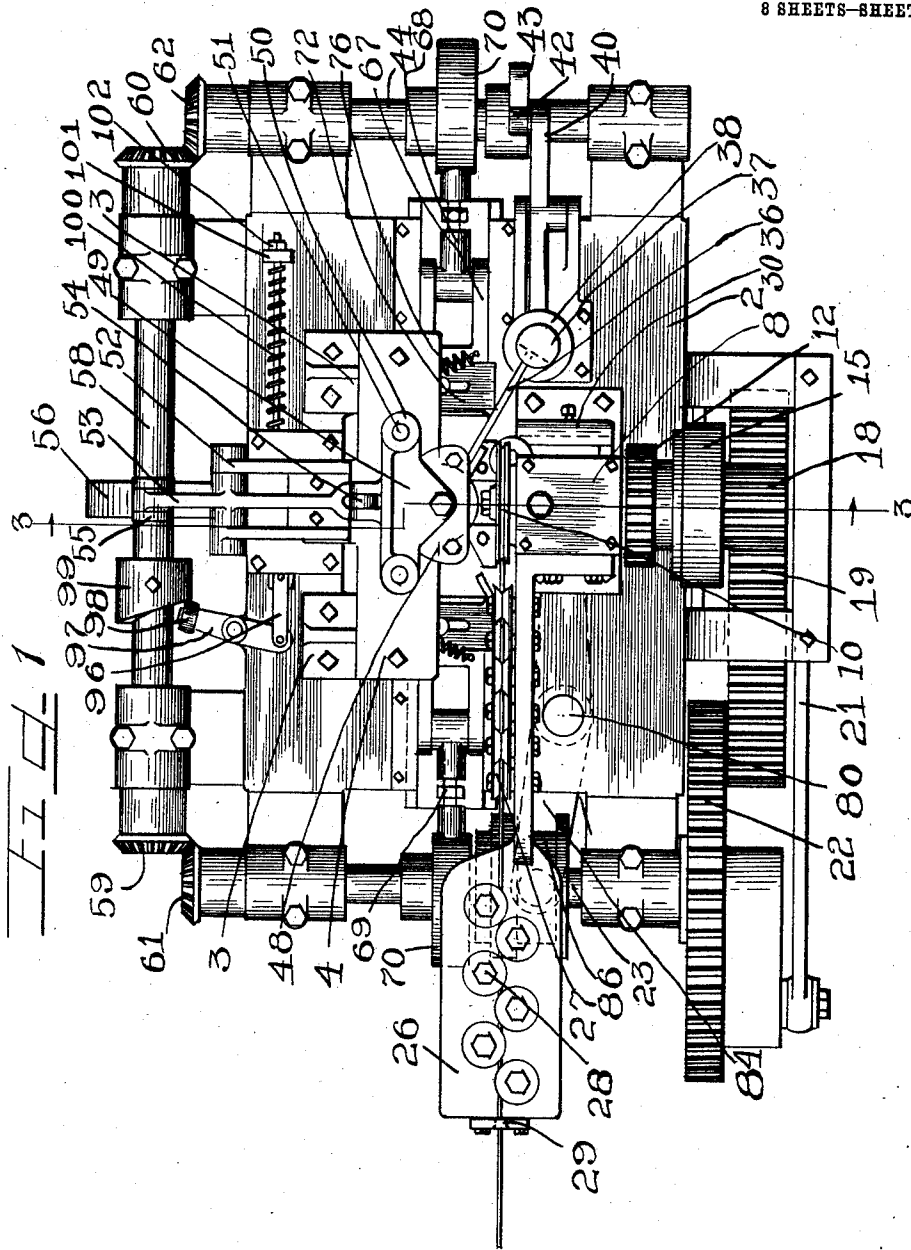


C. STECHER.
WIRE BAIL FORMING MACHINE.
APPLICATION FILED NOV. 24, 1909.

1,039,837.

Patented Oct. 1, 1912.

8 SHEETS—SHEET 1.



WITNESSES

J. H. Angell.
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INVENTOR

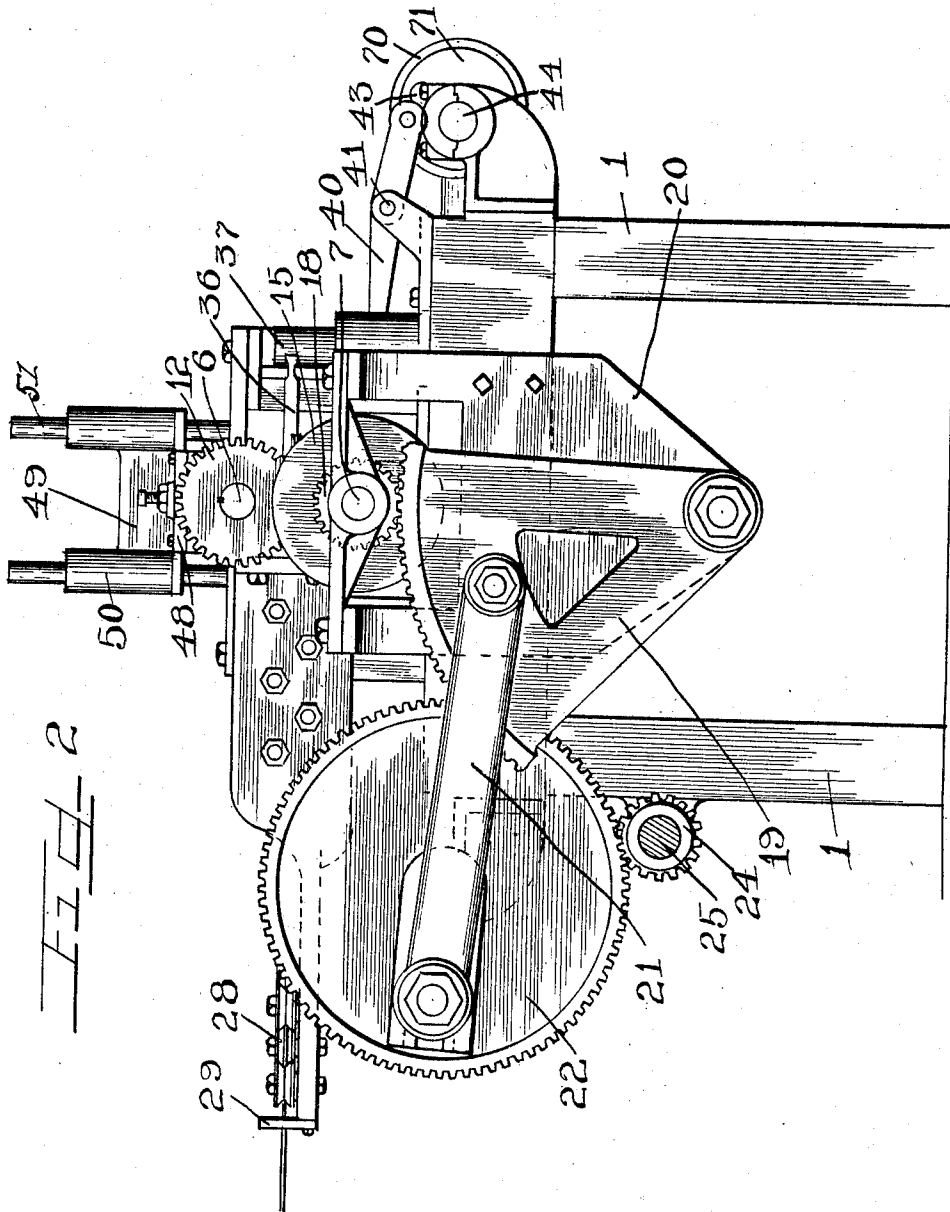
Charles Stecher.

Charles Stecher, Atty.

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WITNESSES
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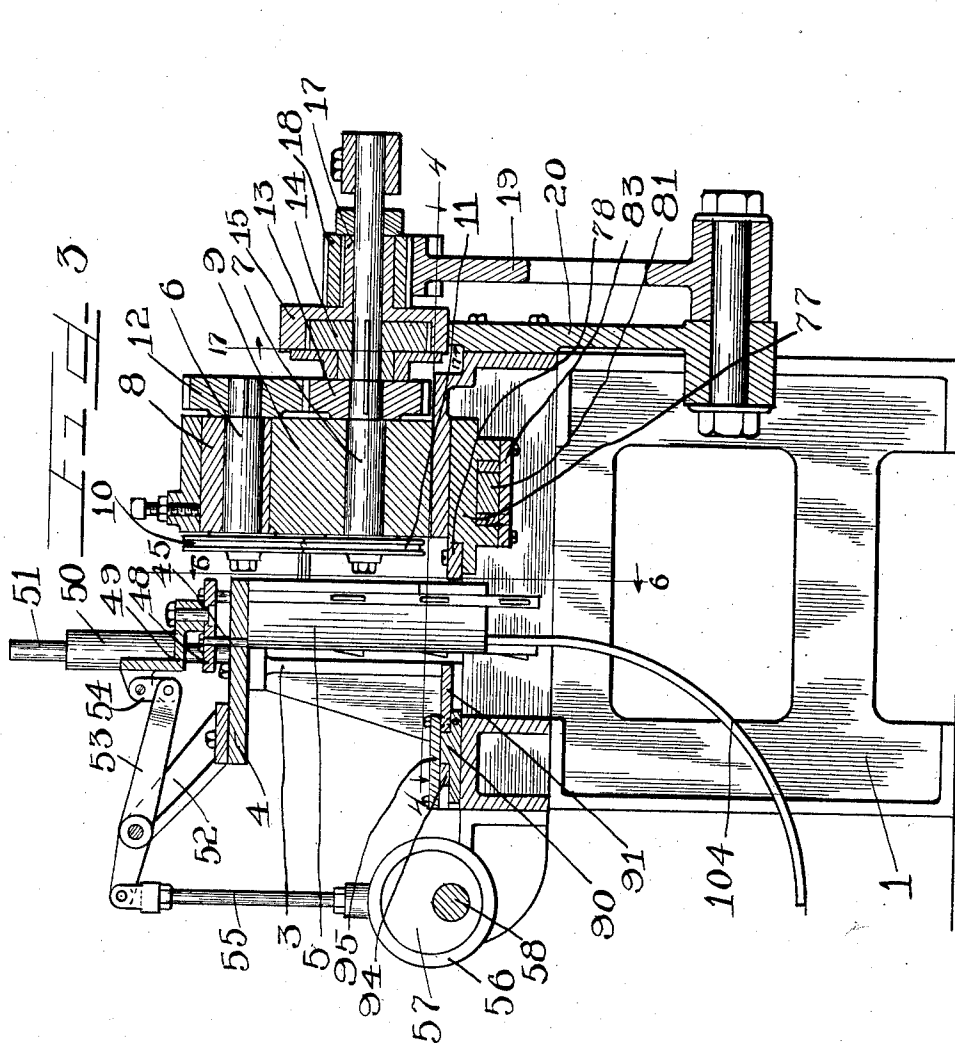
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8 SHEETS-SHEET 3.



WITNESSES
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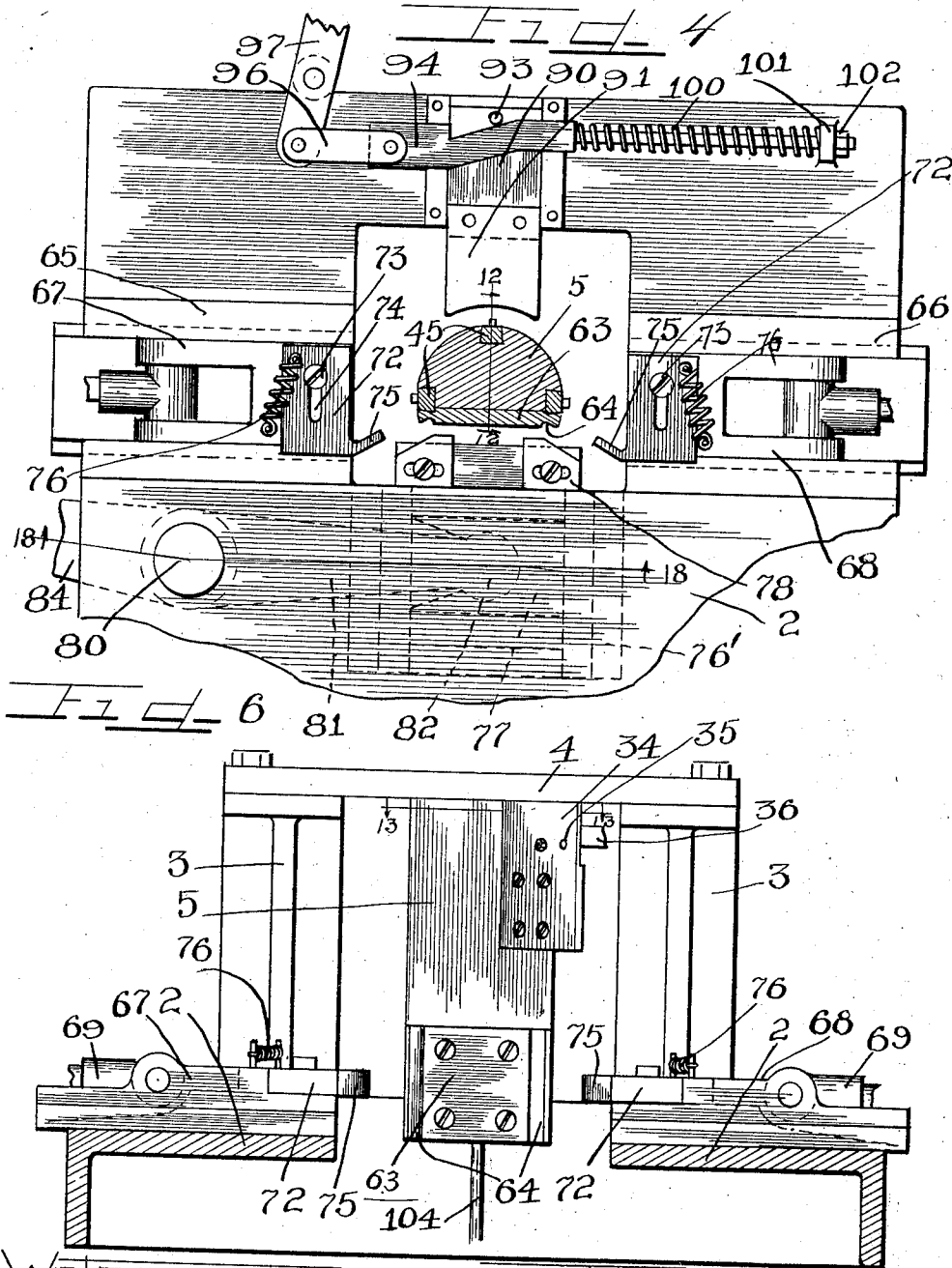
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8 SHEETS—SHEET 4.



WITNESSES

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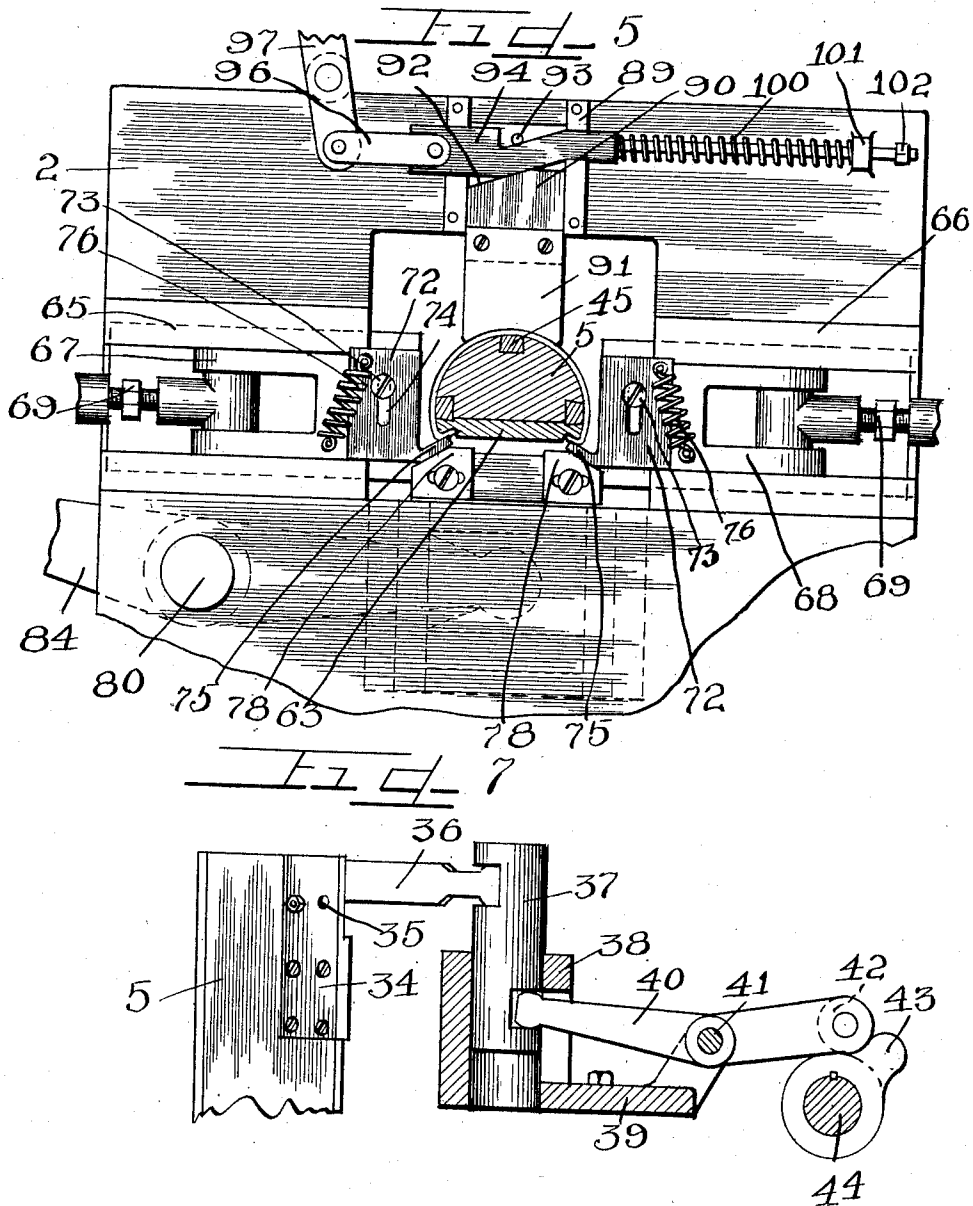
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8 SHEETS—SHEET 5.



WITNESSES

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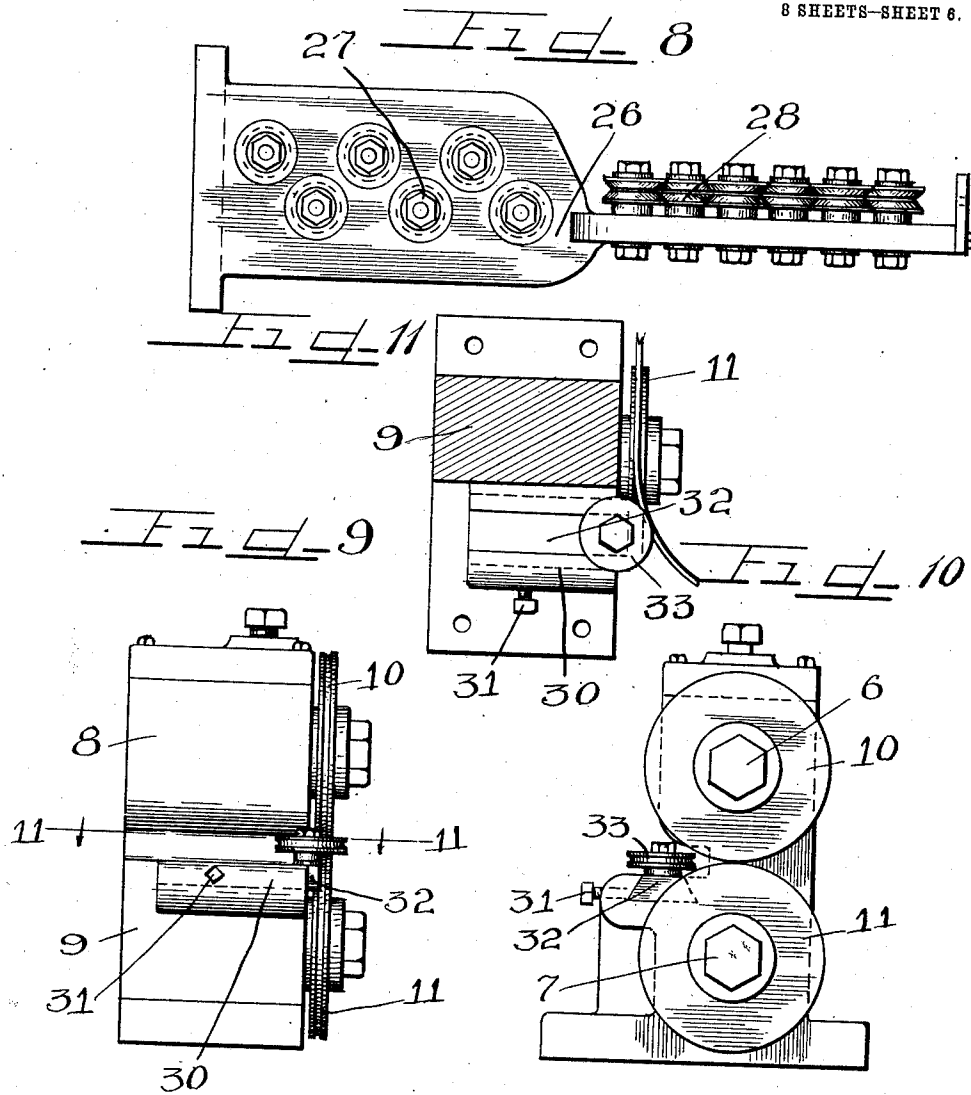
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8 SHEETS—SHEET 8.



WITNESSES

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by

INVENTOR

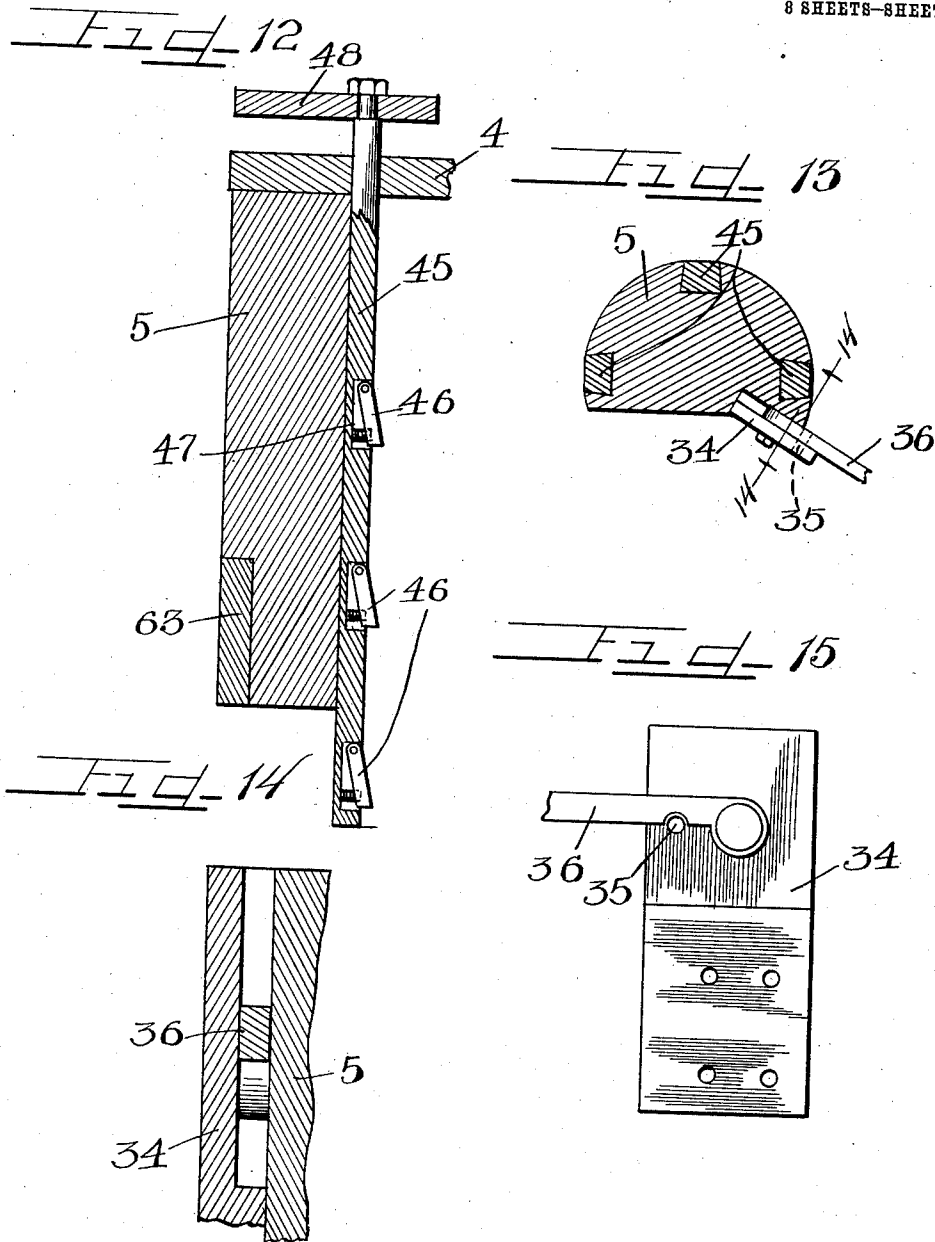
Charles Stecher.
Charles Stecher
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1,039,837.

Patented Oct. 1, 1912.

8 SHEETS-SHEET 7.



WITNESSES

J. H. Angell.
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INVENTOR

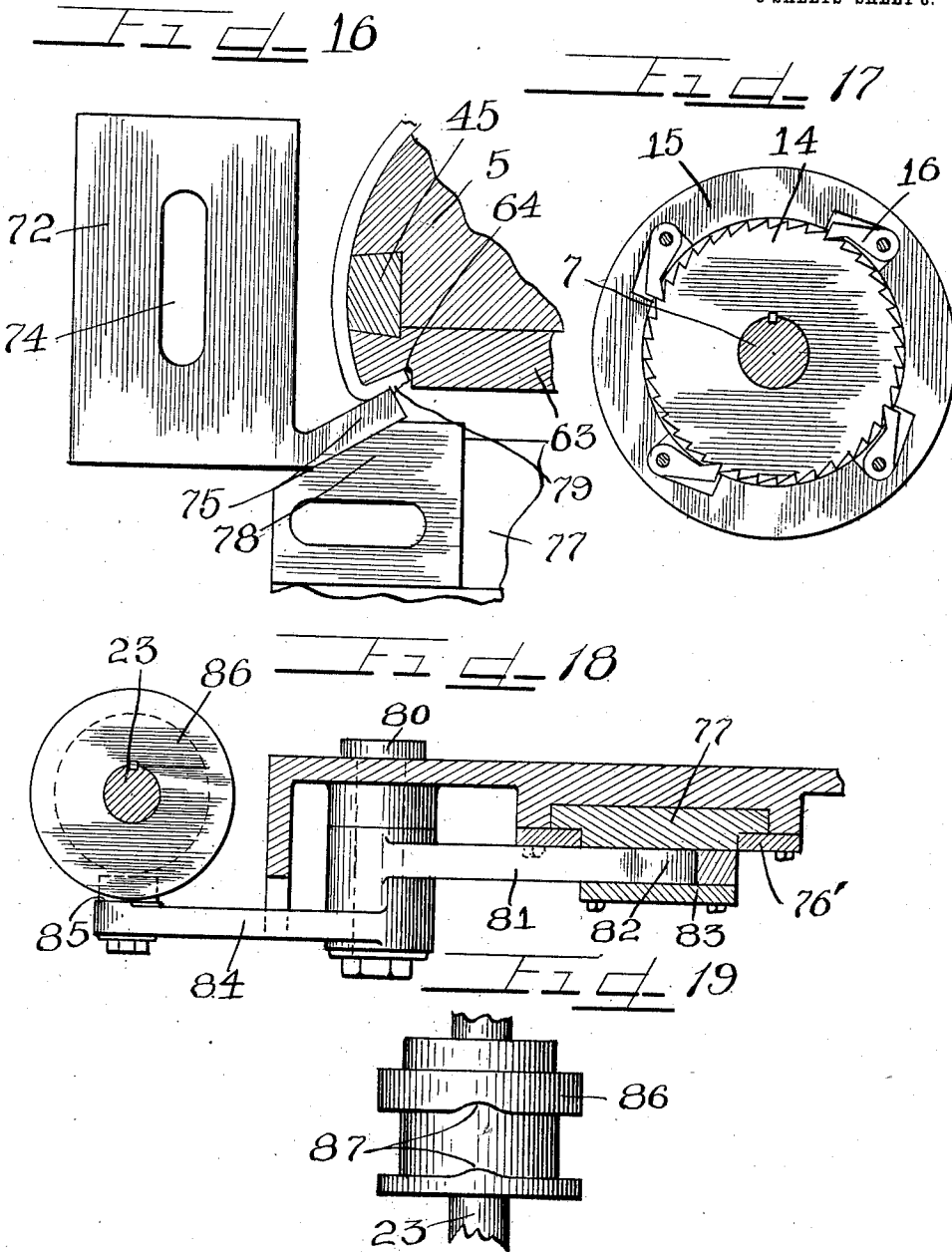
Charles Stecher.

Charles Stecher
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1,039,837.

Patented Oct. 1, 1912.
8 SHEETS—SHEET 8.



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UNITED STATES PATENT OFFICE.

CHARLES STECHER, OF CHICAGO, ILLINOIS.

WIRE-BAIL-FORMING MACHINE.

1,039,837.

Specification of Letters Patent.

Patented Oct. 1, 1912.

Application filed November 24, 1909. Serial No. 529,672.

To all whom it may concern:

Be it known that I, CHARLES STECHER, a citizen of the United States, and resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Wire-Bail-Forming Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numbers of reference marked thereon, which form a part of this specification.

This invention relates to improvements in machines for making wire bails for use on pails, buckets, cans and other articles.

It is an object of this invention to provide a machine in which the wire is fed thereto in a continuous strand, which automatically cuts the wire in proper lengths, bends the cut pieces to proper shape and forms the hooks at the ends of the bail for attaching the same to the desired article, and discharges the bails from the machine.

It is also an object of this invention to provide a machine in which the successive operations are all automatically performed and in which the bails are rapidly made and discharged in completed form from the machine.

It is further an object of this invention to provide a machine in which the feeding mechanism is adjustable adapting the machine to make bails of different lengths and sizes.

It is further an object of this invention to provide a machine which forms a barb or catch on each hook.

It is further an important object of this invention to provide mechanism for forming bails of different curvature adapting the machine to make bails of various lengths and curvatures.

It is further an object of this invention to provide a machine in which all the operations are positive, which is cheap to construct, durable, and which operates at a high rate of speed.

The invention relates to the matters hereinafter described and more fully pointed out and defined in the appended claims.

In the drawings: Figure 1 is a plan view of a machine embodying my invention. Fig. 2 is a side elevation thereof. Fig. 3 is a section taken on line 3—3 of Fig. 1. Fig. 4 is a section taken on line 4—4 of Fig. 3.

Fig. 5 is a view similar to Fig. 4, with the parts in operating position. Fig. 6 is an enlarged fragmentary section taken on line 6—6 of Fig. 3. Fig. 7 is an enlarged detail of the wire cutting mechanism. Fig. 8 is an enlarged detail of the wire straightening and guiding mechanism. Fig. 9 is an enlarged side elevation of the wire bending mechanism. Fig. 10 is a front elevation of the mechanism shown in Fig. 9. Fig. 11 is a section taken on line 11—11 of Fig. 9. Fig. 12 is a section taken on line 12—12 of Fig. 4. Fig. 13 is a section taken on line 13—13 of Fig. 6. Fig. 14 is a section taken on line 14—14 of Fig. 13. Fig. 15 is an enlarged detail of the cutting mechanism. Fig. 16 is an enlarged fragmentary detail of the mechanism for forming the hooks on the ends of the bail. Fig. 17 is an enlarged section taken on line 17—17 of Fig. 3. Fig. 18 is a section taken on line 18—18 of Fig. 4. Fig. 19 is an enlarged view of the cam for operating the mechanism shown in Fig. 18.

As shown in the drawings: A frame is provided constructed of side members 1 and a top member or table 2. Said table is provided with a central opening, as shown clearly in Fig. 6, and secured to the table on each side of said opening are uprights or posts 3, connected at their upper ends by means of a plate or support 4. A semi-cylindric or suitably shaped die member or form 5 is rigidly secured to the support 4, and depends therefrom and extends at its lower end into the opening in the table 2.

Means are provided for feeding the wire forwardly and curving the same to pass around the die member. For this purpose a plurality of parallel shafts 6—7 are journaled in suitable bearing blocks 8—9, rigidly secured to the table 2 opposite the flat face of the die member, and secured on the inner ends thereof are coacting grooved feeding rollers 10—11, which intermittently advance the wire strand.

For the purpose of intermittently rotating the feeding rollers, intermeshing gears 12—13 are secured on the outer ends of the shafts 6—7, and on the shaft 7 outside the gear 13, a ratchet wheel 14 is keyed, which is inclosed by a casing 15 having pawls 16 pivoted thereto, as shown in Fig. 17, which engage the teeth of the ratchet wheel when rotated in one direction to actuate the feed rollers and which slide over the teeth of the

ratchet wheel when rotated reversely. Keyed on the hub 17 of said casing 15 is a gear 18, which meshes with a segment 19, pivoted to a depending bracket 20 secured to the frame, and pivotally connected at one end to said segment is a connecting rod 21, which is adjustably and eccentrically pivoted at its opposite end to a gear 22, secured on a shaft 23, journaled at one end of the frame, and said gear 22 meshes with a pinion 24, on a drive shaft 25.

For the purpose of guiding the strand of wire to the feeding rollers and straightening the wire, a frame 26 is rigidly bolted to the frame on which are two sets of rollers 27—28, one set vertically arranged and the other set horizontally arranged. The rollers in each set are grooved and arranged staggering, and rigidly secured to the outer end of the frame is a guide plate 29, provided with an aperture therein through which the wire is passed to the rollers. A guideway 30 is secured to the bearing block 9, and secured therein by means of a set-screw 31 is a slide 32, on the end of which is secured a grooved bending roller 33, horizontally disposed with the grooves in position to receive the wire from between the feeding rollers 10—11, and which bends the wire on a radius slightly less than the radius of the die member to adapt the curved wire to tightly fit the die member. A guide plate 34 is rigidly secured to the die member 5 at one corner thereof and is provided with an aperture 35 therein through which the wire is passed and which directs the curved wire around the die member. Pivoted between said guide plate 34 and die member 5, is a cutter 36, which severs the strand after the length suitable for a bail has passed. The end of said cutter 36 is provided with a head to engage in a suitable notch in a plunger 37, which reciprocates in a suitable sleeve 38, secured to a bracket 39, secured to the table 2. An aperture is provided in one side of the guide cylinder 38, through which the end of an oscillating lever 40 extends which is provided on its inner end with a head to engage in a notch in the plunger 37. Said lever 40 is pivoted to a shaft 41, supported on the bracket 39, and the outer end thereof is provided with an anti-friction roller 42, which is operated by a cam 43, secured on a shaft 44 journaled at the end of the frame opposite from the shaft 23, and said cam is timed to operate the cutter at the instant the desired length of wire has been fed past the knife. The wire bail is now bent around the upper end of the die member 5, with the ends projecting from each corner of the die member a sufficient distance for the forming of the hooks on the ends of the bail.

For the purpose of forcing the bails downwardly into position for forming the hooks and thence to discharge the completed bails,

a plurality of reciprocating bars 45 (as shown three in number, arranged one adjacent each corner and one intermediate the same) are provided, which slide in longitudinal dovetailed grooves in the cylindrical face of the die member and are each provided with three spring-pressed pawls 46, adapted to be depressed in recesses 47 in the bars by the bails when the bars are reciprocated upwardly but which engage the bails on the downward reciprocation to force the same toward the lower end of the die member 5. For the purpose of simultaneously and equally reciprocating said bars a plate 48 is secured to the upper ends thereof, said ends being reduced in diameter as shown in Fig. 12, and rigidly bolted to said plate is an arm 49, on each end of which is secured a sleeve 50, each of which engages a guide stem 51 secured to the support 4. An outwardly directed bracket 52 is rigidly secured on the support 4, on which is pivoted an oscillating lever 53, the inner end of which is pivotally connected to the arm 49 by means of a link 54, and the outer end of said lever is pivoted to a connecting rod 55, on the end of which is secured an eccentric strap 56, which engages around the eccentric 57, secured on the shaft 58, journaled at the side of the frame opposite the feeding mechanism and which is provided with bevel gears 59—60 at the ends thereof which mesh with bevel gears 61—62 on the shafts 23 and 44, and whereby all the shafts operate together.

For the purpose of forming the hooks on the ends of the bail a die 63 is set in the flat face of the die member 5 at the lower end thereof and at each corner is provided with a recess 64, shown in Figs. 4, 6 and 16, suitable to receive the end of the wire therein. Suitable guides 65—66 are secured to the table 2 on opposite sides of the opening therein and slidable therein are carriages 67—68, to each of which an adjustable connecting rod 69 is pivotally connected at one end and on the outer end of each rod is an eccentric strap 70, which engages around an eccentric 71, secured to the respective shafts 23 and 44. Transversely slidable plates 72 are secured to each carriage by means of a set-screw 73, which passes through a slot 74 in the plate and each plate is provided with an angularly inclined sharp edged bending finger 75, adapted to engage the end of the wire and bend the same into the recesses in the die block 63, and a pulling spring 76 secured at one end to the plate and at its opposite end to the carriage acts to shift the bending fingers out of engagement with the hooked ends of the wire to permit free retraction thereof.

For the purpose of forcing the bending fingers 75 to form the hooks at the ends of the bail and also to provide a barb in the

hooked ends of the bail, ways 76' are secured to the under side of the table in which a carriage 77 slides, on the inner end of which are adjustably but rigidly secured cam plates 78, against which the inclined fingers 75 engage as the carriages 67—68 move inwardly causing the fingers to move inwardly to bend the ends of the bail to form hooks and the fingers bite into the hooks to form a barb 79, as shown clearly in Fig. 16. Said cams 78 are in effect stationary being shifted outwardly once during each operation just prior to the retraction of the carriages 67—68, to permit the springs 75 to throw the forming fingers outwardly from the die, but at all other times said cams are rigidly held at their inner limit of movement, as shown in Fig. 5. For this purpose a stud shaft 80 is secured to the table on which is pivoted a horizontally oscillating lever, one end 81 of which is provided with a rounded head 82, and is secured in a notch in the carriage 77 by means of a plate 83, and the opposite end 84 is provided with an anti-friction roller 85, which engages in a groove in the cam 86, secured on the shaft 23, and which is provided with a throw 87, shown in Fig. 19, which actuates the lever once during each rotation of the shaft to shift the cam plate 78 slightly outwardly sufficient for the purpose specified.

Means are provided for preventing the bail springing or being forced from the die block when the hooks are being formed. For this purpose ways 89 are secured to the table on the opposite side of the opening from the cam plates 78, and slidably secured therein is a carriage 90, on the inner end of which is secured a clamp or plate 91, concave on its inner end complementally with the curvature of the die member 5. The carriage at its outer end is reduced in thickness and provided with a cam face 92 and a pin 93, between which is slidably secured a cam bar 94, shaped on one side complementally with the cam 92, and provided with an inclined face on its opposite side against which the pin 93 bears. A plate 95, shown in Fig. 3, is secured to the ways 89, to prevent displacement of any of the parts. A link 96 is pivoted at one end to the cam bar 94 and at the opposite end to a lever 97 pivoted to the table. Said lever is provided with an anti-friction roller on its outer end which engages the face of a cam 99, the throw of which is sufficient to force the plate 91 to firmly engage the bail to the die member at the proper time.

For the purpose of retracting the carriage 90 and plate 91, a spring 100 is secured on the reduced end of the cam bar and bears at its outer end against a lug 101 on the table, and a nut 102 is threaded on the outer end of the cam bar to limit the return of the cam bar to normal.

The operation is as follows: The end of the strand of wire is inserted through the guide aperture in the plate 29, thence led through the sets of guiding and straightening rollers 28 and 27, between the feeding rollers 10—11, around the bending roller 33, and inserted through the aperture 35 in the plate 34. The machine is now ready for operation, and power is applied. The feed rollers are rotated a distance to feed through the aperture 35 a sufficient length of wire to form the bail and the hooks, and the bending roller curves the wire to pass around the die member 5. At the moment the intermittent feed of the rollers 10—11 ceases the cam 43 on the shaft 44 actuates the lever 40, which reciprocates the plunger 37, to operate the knife to sever the wire. After the wire is severed the eccentric 57, on the shaft 58, oscillates the lever 53, which elevates the reciprocating bars 45, for the pawls to engage above the bail and then depresses the bars forcing the bail downwardly on the die member without loosening the grip of the bail thereon. This is possible owing to the fact that the pawls yield inwardly on the upward stroke permitting the same to pass beneath the bail without jarring the same loose and when above the bail the springs force the pawls outwardly to engage the bail on the downward stroke. When the bails have been adjusted downwardly into position for the hooks to be formed the clamp or plate 91 is operated to bear against the bail and hold the same tightly against the die member, after which the eccentrics on the shafts 23 and 44 operate the carriages 67—68 simultaneously inwardly carrying the bending or hook-forming fingers or members therewith, which engage the projecting ends of the bail and bend the same into the recesses in the die 63. The hook-forming members engage on the cam faces of the cams 78, and are gradually forced inwardly with great power biting into the ends of the bail to form a barb or catch, as shown. At the end of the inward movement of the hook-forming members and prior to their retraction the throw 87, in the cam 86, actuates the carriage 77, to slightly retract the cam members 78, and simultaneously the springs 76 draw the hook-forming members from the die after which the carriages retract said hook-forming members. The eccentric 57, on the shaft 58, has by this time again reciprocated the bars 45 upwardly and now reciprocates the same downwardly and one set of pawls forces a bail into position to have the hooks formed while the lower set of pawls engages the bail on which the hooks have been formed and forces the same from the die member into the guide 104, which conveys the bails from the machine.

It will be noted that after the knife has

severed a strip of the wire, the end of the wire remains in the guide hole 35, in position to pass around the die member when the feed rollers again operate. The radius of the bail being slightly less than the radius of the die member the bail clings to the die member and cannot be jarred loose transversely of the die member. It will further be seen that the construction is such that the cam members 78 form a stationary device thereby adapting great pressure to be exerted by the hook-forming members, and also that by the slight retraction thereof that said members may be withdrawn without friction and danger of breakage. The feed is intermittent and can be adjusted by means of the connections for the rod 21 and gear 22, to feed various lengths of strips to form bails of different length and the curvature of the bail may be changed by adjustment of the bending roller 33, thereby adapting the machine for making various sizes of bails by replacing the die member 5 with suitable die members.

Many changes in the construction may be made without departing from the principles of this invention, and I therefore do not desire to limit this application for patent otherwise than necessitated by the prior art.

I claim as my invention:

1. In a machine of the class described, a frame, a top member therefor having a central opening therein, posts secured to the top member, a plate connecting the posts, a die member secured to the plate and depending therefrom into the opening in the top member, feeding rollers adapted to feed the wire intermittently, a horizontally disposed grooved binding roller adapted to bend the wire around the die member, a knife for severing the curved wire into bails, and means forming hooks at the ends of the bails while on the die member.

2. A machine for making wire bails, comprising a curved die member, coacting grooved rollers for intermittently feeding the wire, a horizontally disposed grooved roller for directing the wire to engage around the curved die member, and a knife for severing the wire in suitable lengths for the bails.

3. In a bail making machine, coacting feed rollers feeding the wire, a semi-cylindric form, an adjustable horizontally disposed roller adapted to curve the wire on a less radius than the radius of the form to pass around the form and cling thereto, a knife for severing the wire into bails with the ends of the bails projecting from the form, and means for engaging and bending the projecting ends of the bails to form hooks.

4. In a device of the class described, a curved form or die member, coacting grooved rollers for intermittently feeding wire, an

adjustable roller for curving the wire to fit around the form, a knife for severing the wire into bails after the wire is curved around the form, a clamp for holding the bail on the form, and means for hooking the ends of the bail.

5. In a device of the class described, a curved form or die member, coacting rollers for intermittently feeding wire, a horizontally disposed adjustable roller for curving the wire to fit around the form, a knife for severing the wire into bails after the wire is curved around the form, a clamp for holding the bail on the form, bending fingers for hooking the ends of the bail, and reciprocating members for forcing the bails longitudinally of the form and from the form.

6. In a machine of the class described, coacting rollers for feeding a wire strand, a knife for severing the wire into bail lengths, an adjustable roller for curving the wire to form bails, and bending fingers for forming barbed hooks at the ends of the bails.

7. In a bail making machine of the class described, adjustable coacting rollers adapted to feed wire for different lengths of bails, an adjustable horizontally disposed bending roller adapted to curve the bails with different radii of curvature, and means for severing the wire.

8. In a bail making machine, wire guiding and straightening rollers, feed rollers for the wire, an adjustable horizontally disposed roller for curving the wire, a knife for severing the wire after the same is curved, and bending fingers acting on the ends of the curved wire to form barbed hooks.

9. In a bail making machine, coacting rollers for feeding the wire, a semi-cylindric form, an adjustable roller for curving the wire on a less radius than the radius of the form to pass around the form and cling thereto, a knife for severing the wire into bails with the ends of the bails projecting from the form, bending fingers for engaging and bending the projecting ends of the bails to form hooks, and a clamp for holding the bail to the form when the hooks are being formed.

10. A machine for making wire bails, comprising a die member, rollers for feeding the wire, an adjustable grooved roller for bending and guiding the wire around the die member, a knife for cutting the wire in bail lengths, and bending fingers for forming barbed hooks at the ends of the bail while on the die member.

11. A machine for making wire bails, comprising a curved die member, coacting grooved rollers for intermittently feeding the wire, an adjustable grooved roller, means for directing the wire to engage around the curved member, a knife for severing the

wire in suitable lengths for the bails, and means for bending the ends of the bail to form hooks.

12. In a bail making machine, wire guiding and straightening rollers, coacting feed rollers for the wire, a horizontally disposed roller for curving the wire as it is fed from the coacting rollers, a knife for severing the wire after the same is curved, means for bending the ends of the curved wire to form hooks, reciprocating members for discharging the bails from the machine, and a curved guide for directing the bails from the machine.

13. In a bail making machine of the class described, a feeding mechanism adjustable to feed wire for different lengths of bails, a bending roller adjustable to curve the bails with different radii of curvature, means for severing the wire, and fingers for bending and barbing the ends of the bail to form barbed hooks.

14. A machine for making wire bails, comprising a curved die member, rollers for intermittently feeding the wire, an adjustable horizontally disposed roller for curving and directing the wire to engage around the curved die member, a knife for severing the wire in suitable lengths for the bails, reciprocating fingers for turning the ends of the bail to form barbed hooks, a spring for moving said fingers transversely from their reciprocation prior to the retraction thereof, and carriages for retracting said members.

15. A machine for making wire bails comprising a die member, coacting rollers for feeding the wire, an adjustable bending roller for bending the wire around the die member, a knife for cutting the wire in bail lengths, fingers for simultaneously forming hooks and barbs at the ends of the bail while on the die member, and reciprocating members for discharging the completed bails from the die member.

16. In a bail making machine, wire feeding mechanism comprising a pair of cooperating rollers adapted to engage the wire between them, means for intermittently rotating said rollers a predetermined distance, and a single bending roller arranged to cooperate with said feeding mechanism to produce a regularly curved wire.

17. In a bail making machine, wire feeding mechanism and bending mechanism comprising an adjustable bending roller positioned in the path of the wire engaged by a pair of coacting feed rollers and arranged to cooperate with said feed rollers to produce a regularly curved wire, and a knife for cutting the curved wire in bail lengths.

18. In a wire forming machine, coacting feed rollers adapted to advance the wire a predetermined distance, a bending roller arranged to cooperate with said feed rollers to produce a regularly curved wire, a knife for

cutting the curved wire in bails, and fingers for simultaneously forming hooks at the ends of the bails and making a barb in each hook.

19. In a wire forming machine, wire feeding rollers, a bending roller arranged to cooperate with said feeding rollers to produce a regularly curved wire, and a die member arranged to be partially embraced by said curved wire to control the position of the wire.

20. In a wire forming machine, wire feeding rollers, bending mechanism comprising a transversely movable member positioned in the path of the wire engaged by said feeding rollers and arranged to cooperate with said feeding rollers to produce a regularly curved wire, a die member around which the wire curves, a knife for cutting the curved wire with the ends projecting from said die member, and fingers for folding the projecting ends of the curved wire against said die member to provide barbed hooks.

21. In a wire forming machine, wire feeding rollers and bending mechanism comprising a grooved roller rotatable transversely of the feed rollers positioned in the path of the wire engaged by said feeding rollers and adapted to curve the roller to form a bail, a die member adapted to engage the bail to support the same, and reciprocating members movable longitudinally of the aforesaid member for advancing the bail toward one end of the die member.

22. In a bail forming machine, wire feeding mechanism, a bending roller positioned in the path of the wire fed by said feeding mechanism adapted to curve said wire, a guide for adjusting the roller to vary the radius of curvature of the wire, a die member adapted to receive the curved wire, a knife for cutting the wire into bails, and means forming barbed hooks at the ends of the bail while on the die member.

23. In a wire forming machine, wire feeding mechanism comprising a pair of cooperating rollers adapted to engage a wire between them and means for intermittently rotating said rollers a predetermined distance, and bending mechanism comprising a single roller positioned in the path of the wire engaged by said cooperating rollers and arranged to cooperate with said rollers to produce a regularly curved bail.

24. In a bail forming machine, wire feeding mechanism comprising a pair of cooperating rollers adapted to engage a wire between them, means for intermittently rotating said rollers a predetermined distance, bending mechanism comprising a single roller positioned in the path of the wire engaged by said cooperating rollers arranged to cooperate with said rollers to produce a regularly curved wire, a knife for severing

the curved wire into bails, a die member adapted to be partially embraced by said curved wire bail and reciprocating members for longitudinally adjusting the bail upon the die member.

25. In a bail forming machine, a frame, a top member therefor, posts secured to the top, a plate connecting the posts, a die member secured thereto and depending therefrom, coacting feed rollers adapted to feed a strand of wire intermittently, a horizontally disposed bending roller adapted to bend the wire around the die member, a knife for severing the curved wire into bails, reciprocating members for advancing the bails toward one end of the die member, and means forming hooks at the ends of the bails while in the die member.

26. In a bail forming machine, a semi-cylindrical member adapted to engage a bail to support the same, and reciprocating members movable longitudinally of the aforesaid member for advancing the bail toward one end of the semi-cylindrical member.

27. In a bail forming machine, a semi-cylindrical member adapted to engage a bail to support the same, reciprocating members movable longitudinally of the aforesaid member for advancing the bail toward one end of the semi-cylindrical member, and means forming hooks at the ends of the bail while on the semi-cylindrical member.

28. In a bail forming machine, a die member adapted to engage a bail upon its exterior to support the same after it is severed from the wire strand, and bending fingers acting on the bail while supported on the die member to form barbed hooks at the ends.

29. In a bail forming machine, a member adapted to receive a bail and to which the bail clings to prevent transverse movement but permitting longitudinal movement, and means for longitudinally adjusting the position of the wire upon said member.

30. In a bail forming machine, a die member adapted to receive a bail to support the same during the completion of the forming operation, a clamp adapted to hold said bail tightly against the die member and fingers for bending the ends of the bail to form barbed hooked ends.

31. In a bail forming machine, a member adapted to receive a bail therein to support the same during the completion of the forming operation, and means provided with a plurality of movable pawls arranged to pass the bail in one direction and to engage the bail when traveling oppositely, and move the same longitudinally of said member to adjust the position of the bail upon the member.

32. In a bail forming machine, a member adapted to receive a bail thereon to support the same during the completion of the forming

operation, and means provided with a plurality of series of movable spring-pressed pawls arranged to engage the wire and move the same longitudinally of said member to adjust the position of the wire upon the member.

33. In a bail forming machine, a member adapted to receive a bail thereon to support the same during the completion of the forming operation, means provided with a plurality of series of movable spring-pressed pawls arranged to engage the wire and move the same longitudinally of said member to adjust the position of the wire upon the member, a clamp for holding the wire on the member, and means for bending the ends of the bail to provide hooks.

34. In a machine of the class described, a die member, reciprocating bars fitted in longitudinal grooves in said member, mechanism for reciprocating said bars, means secured to said bars for forcing a bail downwardly on said die member, and mechanism for forming a bail and delivering the same to said die member.

35. In a machine of the class described, a die member, reciprocating bars fitted in longitudinal grooves in said member, mechanism for reciprocating said bars, means secured to said bars for forcing a bail downwardly on said die member, mechanism for forming a bail and delivering the same to said die member, a die secured to the die member having recesses therein, and means for bending the ends of the bail in said recesses to form hooks.

36. In a machine for making wire bails, a die member, coacting feed rollers, a bending roller adapted to curve and direct the wire around the die member, a knife for severing the wire into bails, means for adjusting the bails upon the die, a clamp for holding the bails in their adjusted position, reciprocating fingers acting to turn the ends of the bails to form barbed hooks, springs acting to move said fingers transversely from their reciprocation prior to the retraction thereof, carriages for retracting said members, cams adapted to be outwardly shifted prior to the retraction of the carriages to permit the springs to throw the fingers outwardly from the die, and means for discharging the completed bails from the machine.

37. In a bail forming machine, a frame, a top member, posts secured to the top member, a plate connecting the posts, a die member secured to the plate and adapted to engage a bail to support the same, and reciprocating members movable longitudinally of the aforesaid member for advancing the bail toward one end thereof.

38. In a bail forming machine, a frame, a top member, posts secured to the top member, a plate connecting the posts, a die mem-

ber secured thereto and adapted to engage a bail upon its exterior to support the same, and means for adjusting the position of the wire upon said member.

5 39. In a bail forming machine, coacting rollers for feeding a wire strand, an adjustable roller for curving and directing the wire as it is fed from the coacting rollers, a semi-cylindrical die adapted to engage the
10 curved wire to support the same, a knife for severing the wire into bails, reciprocating members movable longitudinally of the die for advancing the bails toward one end of the die, and means forming hooks at the ends
15 of each bail while on the semi-cylindrical die.

20 40. In a wire forming machine, wire feeding rollers, a bending roller arranged to cooperate with said feeding rollers to produce a regularly curved wire, a die member arranged to be partially embraced by said curved wire to control the position of the

wire, and reciprocating members movable longitudinally of the aforesaid member for advancing the bail toward one end thereof. 25

41. In a bail forming machine, a die member adapted to engage a bail to support the same, and means for longitudinally adjusting the position of the bail upon said die member. 30

42. In a bail forming machine, a die member having recesses therein, said die member adapted to engage a bail to support the same, means for longitudinally adjusting the position of the bail upon said die member, and
35 fingers for bending the ends of the bail in said recesses to form hooks.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

CHARLES STECHER.

Witnesses:

K. E. HANNAH,

J. W. ANGELL.

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