute the equivalent of a friction clutch which permits the shaft (6) to rotate relatively to the gear wheel (7) when resistance to rotation of the latter exceeds the driving force of the said washers.

One of the side plates (3) of the machine may be integral with or rigidly secured to front and rear frame-plates (66) which are suitably secured rigidly to a support (69). Said plate (66) is equipped with studs (67) having annular shoulders between their ends against which the outer plate (3) bears, the reduced end portion of said studs projecting through openings in said plate (3) and being provided with openings to receive the pin (68) between which and said last-mentioned shoulders the said outer plate (3) is confined. The latter may thus be easily removed by removing the said pin (68) for purposes of removing the head (1) in case of the jamming above described or for interchange of heads (1) having radial slots of different width for reception of the overlapped portions of springs A and B, made of lighter or heavier gauge wire.

The drive shaft (6) is rotatable independently of the feeding mechanism as it is equipped with its own power drive.

On the drive-shaft of said wire-feeding mechanism, there is mounted a bevel gear wheel (31) which meshes with the bevel gear wheel (32) on a countershaft (33) of the machine or feeding mechanism. The latter is equipped with a crank wheel (34) for rocking a member or pitman (35) which is operatively connected with a bell-crank lever (36) for rocking the latter.

The shaft (33) carries a cam (33—*a*) which is practically identical with the cam (17) in shape and is provided with the projecting portion (33—*b*) to actuate the plunger (48) which is spring retracted and cooperates with the companion member (49) to effect severance of the wire (43) at the instant of, or substantially directly after the completion of each stroke of the block (39) as hereinabove described.

A lever (50) pivotally mounted between its ends upon a projection (51) rigid with the guide member (40) and which is held in wire-engaging position by means of the spring (52), is formed at its other end portion to provide a wire-engaging formation (53) which will prevent the wire (43) from being retracted from its advanced position during movement of the block (39) from the position shown in full lines to the position shown in dotted lines in Fig. 3.

Said bell-crank lever (36) is mounted pivotally at its elbow upon a rigid part (37) of the machine frame and at its other end is pivotally connected with one end of a link (38) which is connected with a sliding block (39) mounted upon a guide member (40) which is carried by the bracket member (41) of the machine frame.

The said block (39) is composed of two parts which are pivotally joined by means of the member (39*a*). The lower part of said block is provided with a guide (42) for the wire (43) behind two adjustable stop members (44) which limit the rocking movement of the upper part of said block relatively to the lower part thereof. The said upper part carries the wire engaging member (45) which is thrown into engagement with the wire (43) immediately preceding the forward or feed stroke of the said block and is thrown out of engagement with said wire immediately precedent to the return stroke of the said block as is obvious due to the action of the link (38) and the lever (36).

The said wire (43) passes through a cutting die member (46) into a tube (47) which is axially aligned with the openings (9) in the member (1)

to cause lengths of wire, indicated by reference numeral 10 in Fig. 9, equal in length to the stroke of the block (39), to be fed through said member (1) at each stroke of said block as last described.

It will be noted that the cutting mechanism consists of the members (48 and 49) positioned contiguously to the wire receiving end of the tube (47) so that each cutting operation will leave a predetermined length (10) of wire, disposed mainly within the tube with only a short portion projecting from the latter and said portion will be aligned axially with the succeeding portion of said wire (43), so that at each forward stroke of the last (39) said wire (43) will advance the last cut-off portion or length (10) of said wire, forward a distance equal to its own length. Thus said lengths (10) of wire cut from the wire (43) are advanced successively and fed through said openings (9) in the member (1) and against the stop member (54) mounted upon a frame plate (3).

Disposed at the discharge end of said tube (47) is a plate (55) upon which are mounted pivotally, a pair of opposed clamping jaws (56) equipped with opposed recesses in which the wire lengths (10) are engaged successively as shown in Fig. 6. Said jaws (56) are maintained in yielding engagement with the wire lengths (10) by means of the spring (57), and constitute a brake mechanism for preventing movement or feeding of wire lengths (10) except under the influence of the means for projecting the same as hereinbefore described.

The entire machine, comprising the several mechanisms described hereinabove, are mounted above a table (58) upon which springs A, B, and C., etc. are supported substantially as shown in Fig. 2; the elevation of the member (1) above said table (58) being substantially the same as the height of said upholstery springs A, B, and C. To this end, in order that the table (58) may support a spring assembly made up of springs A, B, C, etc. in any desired number, such for example, as would be requisite for a mattress for a double bed, without encountering any obstruction to prevent the free movement of said spring assembly upon said table (58) for bringing the terminal convolutions of component springs successively into position to receive the wires (10) for tying said springs together, the said above described mechanisms are mounted upon one or more posts (69) depending from the ceiling of the room containing said mechanisms.

The tube (47) and the wire feeding and guiding means associated with the same are disposed in axial alignment with the openings (9) of the head or member (1).

Obviously, the wires (10) may be fed into the said openings (9) by hand in the instances of omission of a feeding mechanism.

The crank wheel (34) of the wire-feeding mechanism serves also as a brake-drum for cooperation with a spring-held brake shoe as described in connection with the brake mechanism (59) for the shaft (6) to cause the wire feeding mechanism to be properly re-positioned after each operation of said feeding mechanism.

While the operation of the machine may be very well understood from the foregoing description in the light of the drawings, a brief description of said operation is appended.

The springs of the assembly which is to be made by the machine may consist of pivotally inter-engaged springs arranged in parallel rows which extend substantially parallel with the axis of rotation of the head or member (1). Said rows of springs would be equal in length to the length or width of the ultimate spring assembly and these rows would then be equipped with the hinge formations or ties of the type shown in detail in Figs. 8 and 10, though it will be understood, of course, that the first mentioned rows of springs may consist of a series of the latter connected together by means of the wire ties shown in Figs. 8 and 10, or in any other suitable manner, besides that shown at (70) in Figs. 7 and 8. The latter type of connection of springs with each other is fully described and illustrated in my co-pending applications for patents for a Spring assembly for upholstery and for a Machine for pivotally joining upholstery springs, respectively, identified by the Serial Nos. 713,869 and 715,449.

Whether the spring assembly is to be built up gradually by means of the wire ties shown in Figs. 8 and 10, or by tying together rows of previously joined springs, as indicated in Figs. 7 and 8, the need for ample free space for manipulating an appreciable number of springs A, B, and C will be required, and to this end the relative elevations of the top of the table (58) and the radial slot of the head or member (1) is also important.

The operator brings the terminal convolutions at the tops of two contiguous springs A and B to be tied together into the position shown in Fig. 7, within the recess of the head or member (1) and thereupon depresses the foot lever (11) which causes the wire-feeding mechanism to be actuated in the manner above described, to project a wire (10) through the openings (9) in the head or member (1) and also through the openings bordered by the overlapped arcuate portions of the terminal convolutions of the springs A and B.

The projection (30) of the cam (17) is normally disposed in such a position that it will actuate the wire-cutting plunger either prior to or following the engagement of said projection with the anti-friction rollers of the arm of the rockshaft (16) to throw in the punch press clutch (12), and thus cause the predetermined rotation of the head or member (1) to cause the respective end portions of the wire (10) to be coiled or twined about the overlapped portions of the springs A and B at their points of crossing each other.

The self release of both of the punch press clutches, at the instant that the respective shafts controlled by the operation thereof have completed one revolution, coupled with the action of the aforesaid brake mechanisms, assures the re-positioning of the two mechanisms as initially, so that after extracting the completed hinge-jointed pair of springs A and B from the recess of the head or member (1) and the positioning of another pair of overlapped portions of a pair of springs within said recess, the foregoing operation is repeated. These operations are very rapid and are synchronized as required.

In Figs. 7 to 10, inclusive, and particularly in Figs. 7 and 8, the springs A and B are shown to be overlapped to a greater extent than is common in the actual manufacture of spring assemblies. The recess of the head (1) serves to bring the overlapped portions of springs A and B into position to cause the same to engage diametrically opposite sides of the wire (10) during the first quarter revolution of said head (1) and this is effective also to cause the windings at the end portions of the wire (10) to embrace the crossing

points of the springs more accurately than is shown in Fig. 8.

By reference to Figs. 7, 9, and 10, it will be noted that the terminal convolutions of the springs A and B are inserted into the recess of the head (1) so that the convex side of the lower convolution opposes the semi-cylindrical end wall of said recess and the concave side of the end convolution of the other spring is opposed to the said end wall and is disposed at the higher elevation. The head (1) rotates clockwise as seen in Fig. 1 and during its first quarter-revolution causes the upper wall of said recess to bear upon the convex side of the last-mentioned convolution and crowd the same against the tie-wire (10), the convex side of the first-mentioned convolution being held in contact with the rear wall of the recess by the operator. Thus the tie-wire (10) is clamped between the overlapped convolutions and so held while the end portions are being coiled.

Obviously, the feeding of a length (10) of wire into the head or member (1) must precede the rotation of the latter and, preferably, the wire cutting operation of the plunger (48) will occur at the instant of completion of the said feeding operation and at substantially the same instant that the clutch (12) is thrown in to cause the rotation of said member (1).

Reference herein to a conventional punch-press clutch is intended to include any well known mechanism for performing the desired function of effecting forced rotation through a single revolution of a driving element and including automatic stoppage of the said driving member at the completion of said single revolution.

I claim as my invention:

1. A machine for the purpose specified comprising a drive shaft, a power actuated member, a conventional punch-press clutch for engaging said shaft with said power actuated member, a rotatable member equipped with a radial recess extending from end to end thereof and terminating at its inner end in a semi-cylindrical wall concentric with the axis of rotation of said member, and opening in each end of said head at respectively opposite sides of said recess and communicating with the latter, the said openings having a common axis intersecting the axis of rotation of said member, and gearing between said member and said drive shaft for causing the former to rotate through a given number of complete revolutions for each complete revolution of said drive-shaft.

2. A machine for the purpose specified comprising a drive-shaft, a power actuated member, a conventional punch-press clutch for engaging said shaft with said power actuated member, a rotatable member equipped with a radial recess extending from end to end thereof and terminating at its inner end in a semi-cylindrical wall concentric with the axis of rotation of said member, an opening in each end of said head at respectively opposite sides of said recess and communicating with the latter, the said openings having a common axis intersecting the axis of rotation of said member, bearings for the ends of said member having recesses registering normally with the recess of said member, gearing between said member and said drive shaft for causing the former to rotate through a given number of complete revolutions for each complete revolution of said drive-shaft, and a brake for said drive-shaft cooperating with the said clutch to cause said member to be restored to its initial position after each actuation thereof.

3. A machine for the purpose specified comprising a drive-shaft, a power actuated member, a conventional punch-press clutch for engaging said shaft with said power actuated member, a rotatable member equipped with a radial recess extending from end to end thereof and terminating at its inner end in a semi-cylindrical wall concentric with the axis of rotation of said member, an opening in each end of said head at respectively opposite sides of said recess and communicating with the latter, the said openings having a common axis intersecting the axis of rotation of said member, bearings for the ends of said member having recesses registering normally with the recess of said member, gearing between said member and said drive-shaft for causing the former to rotate through a given number of complete revolutions for each complete revolution of said drive-shaft, frictional means engaging on said drive-shaft for engaging the latter with said gearing, and a brake for said drive-shaft cooperating with the said clutch to cause said member to be restored to its initial position after each actuation thereof.

4. In a machine for the purpose set forth, the combination with a rotatable wire twisting head equipped with openings to receive a length of wire and arranged to position the same in intersecting angular relation to the axis of rotation of said head, of a stop disposed for cooperation with said openings to cause said length of wire to intersect the axis of rotation of said head at a point substantially midway between the ends of said wire and driving mechanism for said head, including a drive-shaft, gearing between the same and said head, and a frictional drive association between said shaft and said gearing.

5. In a machine for the purpose set forth, the combination with a rotatable wire twisting head equipped with openings to receive a length of wire and arranged to position the same in intersecting angular relation to the axis of rotation of said head, of a stop disposed for cooperation with said openings to cause said length of wire to intersect the axis of rotation of said head at a point substantially midway between the ends of said wire and driving mechanism for said head including a drive-shaft, a conventional punch-press clutch for associating the same with a source of power, gearing between said shaft and said head, and a frictional drive association between said shaft and said gearing.

6. A machine of the type specified including a rotatable cylindrical head mounted in bearings in the machine frame and equipped with spur gear teeth between its ends, said head provided with a radial recess extending from end to end, thereof, and having an inner semi-cylindrical wall disposed concentric with the axis of rotation of said head, and equipped with openings in its opposite ends having a common axis extending angularly of and intersecting the said axis of said head, there being radial slots in said bearings adapted to register with the said recess of said head, a source of power, and gearing between the latter and said head for rotating the latter.

7. A machine of the type specified comprising a source of power, a drive shaft, a conventional punch-press clutch interposed between the latter and said source of power, a spur gear wheel rotatable on said drive-shaft, friction means engaging the same with said shaft, a spring-held

brake operatively associated with said shaft for preventing rotation thereof under momentum following release of said clutch, a rotatable wire coiling head, bearings for the same, a radial recess in said head arranged to register with radial slots in said bearings for the reception of overlapped coils of springs to be tied together and tie-wire receiving openings in said head having a common axis intersecting the axis of rotation of the latter, said gearing and said clutch and brake cooperating to cause said head to rotate a predetermined number of revolutions following each throw-in of said clutch from a position wherein said recess of said head is in register with the slots of the bearings back to said position.

8. In a machine of the type specified including a tie-wire coiling head, a machine frame including parallel walls equipped with bearings for said head, a drive shaft having an end portion projecting through openings in said parallel walls, a gear train disposed between said walls for transmitting motion from said shaft to said head, one of said walls equipped with studs projecting through openings in the other thereof and provided with diametric openings in their projecting ends portions, a lock-pin extending through said last-mentioned openings and engaged with one of said walls for holding the same in position relatively to the other wall, trunnions on said head and the gear wheel of said train interposed between the said head and the said drive-shaft, and bearings in said walls for said trunnions, said pin removable to permit removal of said last-named wall and said last mentioned gear wheels and head.

9. The combination with a machine of the type specified, including a tie-wire coiling head equipped with means for receiving and engaging the wire of predetermined length, of a tie-wire feeding mechanism including mechanism for progressively moving a long length of wire toward said head a distance equal to the predetermined length of said tie-wire, cutting mechanism operatively associated with said feeding mechanism for automatically cutting the wire following each feed movement thereof to be cut off prior to operation of said cutting mechanism and maintaining the cut-off portion in axial alignment with the following portion of the wire for movement by the latter, means associated with said tube for frictional engagement with cut-off wire lengths to resist movement thereof independently of the following wire, said tube arranged to deliver cut-off wire lengths constituting tie-wires, to said tie-wire receiving means of said head.

10. The combination with a machine of the type specified, including a tie-wire coiling head equipped with means for receiving and engaging tie-wire of predetermined length, of a tie-wire feeding mechanism including mechanism for progressively moving a long length of wire toward said head a distance equal to the predetermined length of said tie-wire, cutting mechanism operatively associated with said feeding mechanism for automatically cutting the wire following each feed-movement thereof, a tube arranged in the path of the wire and receiving the end portion thereof to be cut off prior to operation of said cutting mechanism and maintaining the cut-off portion in axial alignment with the following portion of the wire for movement by the latter, means associated with said tube for frictional engagement with cut-off wire lengths to resist movement thereof independently of the following wire, said tube arranged to deliver cut-off wire lengths constituting tie-wires, to said tie-wire receiving means of said head, and a stop arranged for cooperation with said feeding means and said head for effecting predetermined positioning of said tie-wires relatively to said head.

11. The combination with a wire-tie coiling mechanism including a coiling head equipped with openings to receive and engage a tie-wire of predetermined length, and means associated with said head for positioning said tie-wire in said head, of a tie-wire feed tube disposed in axial alignment with said openings, wire feeding and cutting mechanism associated with said tube for successively supplying tie-wires to said tube and projecting them from the same into said head, a manually controlled power-supplying means for operating said feed mechanism and means including in the latter and the first-named mechanism for controlling operation of the latter in synchronism with said feed mechanism.

12. The combination with a wire-tie coiling mechanism including a coiling head equipped with openings to receive and engage a tie-wire of predetermined length, and means associated with said head for positioning said tie-wire in said head, of a tie-wire feed tube disposed in axial alignment with said openings, wire feeding and cutting mechanism associated with said tube for successively supplying tie-wires to said tube and projecting them from the same into said head, a manually controlled power supplying means for operating said feed mechanism and means including in the latter and the first-named mechanism for causing operation of the latter immediately following each wire-feeding stroke of the feed mechanism.

13. The combination with a wire-tie coiling mechanism including a coiling head equipped with openings to receive and engage a tie-wire of predetermined length, means associated with said head for positioning said tie-wire in said head, a conventional punch-press clutch controlling the operation of said head, of a tie-wire feed tube disposed in axial alignment with said openings, wire feeding and cutting mechanism associated with said tube for successively supplying tie-wires to said tube and projecting them from the same into said head, a conventional punch-press controlling the operation of the said feed mechanism, means included in the latter for throwing in the first-mentioned punch-press clutch at a given point in the movement of said feed mechanism and a manually operable lever controlling the second-named punch-press clutch.

14. The combination with a wire-tie coiling mechanism including a coiling head equipped with openings to receive and engage a tie-wire of predetermined length and means associated with said head for positioning said tie-wire in said head, of a tie-wire feed tube disposed in axial alignment with said openings, wire feeding and cutting mechanism associated with said tube for successively supplying tie-wires to said tube and projecting them from the same into said head, frictional tie-wire engaging means associated with said tube for resisting movement thereof independently of the action of said feed mechanism, a manually controlled power supplying means for operating said feed mechanism and means including in the latter and the first-named mechanism for controlling operation of the latter in synchronism with said feed mechanism.

15. The combination with a wire-tie coiling

mechanism including a coiling head equipped with openings to receive and engage a tie-wire of predetermined length and means associated with said head for positioning said tie-wire in said head, of a tie-wire feed tube disposed in axial alignment with said openings, wire feeding and cutting mechanism associated with said tube for successively supplying tie-wires to said tube and projecting them from the same into said head, frictional tie-wire engaging means associated with said tube for resisting movement, thereof, independently of the action of said feed mechanism, conventional punch-press clutches controlling the operation of both said mechanisms, means included in the latter for throwing in the first-mentioned punch-press clutch at a given point in the movement of said feed mechanism and a manually operable lever controlling the second-named punch-press clutch.

16. The combination with a wire-tie coiling mechanism including a coiling head equipped with openings to receive and engage a tie-wire of predetermined length and means associated with said head for positioning said tie-wire in said head, of a tie-wire feed tube disposed in axial alignment with said openings, wire feeding and cutting mechanism associated with said tube for successively supplying tie-wires to said tube and projecting them from the same into said head, conventional punch-press clutches controlling the operation of both said mechanisms, means included in the latter for throwing in the first-mentioned punch-press clutch at a given point in the movement of said feed mechanism and a manually operable lever controlling the second-named punch-press clutch.

17. The combination with a wire-tie coiling mechanism including a coiling head equipped with openings to receive and engage a tie-wire of predetermined length and means associated with said head for positioning said tie-wire in said head, of a tie-wire feed tube disposed in axial alignment with said openings, wire feeding and cutting mechanism associated with said tube for successively supplying tie-wires to said tube and projecting them from the same into said head, control means for both said mechanisms operable independently of each other, means included in the feed mechanism for effecting operation of the first-named mechanism at a given point in the operation of the feed mechanism, and a manually operable lever for actuating the control means for the feed mechanism.

18. The combination with a wire-tie coiling mechanism including a coiling head equipped with openings to receive and engage a tie-wire of predetermined length, of a tie-wire feed tube disposed in axial alignment with said openings, wire feeding and cutting mechanism associated with said tube for successively supplying tie-wires to said tube and projecting them from the same into said head, a manually controlled power supplying means for operating said feed mechanism, and means including in the latter and the first-named mechanism for controlling operation of the latter in synchronism with said feed mechanism.

19. The combination with a wire-tie coiling mechanism including a coiling head equipped with openings to receive and engage a tie-wire of predetermined length, of a tie wire feed tube disposed in axial alignment with said openings, wire feeding and cutting mechanism associated with said tube for successively supplying tie-wires to said tube and projecting them from the same into said head, conventional punch-press clutches controlling the operation of both said mechanisms, means included in the latter for throwing in the first-mentioned punch-press clutch at a given point in the movement of said feed mechanism, and a manually operable lever controlling the second-named punch-press clutch.

20. The combination with a wire-tie coiling mechanism including a coiling head equipped with openings to receive and engage a tie-wire of predetermined length, of a feed mechanism for feeding the wires to said head, a conventional punch-press clutch controlling the operation of said head, a conventional punch-press clutch controlling the operation of the said feed mechanisms, means included in the latter for throwing in the first-mentioned punch-press clutch at a given point in the movement of said feed mechanism, and a manually operable lever controlling the second-named punch-press clutch.

21. A machine of the type set forth, a rotatable wire coiling head adapted to receive and rotate relatively to a pair of spaced-apart wires to be coupled and means in said head for engaging a piece of the wire at its opposite end portions which extends angularly of and between said wires, whereby upon rotation of said head relatively to said spaced apart wires, the said end portions of said wire will be coiled about said first-named wires.

22. In a machine of the kind specified, a rotatable head having an axial hollow extending from end to end thereof and of a diameter sufficient to receive a pair of spaced apart wires about which said head is adapted to rotate, and means in said head extending angularly of and having an axis intersecting the axis of said head between the ends of the latter and adapted to engage opposite end portions of tie wire disposed between its ends between said first-named wires, whereby upon rotation of said head relatively to said spaced apart wires, the said end portions of said tie wire will be coiled about said first-named wires.

23. A mechanism for coupling wires while maintaining the same spaced from each other at one point which comprises rotatable means arranged for rotation relatively to and about a pair of spaced apart wires and means included in said rotatable means for engaging the end portions of the tie wire extending angularly of said spaced apart wires and passed between the same, whereby upon rotating said rotatable means relatively to the said spaced apart wires, the end portions of said tie wire will be coiled about said spaced apart wires while an intermediate portion of said tie wire remains disposed therebetween.

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