

D. E. KEMPSTER.
MACHINE FOR MAKING BAILS.
APPLICATION FILED OCT. 26, 1910.

1,001,531.

Patented Aug. 22, 1911

7 SHEETS-SHEET 1.

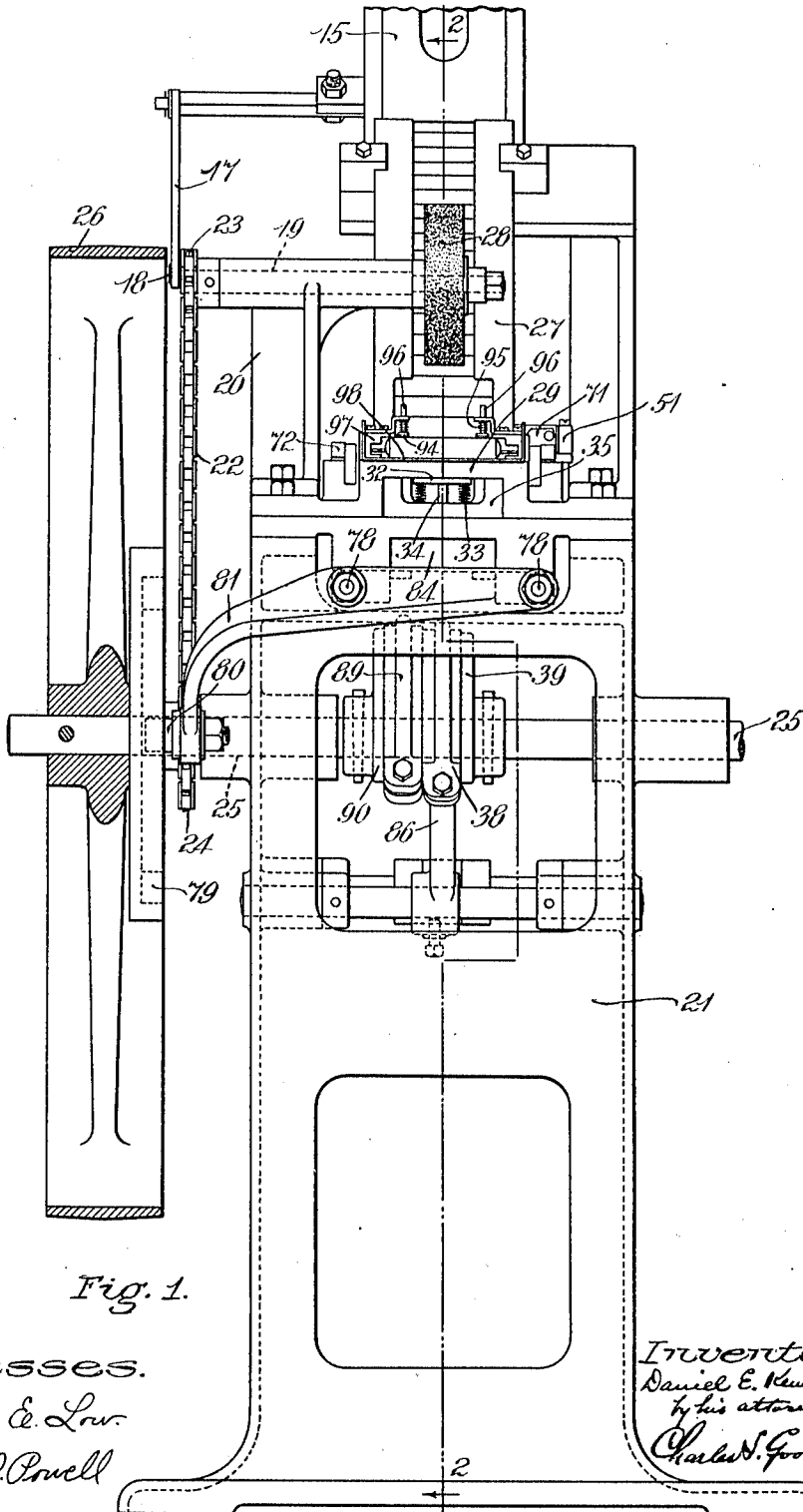


Fig. 1.

Witnesses.
Franklin E. Low.
Lemuel A. Powell

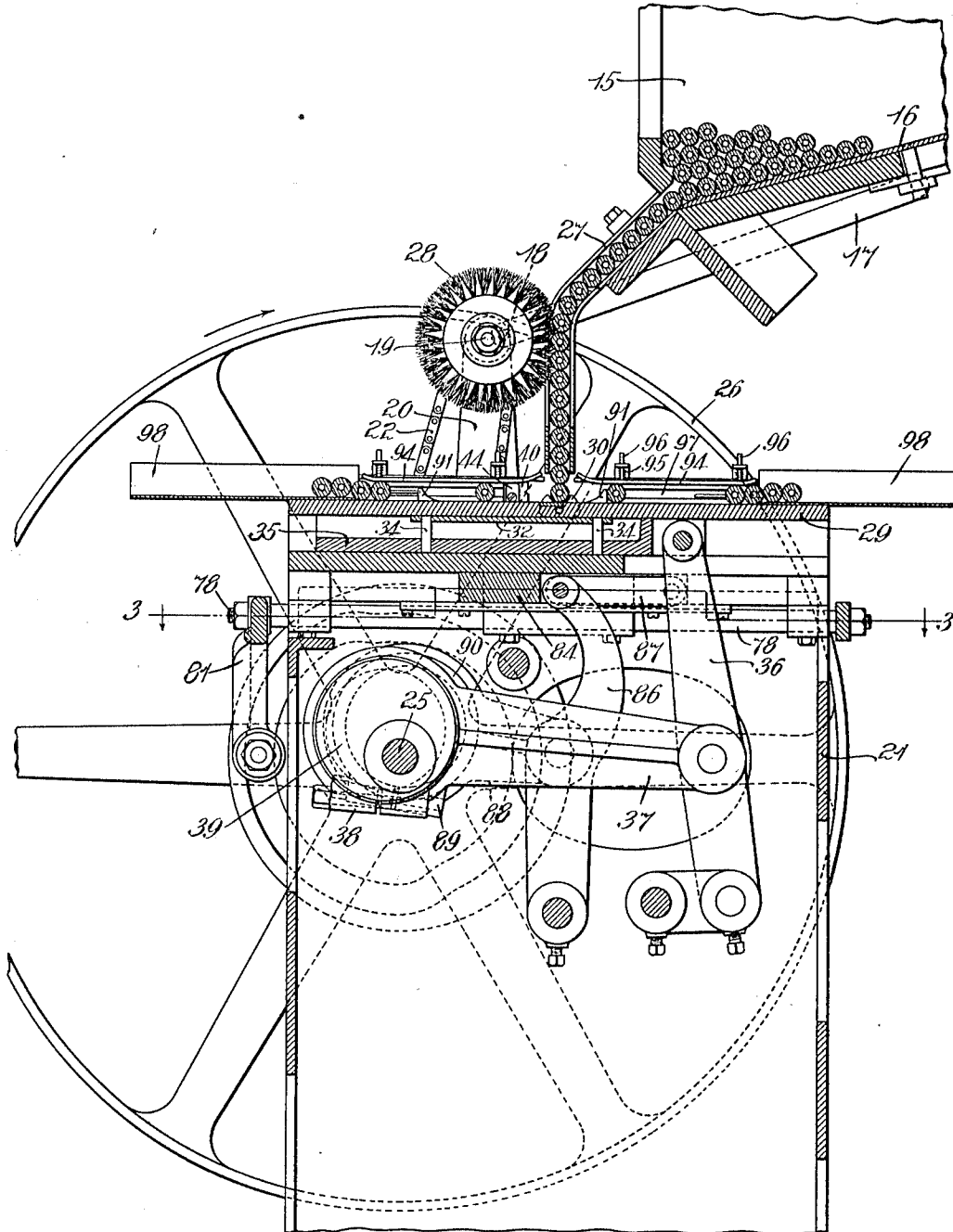
Inventor.
Daniel E. Kempster
by his attorney
Charles N. Gooding.

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7 SHEETS-SHEET 2.



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Fig. 2.

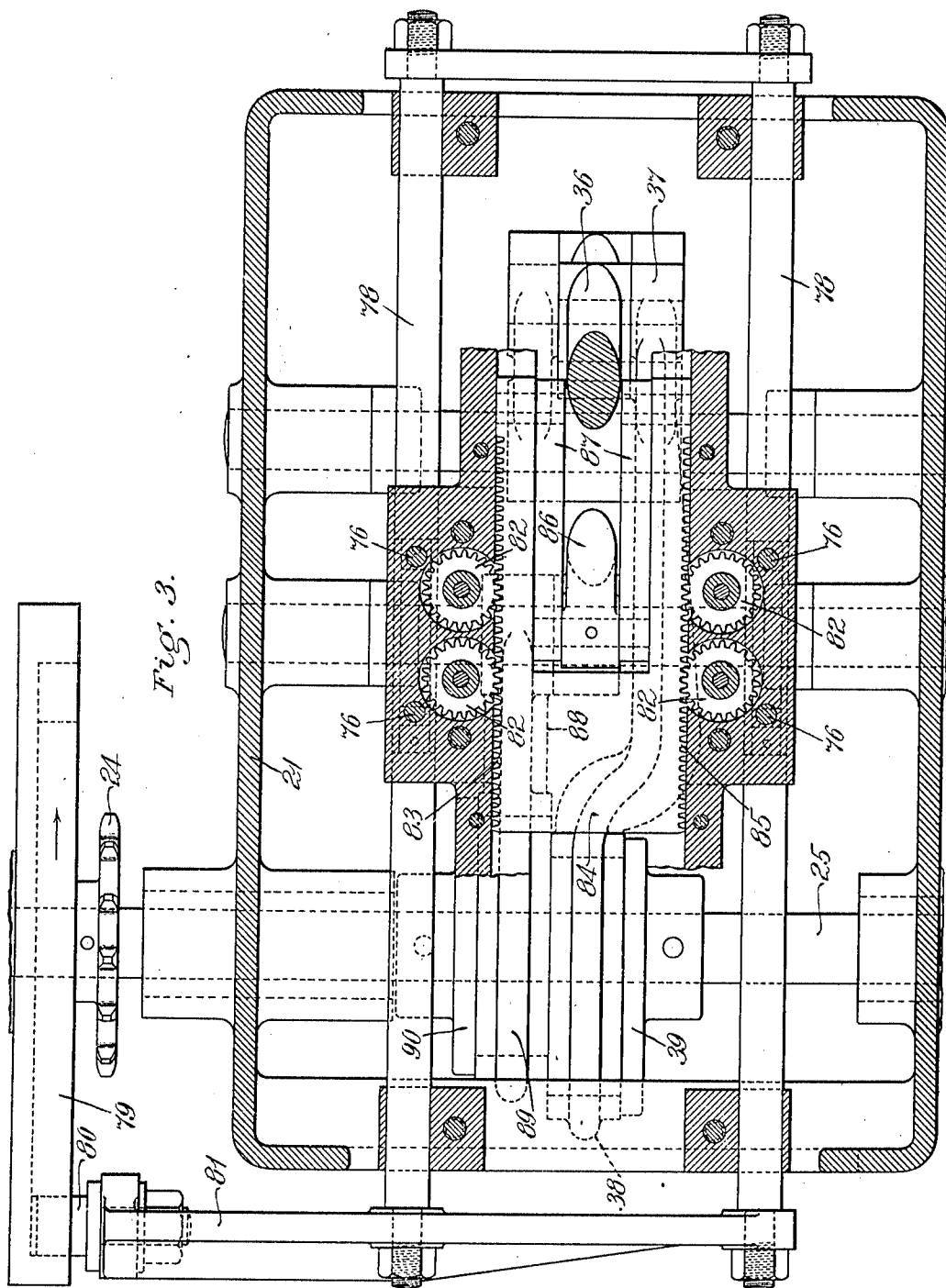
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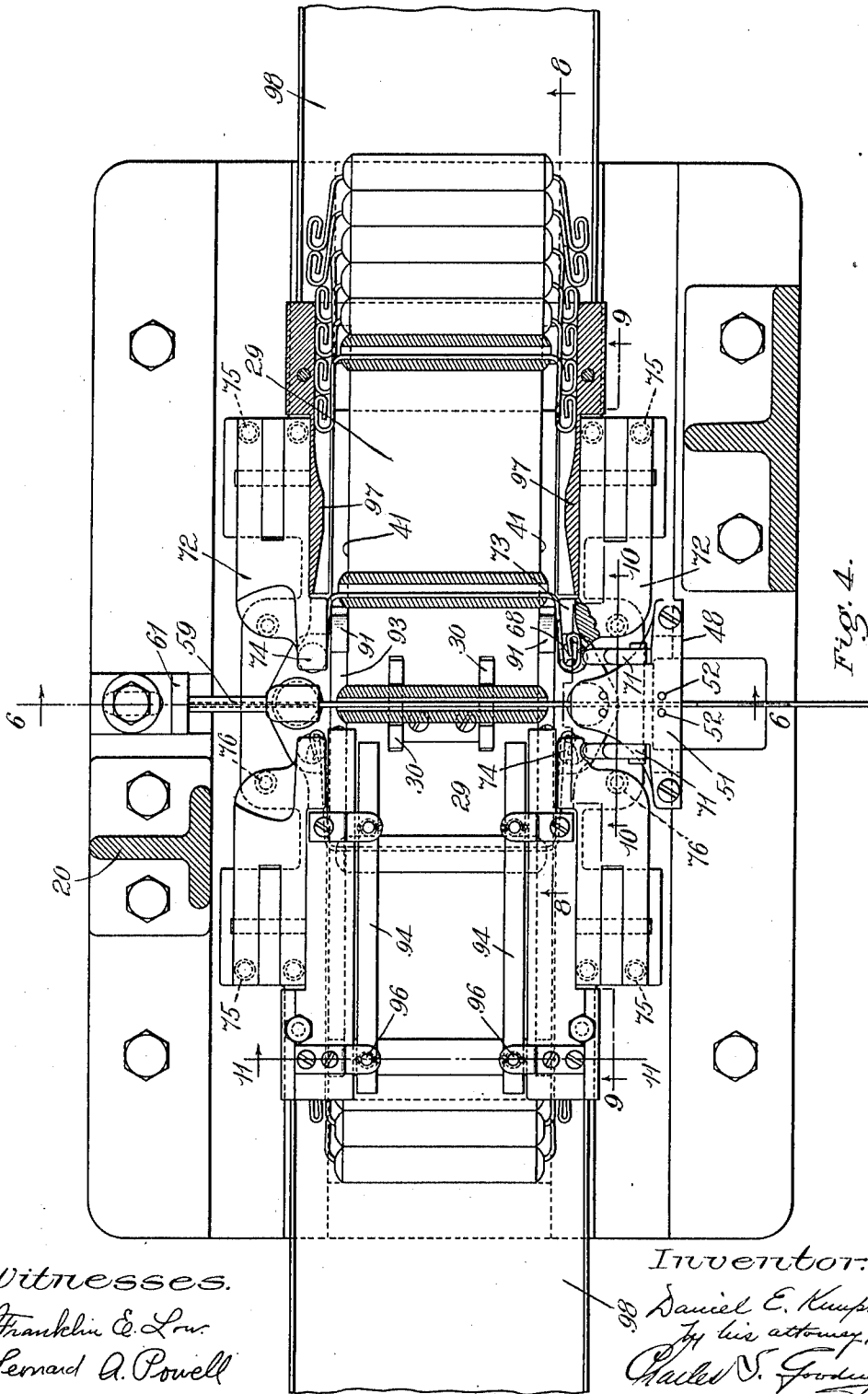


Fig. 4.

Witnesses.
Franklin E. Low.
Lemard A. Powell

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Charles V. Gooding.

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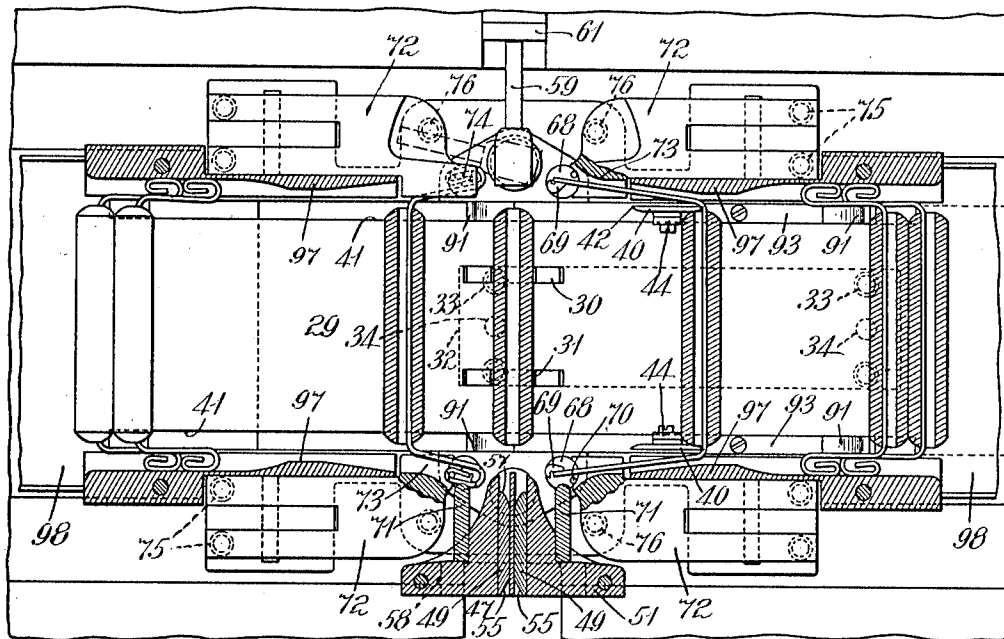


Fig. 5.

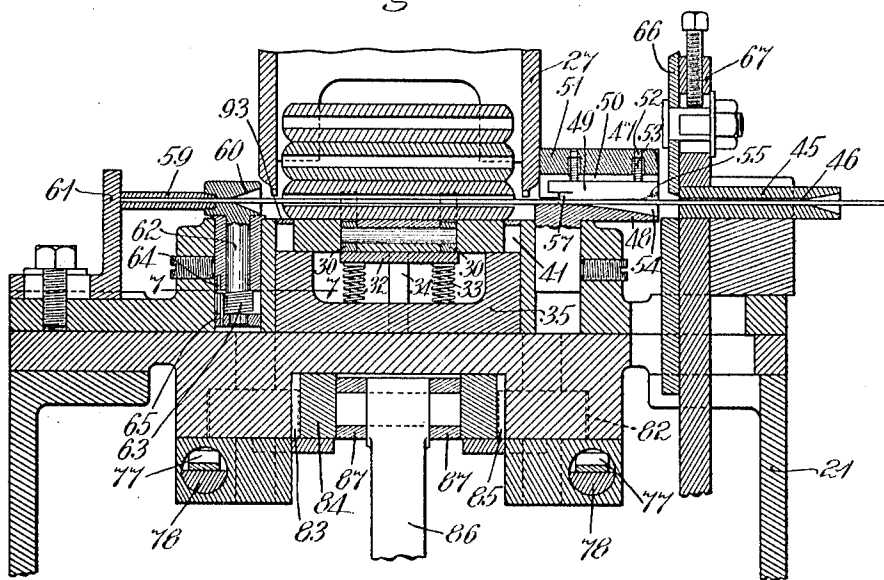


Fig. 6.

Witnesses.
Franklin E. Low.
Leonard O. Powell.

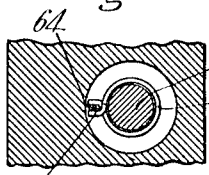


Fig. 7.

Inventor.
Daniel E. Kempster,
by his attorney,
Charles S. Gooding.

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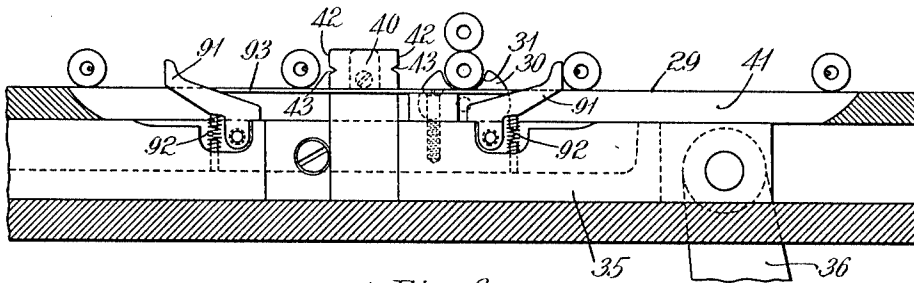


Fig. 8.

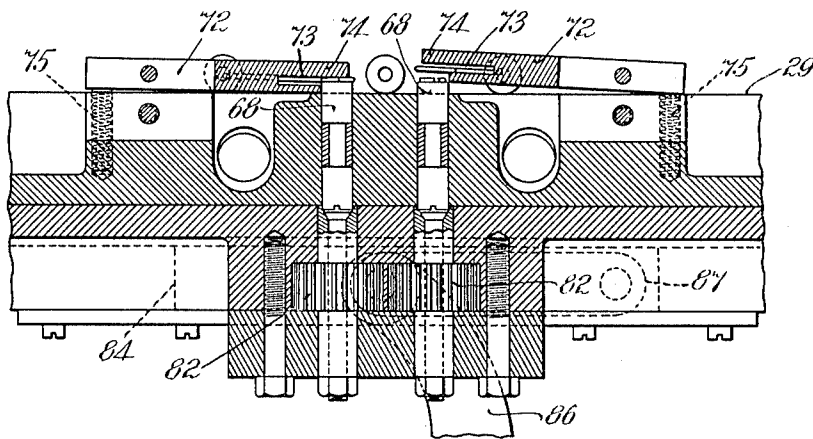


Fig. 9.

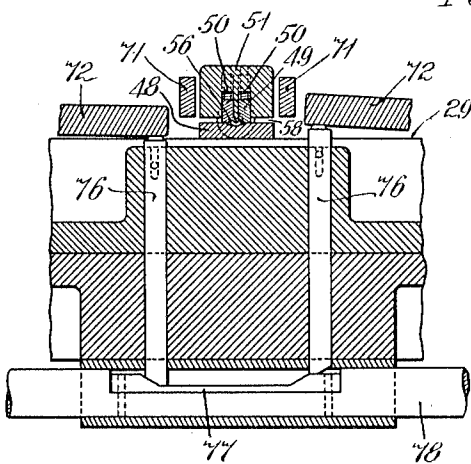


Fig. 10.

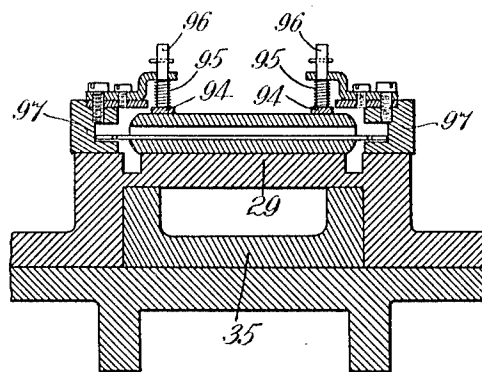


Fig. 11.

Witnesses.
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Lemuel R. Powell.

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Daniel E. Kempster
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Charles S. Gooding.

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7 SHEETS—SHEET 7.

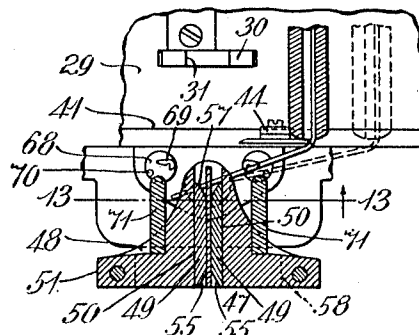


Fig. 12.

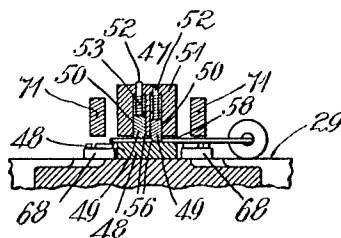


Fig. 13.

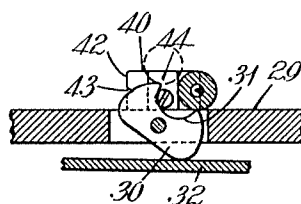


Fig. 14.

Witnesses.
Franklin E. Low.
Lernand A. Powell

Inventor.
Daniel E. Kempster
by his attorney
Charles V. Gooding.

UNITED STATES PATENT OFFICE.

DANIEL E. KEMPSTER, OF CAMBRIDGE, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO
SAMUEL R. UPHAM, OF BOSTON, MASSACHUSETTS.

MACHINE FOR MAKING BAILS.

1,001,531.

Specification of Letters Patent. Patented Aug. 22, 1911.

Application filed October 26, 1910. Serial No. 589,204.

To all whom it may concern:

Be it known that I, DANIEL E. KEMPSTER, a citizen of the United States, residing at Cambridge, in the county of Middlesex and State of Massachusetts, have invented new and useful Improvements in Machines for Making Bails and the Like, of which the following is a specification.

This invention relates to improvements in machines for making wire bails or package carriers of that class in which a wire is assembled with a handle and is subsequently bent into the desired form at its ends to form a means for attaching the bail to a package or other article.

The object of my invention is primarily to provide a machine of this class which shall produce the bails or package carriers at a much higher speed than has heretofore been possible.

Another object is to provide a machine of this class which shall operate with greater accuracy and certainty than has heretofore been possible and thus increase the rate of production by practically obviating the stopping of the machine for the purposes of adjustment and the removal of imperfectly formed bails.

To these ends, my invention consists in the novel features of construction and in the combination and arrangement of parts set forth in the following specification and particularly pointed out in the claims.

Referring to the drawings: Figure 1 is an end elevation, partly in section, of a machine embodying my invention. Fig. 2 is a sectional view taken on line 2—2 of Fig. 1, looking toward the left. Fig. 3 is an enlarged plan section taken on line 3—3 of Fig. 2. Fig. 4 is a plan of the machine with the hopper and raceway removed and showing some of the parts of the machine as well as some of the handles in section. This view shows one handle with the wire assembled therewith ready for the bending operations and shows other bails in various stages of making. Fig. 5 is a plan sectional view of the machine, partly broken away, taken in a plane containing the axes of the handles which rest upon the platen. Fig. 6 is a sectional view taken on line 6—6 of Fig. 4, looking toward the right. Fig. 7

is a detail plan section taken on line 7—7 of Fig. 6. Fig. 8 is a sectional view taken on line 8—8 of Fig. 4, looking in the direction of the arrows on said line. Fig. 9 is a sectional view taken on line 9—9 of Fig. 4, looking in the direction of the arrows on said line. Fig. 10 is a sectional view taken on line 10—10 of Fig. 4, looking in the direction of the arrows on said line. Fig. 11 is a sectional view taken on line 11—11 of Fig. 4, looking in the direction of the arrow on said line. Fig. 12 is a detail plan section illustrating the action of the first wire guide in bending the end of the wire which projects from the handle. This view shows the wire extending across the rounded end of one of the blocks which constitute the wire guide and beneath the other of said blocks. Fig. 13 is a detail sectional view taken on line 13—13 of Fig. 12, looking in the direction of the arrow on said line, one of the guide blocks being shown raised and the wire located therebeneath. Fig. 14 is a sectional view illustrating the action of the rocker plates in releasing the handle as the same is being fed by the notched plates which engage the wire in the handle.

Like numerals refer to like parts throughout the several views of the drawings.

In the drawings, referring to Figs. 1 and 2, 15 is a hopper which may be of any suitable construction for the handles which are to be assembled with the wires. In the present instance, these handles are cylindrical in form and each is provided with an axial bore extending from end to end. The hopper 15 may be provided with a suitable agitator 16 such, for example, as the sliding plate shown in Fig. 2, and this plate may be reciprocated by any suitable means such, for example, as a link 17 pivotally connected at one end to said plate and at its other end to a crank pin 18 carried by a shaft 19. The shaft 19 is journaled in a suitable bearing bracket 20 mounted on the main frame 21 of the machine and said shaft is driven by suitable means such as a chain 22 connecting the sprocket wheel 23 on the shaft 19 to a sprocket wheel 24 on a main driving shaft 25, the latter shaft being journaled in suitable bearings in the frame 21 and being

driven by a suitable pulley 26. As the main shaft is rotated, the crank pin 18 acts through the link 17 to impart a reciprocatory motion to the agitator 16 to cause the handles to be fed from the hopper 15 down a suitable raceway 27.

The column of handles in the raceway is constantly urged downwardly therein by a rotating brush 28 secured to and driven by the shaft 19, this brush assuring a rapid feed of the handles to the point at the bottom of the raceway where they are operated upon, this brush being an important factor in the operation of the machine, since by its use the machine can be operated at very high speed without the danger of failure of the handles to feed down the raceway, as would be the case in a gravity feed which is too slow for a high speed machine.

As the handles are fed down the raceway, the lowermost handle in the column is fed onto a suitable support, preferably consisting of a stationary platen 29 which directly supports the lowermost handle and thus supports the rest of the column of handles. The lowermost handle as it rests upon the platen is positioned by suitable positioning means preferably consisting of a pair of rocker plates 30 (see Figs. 2, 4, 5, 6 and 14) these plates being pivoted upon the plates 29 and provided, respectively, with semicircular recesses 31 to receive the handle to position the same as to movement longitudinally of the platen 29.

Preferably, there is a slight clearance between the handle and the recesses 31 so that the handle is not supported by the rocker plates, but is supported entirely by the platen.

Against the lower faces of the rocker plates 30 a spring plate 32 is borne by suitable springs 33 and said plate is guided by suitable guides such, for example, as pins 34. This spring plate bearing against the bottoms of the rocker plates 30 normally holds them in upright position to receive the handle and position the same, while the wire is assembled therewith, as hereinafter described, but when the handle is fed to the right or to the left, as the case may be, as hereinafter described, said plates are adapted to rock to the right or left, as illustrated in Fig. 14, according to the direction of travel of the handle, and in doing so, said plates act to force the spring plate 32 downwardly against the tension of the springs 33 and said springs subsequently act through the spring plate 32 to return the rocker plates 30 to their normal position.

The guide pins 34 are mounted in a slide 35, (see Figs. 1, 2 and 6) guided in suitable ways beneath the platen 29. A reciprocatory motion is imparted to the slide 35 by any suitable mechanism such, for example,

as a lever 36 pivotally connected to an eccentric rod 37 having a strap 38 surrounding an eccentric 39 secured to the main driving shaft 25.

The slide 35 carries devices for feeding the handles from the foot of the raceway to the right and left along the platen 29. There are two sets of these devices shown best in Figs. 5 and 8. The first set of these devices to operate upon the handles consists of two plates 40 secured to the slide 35 and projecting upwardly through long slots 41 provided in the platen 29. Each of these plates is preferably provided with two vertical sharpened edges 42 and each of these edges is preferably provided with a V-shaped notch 43 to receive the wire adjacent to the ends of the handle. The edges of these notches are likewise sharpened so that by reason of the converging edges of the notches and the fact that they are sharpened, the wire is prevented from becoming displaced longitudinally when once engaged by the plates 40.

The plates 40 are preferably provided, respectively, with lugs 44 formed on or secured thereto. These lugs engage the handles adjacent to the ends thereof and coact with the plates 40 to feed the handles to the right and left alternately from the foot of the raceway, it being understood that when the slide 35 is carried toward the right from the position shown in Fig. 8, the right hand edges of the plates 40 will engage the wire of the lowermost handle in the raceway and the right hand edges of the lugs 44 will engage the ends of said handle and the handle will be fed along the platen 29 and out of the positioning rocker plate 30, as illustrated in Fig. 4.

I will now proceed to describe the means whereby the wire is assembled with the lowermost handle in the raceway while positioned by the rocker plates 30, as shown in Figs. 5 and 6. Referring to Fig. 6, 45 is a stationary wire guide having therein a passage 46 through which the wire is fed in the direction of the arrow. The wire passes from this guide through a second wire guide 47 comprising a stationary block 48, (see Figs. 6 and 10) and a pair of vertically yielding blocks 49, the latter being located, respectively, in grooves 50 provided in a bracket 51 and guided by pins 52. Suitable springs 53 surrounding the pins 52, respectively, urge the yielding blocks 49 downwardly toward the stationary block 48. The stationary guide block 48 is preferably provided with a tapered entrance throat 54 to insure the feeding of the wire from the adjacent guide 45 and the yielding guide blocks 49 are preferably provided with beveled faces 55 at their ends adjacent to the guide 45 also for the purpose of insuring

the proper feed of the wire. The lower adjacent corners 56 of the guide blocks 49 are preferably rounded or beveled, as shown in Fig. 10, thus forming a passage for the wire.

5 The guide blocks 49 are preferably provided with beveled or rounded ends 57, (see Fig. 5) flaring or diverging outwardly away from each other in the direction of the travel of the wire for a purpose which will appear hereinafter. Between the upper face of the stationary guide block 48 and the lower face of the bracket 51 there is provided a space 58 for the purpose of allowing the wire to pass to the right or left by lifting either of the yielding guide blocks 49, as the case may be, and sweeping across the upper face of the stationary guide block 48 in a manner and for a purpose which will be fully described hereinafter. When the wire is fed through the guides 45 and 47 it passes through the lowermost handle of the column in the raceway and thence into a guide 59 having an entrance throat 60 and the advancing end of the wire encounters an adjustable stop 61, (see particularly Figs. 5 and 6).

The wire guide 59 is mounted to swing upon a vertical pivot 62 and although its passage is normally in line with the line of travel of the wire in feeding through the handle, said guide may be swung to the right or left upon its pivot against the tension of a torsional spring 63 surrounding the pivot 62 and having one end bearing against a stationary pin 64 and its other end bearing against a pin 65 carried by the pivot 62, (see Figs. 6 and 7).

When the wire is fed through the wire guides 45 and 47 through the handle and into the wire guide 59 against the stop 61 into the position shown in Fig. 6, said wire is severed by a movable cutter 66 carried by a cutter slide 67 and coacting with the stationary guide 45 which also constitutes a cutter. The mechanism for feeding and cutting the wire forms the subject matter of another application filed by me April 29, 1910, Serial No. 558,374, and it will be unnecessary for me to further refer to the feeding and cutting of the wire, except to say that any suitable mechanism may be employed for this purpose.

When the handle is fed along the platen by the plates 40 and their lugs 44, as hereinbefore described, the wire guides 47 and 59 cooperate with said plates to bend the ends of the wire which project from the handle in a manner which I will now proceed to describe. Referring now particularly to Figs. 4 and 8, and assuming that the slide 25 is traveling toward the right, the plates 40 advance and engage the wire adjacent to the ends of the handle, it being understood that the wire enters the notches 43 and be-

comes wedged therein so as to be held 65 against longitudinal displacement. Continued movement of the plates 40 toward the right will result in the wire and the handle being carried from a position shown in Fig. 4 in the line of the wire feed toward 70 the right, the consequence being that the wire guide 59 will be swung from the position shown in full lines in Figs. 4 and 5 into the position shown in dotted lines in Fig. 5 with the result that the end of the 75 wire held by said guide will be bent inwardly. Meantime, the other end of the wire has been carried across the rounded or beveled end 57 of the right hand guide block 49, the natural tendency being that the free 80 end of the wire will be swung toward the left, thus raising the left hand guide block 49, passing beneath the same and into the space 58 in a manner which is clearly illustrated in Figs. 12 and 13, and in this way, 85 during the advance of the handle and wire toward the right this end of the wire is also bent inwardly simultaneously with the bending of the other end of the wire. When the next handle in the column in the raceway receives its wire and is fed toward the left, a similar action takes place, it being understood that in this case the right hand guide block 49 will be lifted and the wire will be bent by being dragged across the 95 rounded end 57 of the left hand guide block.

I will now proceed to describe the coilers by means of which the ends of the wire are coiled, the guides which insure the engagement of the wire with the coilers, and the 100 spring-pressed fingers which carry the wires into engagement with the coilers and hold them in such engagement during the coiling operation. Referring now to Figs. 4, 5 and 9, and particularly Fig. 5, there are 105 provided four wire coilers 68 arranged in pairs which will be referred to hereinafter as the right hand pair and the left hand pair. These coilers consist of vertical shafts each of which is provided at its upper end 110 with two lugs 69 and 70 between which the wire is introduced. After the ends of the wire have been bent, as hereinbefore described, during the feeding movement of the handle and wire, the ends of 115 the wire are carried across the tops of the coilers. In some cases, where the wire is very stiff, it is desirable to employ a pair of guides 71 pivoted on the bracket 51 to swing to a very slight degree in vertical 120 planes, the extremities of these guides extending slightly across the upper ends of their respective coilers, as shown in Fig. 4. These guides insure the passing of the wires into a position above the space between the 125 lugs 69 and 70 of the two coilers 68 which are located adjacent to the guides 71 and the guide 47.

I will now proceed to describe the means by which the wires are carried downwardly into the space between the lugs 69 and 70 and held therein during the coiling operation. Referring to Figs. 4, 5, 9 and 10, there are provided four fingers 72 pivotally mounted two upon each side of the platen 29, one finger being provided for each of the coilers. Each of these fingers is provided with a horizontal slot 73 into which the wire is drawn when passing into position above the space between the lugs 69 and 70 of the coiler and each of these fingers is provided with a lug 74 extending across the top of its respective coiler, as best seen in Figs. 4 and 9. Each of these fingers is provided with a suitable spring 75 tending to urge the lug 74 downwardly toward the top of its respective coiler. The fingers are lifted by any suitable means such, for example, as vertically sliding pins 76, (see Figs. 3 and 10) the upper ends of which engage the under sides of the fingers 72, respectively, and the lower ends of which are provided with beveled faces which engage a suitable cam 77 carried by a horizontal sliding rod 78 which, when reciprocated at the proper time in the operation of the machine, causes the fingers 72 to be raised and lowered, thus carrying the wires into and out of engagement with their respective coilers at the proper times.

It will be understood that there are two cams 77 and two rods 78, one for each pair of fingers 72 and pins 76. The rods 78 receive their reciprocatory motion from a cam 79 in which is located a cam roll 80 journaled on a yoke 81 secured to the rods 78, (see Figs. 1 and 2). When the fingers 72 are carried downwardly with the ends of the wires in the slot 73 and beneath the lug 74, the wires are carried into the space between the lugs 69 and 70 and are prevented from slipping out during the operation of the coilers and after the coils have been formed the wires are positively lifted entirely clear of the coilers.

I will now proceed to describe the mechanism by which the coilers are given an oscillatory motion. The coilers 68 are, respectively, connected by suitable means to pinions 82 arranged in pairs, one pair meshing with a rack 83 on one side of a rack slide 84 and the other pair meshing with a like rack 85 on the other side of said slide. This rack is given a reciprocatory motion by a lever 86 connected to said slides by a pair of links 87, said lever being connected to an eccentric rod 88 having thereon an eccentric strap 89 surrounding an eccentric 90 secured to the main driving shaft 25. As the shaft is rotated, this eccentric acts through the mechanism just described to impart an oscillatory motion to the coilers

at the proper times during the operation of the machine.

I will now proceed to describe the second set of handle feeding devices or, in other words, the means by which the handles are fed along the platen after the coils have been formed in the wires, and will also describe the means for holding the handles in parallelism during such feeding movement and the means whereby the loops are bent toward each other during such feeding movement. Referring to Figs. 5 and 8, there are provided two pairs of handle feeding dogs 91 pivoted on the slide 35 and normally held in raised position by means of suitable springs 92, said dogs being provided with suitable means to limit their upward movement as, for example, two plates 93 located in the slots 41, respectively, and secured to the slide 35. The left hand pair of dogs 91 serves to feed handles toward the left, while the right hand pair serves to feed handles toward the right. When the coiling of the pair of ends of a wire is completed, the proper pair of dogs 91 engages the handle and feed the same along the platen. By referring to Fig. 4, the right hand pair of dogs 91 may be seen in engagement with one of the handles after the coiling operation has been completed ready to feed the handle toward the right. During the feeding movement of the handles along the platen, the handles are maintained in parallelism by suitable means preferably consisting of two pairs of presser bars 94 mounted above the handles on the platen and held in yielding engagement with said handles by means of springs 95 surrounding guide pins 96. These bars press upon the handles adjacent to their ends and prevent the handles from becoming displaced during their feeding movement. During this final feeding movement, the wires are subjected to a final bending operation in which the coils at the ends of the wires are bent toward each other to the proper extent so that when released, the wires have the desired angular relation with the longitudinal dimension of the handle. This final bending operation is preferably accomplished by means of two pairs of stationary cams 97, one pair at the right and one pair at the left of the raceway, (see particularly Figs. 4, 5 and 11). These cams have just the proper shape so that as the handles are fed along in the platen, the coils are bent inwardly toward each other to the proper extent and when released by the cams after being fed therebeyond, as illustrated at the right of Fig. 4, the wires will spring out to a certain extent as shown by the two handles at the extreme right of said coil and have the proper shape so that each handle fits into the next preceding handle which, of course,

would not be the case if the wires were bent parallel to each other. After the handles pass from between the cams 97 and from beneath the presser bars 94, said handles then pass along to two horizontal chutes 98, one at each end of the machine, beneath which, in practice, it is customary to place a suitable receptacle to receive them as they fall from the ends of the chutes.

Having thus specifically described my invention and the individual operation of its parts, I will now proceed to describe its general operation.

The wire is first fed into the lowermost handle in the raceway, the wire is severed, and the handle is then fed toward the right or toward the left, as the case may be, and the ends of the wire are bent inwardly so as to occupy a position above the coilers, as shown, for example, just at the right of the center of Fig. 5. The ends of the wire are then carried into engagement with the coilers and the coilers begin to rotate counterclockwise. During this rotation of the coilers, it is evident that the operation of coiling the wires shortens them and it is, therefore, necessary for the plates 40 to move toward the left from the position shown in Fig. 5 to allow the handle to be drawn toward the left during the operation of coiling. In the meantime, the ends of the wire of a previous handle have been coiled, as shown at the left of the center of Fig. 5, so that when the handle at the right of the center starts to move toward the left during the coiling operation, the left hand handle is fed along the platen toward the left away from the coilers which have just completed their operation. In the meantime also, another handle in the raceway has received its wire, the wire has been cut, and this handle has been carried toward the left and the operation of coiling the ends of its wire has begun, as shown in Fig. 4, and the completed handle at the right of the center of Fig. 4 is then fed toward the right and is completed by having its coiled ends bent toward each other. Thus it will be seen that at all times in the operation of the machine there are at least two handles being operated upon at any given instant and at some periods there are three handles being operated upon, one receiving its wire and the other two in other stages of the making. In this way, a very high speed of production is obtained, yet without having any of the parts of the machine operated at excessively high speed and the machine, which might be termed a duplex machine, produces twice as many completed bails or package carriers in a given time as are produced in a machine in which only one bail is being made at once, and yet it will be understood that the machine is not in any sense a dupli-

cate or twin machine having two complete sets of mechanisms each operating independently of each other, but, on the contrary, although two handles are being operated upon at any one time, yet the action of all the parts is strictly cooperative. 70

Having thus described my invention, what I claim and desire by Letters Patent to secure is:

1. A machine of the class described having, in combination, means to deliver handles to a certain point, means to assemble a wire with each of said handles at said point, means to feed said handles from said point alternately in opposite directions, and means to bend the ends of said wire. 75 80

2. A machine of the class described having, in combination, means to deliver handles to a certain point, means to feed a wire into each of said handles at said point, means to feed said handles from said point alternately in opposite directions, means to bend the ends of said wire, and means to coil said ends. 85

3. A machine of the class described having, in combination, means to deliver handles to a certain point, means to assemble a wire with each of said handles at said point, means to sever said wire while assembled with said handle, means to feed said handles from said point alternately in opposite directions, and means to bend the ends of said piece of wire. 90 95

4. A machine of the class described having, in combination, a support, means to deliver handles onto said support, means to assemble a wire with each of said handles while on said support, and means to feed said handles along said support alternately in opposite directions. 100

5. A machine of the class described having, in combination, a support, means to deliver handles onto said support, means to position said handles one at a time on said support, means to assemble a wire with each of said handles while on said support, and means to feed said handles away from said positioning means alternately in opposite directions. 105 110

6. A machine of the class described having, in combination, a support, means to deliver handles onto said support, oscillatory positioning means to position said handles one at a time on said support, means to assemble a wire with each of said handles while on said support, and means to feed said handles away from said positioning means alternately in opposite directions. 115 120

7. A machine of the class described having, in combination, a support, means to deliver handles onto said support, means to assemble a wire with each of said handles while on said support, means to feed said handles along said support alternately in 125

opposite directions, and means to bend the ends of said wire in each of said handles.

8. A machine of the class described having, in combination, a support, means to deliver handles onto said support, means to position said handles one at a time on said support, means to assemble a wire with each of said handles while on said support, means to feed said handles away from said positioning means alternately in opposite directions, and means to bend the ends of said wire in each of said handles.

9. A machine of the class described having, in combination, a support, means to deliver handles onto said support, oscillatory positioning means to position said handles one at a time on said support, means to assemble a wire with each of said handles while on said support, means to feed said handles away from said positioning means alternately in opposite directions, and means to bend the ends of said wire in each of said handles.

10. A machine of the class described having, in combination, a support, means to deliver handles onto said support, yielding positioning means to embrace each of said handles to position the same while on said support, means to assemble a wire with each of said handles while on said support, and means to feed said handles away from said positioning means alternately in opposite directions.

11. A machine of the class described having, in combination, a support, means to deliver handles onto said support, means to assemble a wire with each of said handles while on said support, oscillatory positioning means to position said handles one at a time on said support, yielding means to normally hold said positioning means in position to receive a handle from said delivering means, and means to feed said handles away from said positioning means alternately in opposite directions.

12. A machine of the class described having, in combination, positioning means, means to deliver handles one at a time into said positioning means, means to assemble a wire with each of said handles while positioned by said positioning means, and means to feed said handles away from said positioning means alternately in opposite directions.

13. A machine of the class described having, in combination, handle delivering means, positioning means to receive handles from said delivering means, said positioning means being yieldable transversely of said handles, means to assemble a wire with each of said handles while positioned by said positioning means, and means to feed said handles away from said positioning means alternately in opposite directions.

14. A machine of the class described having, in combination, handle delivering means, positioning means to receive handles from said delivering means, said positioning means being elastically yieldable transversely of said handles, means to assemble a wire with each of said handles while positioned by said positioning means, and means to feed said handles away from said positioning means.

15. A machine of the class described having, in combination, handle delivering means, positioning means to receive handles from said delivering means, said positioning means being elastically yieldable transversely of said handles, means to assemble a wire with each of said handles while positioned by said positioning means, means to bend the ends of said wire in each of said handles, and means to feed said handles away from said positioning means.

16. A machine of the class described having, in combination, a support, means to deliver handles onto said support, means to position said handles on said support, said positioning means being elastically yieldable transversely of said handles, means to assemble a wire with each of said handles while positioned by said positioning means, and means to feed said handles away from said positioning means.

17. A machine of the class described having, in combination, means to assemble a wire with a handle, means to engage said wire adjacent to opposite ends of said handle and impart a transverse movement to said handle, means to engage and bend the free ends of said wire transversely during said movement, and means to form a loop in each of said ends.

18. A machine of the class described having, in combination, means to assemble a wire with a handle, means to engage said wire adjacent to opposite ends of said handle and impart a transverse movement to said handle, means to engage and bend the free ends of said wire transversely during such movement, and a pair of rotary coilers to coil the free ends of said wire.

19. A machine of the class described having, in combination, means to assemble a wire with a handle, means to engage said wire adjacent to opposite ends of said handle and impart a transverse movement to said handle, means to engage and bend the free ends of said wire during said movement, means to form a loop in each of said ends, and means to bend said loops toward each other.

20. A machine of the class described having, in combination, means to assemble a wire with a handle, means to engage said wire adjacent to opposite ends of said handle and impart a transverse movement to

said handle, means to engage and bend the free ends of said wire during said movement, means to form a loop in each of said ends, and means to impart a feeding movement to said handle after said loops have been formed.

21. A machine of the class described having, in combination, means to assemble a wire with a handle, means to engage said wire adjacent to opposite ends of said handle and impart a transverse movement to said handle, means to engage and bend the free ends of said wire during said movement, means to form a loop in each of said ends, means to impart a feeding movement to said handle after said loops have been formed, and means to bend said loops toward each other during the last-mentioned movement.

22. A machine of the class described having, in combination, means to assemble a wire with a handle, a pair of members provided with notches to receive said wire adjacent to opposite ends of said handle, means to impart a movement to said handle and said members in a direction transverse to said handle, and means to engage and bend the free ends of said wire transversely during said movement.

23. A machine of the class described having, in combination, means to assemble a wire with a handle, a pair of members provided with sharpened edges to engage said wire adjacent to opposite ends of said handle, means to impart a movement to said handle and said members in a direction transverse to said handle, and means to engage and bend the free ends of said wire transversely during said movement.

24. A machine of the class described having, in combination, a pair of wire guides, means to feed a wire through one of said guides, through a handle and into the other of said guides, and means to impart a relative movement to said handle and guides in a direction transverse to said handle.

25. A machine of the class described having, in combination, a wire guide, a swingingly mounted wire guide, means to feed a wire through the first mentioned guide, through a handle and into said swinging guide, and means to impart a relative movement to said handle and guides in a direction transverse to said handle and transverse to the axis upon which said swinging guide swings.

26. A machine of the class described having, in combination, a wire guide comprising two blocks forming a passage for the wire, a swingingly mounted wire guide, means to feed a wire through said passage, through a handle and into said swinging guide, and means to impart a relative movement to said handle and guides in a direction transverse

to said handle and transverse to the axis upon which said swinging guide swings, one of said blocks being mounted to yield transversely of said passage to allow said wire to pass out of said passage.

27. A machine of the class described having, in combination, a wire guide comprising two blocks forming a passage for the wire, a swingingly mounted wire guide, means to feed a wire through said passage, through a handle and into said swinging guide, and means to impart a relative movement to said handle and guides in a direction transverse to said handle and transverse to the axis upon which said swinging guide swings, one of said blocks being mounted to yield transversely of said passage and being provided with an inclined surface adjacent to said passage to allow said wire to pass out of said passage, engage said inclined surface and move said block out of the path of said wire.

28. A machine of the class described having, in combination, a wire guide, a pivoted wire guide, means to feed a wire through the first-mentioned guide, through a handle and into said pivoted guide, a spring to normally hold said pivoted guide in alignment with said handle in position to receive said wire, and means to impart a relative movement to said handle and guides in a direction transverse to said handle and transverse to the axis upon which said pivoted guide swings.

29. A machine of the class described having, in combination, handle delivering means, positioning means to receive handles from said delivering means, a pair of wire guides, means to feed a wire through one of said guides, through a handle held by said positioning means and into the other of said guides, and means to feed said handles away from said positioning means alternately in opposite directions transverse to the length of said handles.

30. A machine of the class described having, in combination, handle delivering means, positioning means to receive handles one by one from said delivering means, a pair of wire guides, means to feed a wire through one of said guides, through a handle held by said positioning means and into the other of said guides, and means to engage the wires one by one adjacent to opposite ends of their respective handles and impart a transverse movement to said handles alternately in opposite directions relative to said guides thereby to bend the ends of the wires held by said guides.

31. A machine of the class described having, in combination, handle delivering means, positioning means to receive handles one by one from said delivering means, a pair of wire guides, means to feed a wire through

one of said guides, through a handle held by said positioning means and into the other of said guides, means to engage the wires one by one adjacent to opposite ends of their respective handles and impart a transverse movement to said handles alternately in opposite directions relative to said guides thereby to bend the ends of the wires held by said guides, and means to form loops in the ends of said wires.

32. A machine of the class described having, in combination, handle delivering means, positioning means to receive handles one by one from said delivering means, a pair of wire guides, means to feed a wire through one of said guides, through a handle held by said positioning means and into the other of said guides, means to engage the wires one by one adjacent to opposite ends of their respective handles and impart a transverse movement to said handles alternately in opposite directions relative to said guides thereby to bend the ends of the wires held by said guides, means to form loops in the ends of said wires, and means to bend said loops toward each other.

33. A machine of the class described having, in combination, handle delivering means, positioning means to receive handles one by one from said delivering means, a pair of wire guides, means to feed a wire through one of said guides, through a handle held by said positioning means and into the other of said guides, means to engage the wires one by one adjacent to opposite ends of their respective handles and impart a transverse movement to said handles alternately in opposite directions relative to said guides thereby to bend the ends of the wires held by said guides, means to form loops in the ends of said wires, and means to feed said handles away from said loop forming means.

34. A machine of the class described having, in combination, handle delivering means, positioning means to receive handles one by one from said delivering means, a pair of wire guides, means to feed a wire through one of said guides, through a handle held by said positioning means and into the other of said guides, means to engage the wires one by one adjacent to opposite ends of their respective handles, and impart a transverse movement to said handles alternately in opposite directions relative to said guides thereby to bend the ends of the wires held by said guides, means to form loops in the ends of said wires, means to feed said handles away from said loop-forming means, and means to bend said loops toward each other during the last-mentioned feeding.

35. A machine of the class described having, in combination, a platen, means to deliver handles to a certain point on said

platen, means to assemble a wire with each of said handles on said platen, means to feed said handles from said point along said platen alternately in opposite directions, and means to maintain said handles in parallelism during the feeding of the handles along said platen.

36. A machine of the class described having, in combination, a platen, means to deliver handles onto said platen, means to assemble a wire with each of said handles on said platen, means to feed said handles along said platen, and means pressing upon said handles adjacent to opposite ends thereof to maintain said handles in parallelism during the feeding of said handles along said platen.

37. A machine of the class described having, in combination, a platen, means to deliver handles onto said platen, means to assemble a wire with each of said handles on said platen, means to feed said handles along said platen, and a pair of spring-pressed plates bearing upon said handles adjacent to opposite ends thereof and pressing said handles against said platen.

38. A machine of the class described having, in combination, means to deliver handles to a certain point, means to assemble a wire with said handles at said point, means to feed said handles from said point alternately in opposite directions, and means to bend the ends of said wire.

39. A machine of the class described having, in combination, a pair of coilers having wire engaging means, means to carry a wire across said coilers, means to carry said wire into interengagement with said coilers and hold said wire in such interengagement during the coiling operation, and means to impart a rotary movement to said coilers.

40. A machine of the class described having, in combination, a pair of coilers having wire engaging means, means to carry a wire across said coilers, spring-pressed fingers to move said wire into interengagement with said coilers, means to impart a rotary movement to said coilers, and means to actuate said fingers to release said wire from said coilers.

41. A machine of the class described having, in combination, means to assemble a wire with a handle, a pair of coilers having wire engaging means, means to impart a transverse feeding movement to said handle and wire to carry said wire across said coilers, means to carry said wire into interengagement with said coilers, and means to impart a rotary movement to said coilers.

42. A machine of the class described having, in combination, means to assemble a wire with a handle, a pair of coilers having wire engaging means, means to impart a transverse feeding movement to said han-

dle and wire to carry said wire across said
coilers, means to bend the ends of said wire
during such movement, means to carry said
wire into interengagement with said coil-
ers, and means to impart a rotary movement
to said coilers.

In testimony whereof I have hereunto set

my hand in presence of two subscribing wit-
nesses.

DANIEL E. KEMPSTER.

Witnesses:

CHARLES S. GOODING,
ANNIE J. DAILEY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
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