

Sept. 1, 1931.

J. S. McCHESNEY

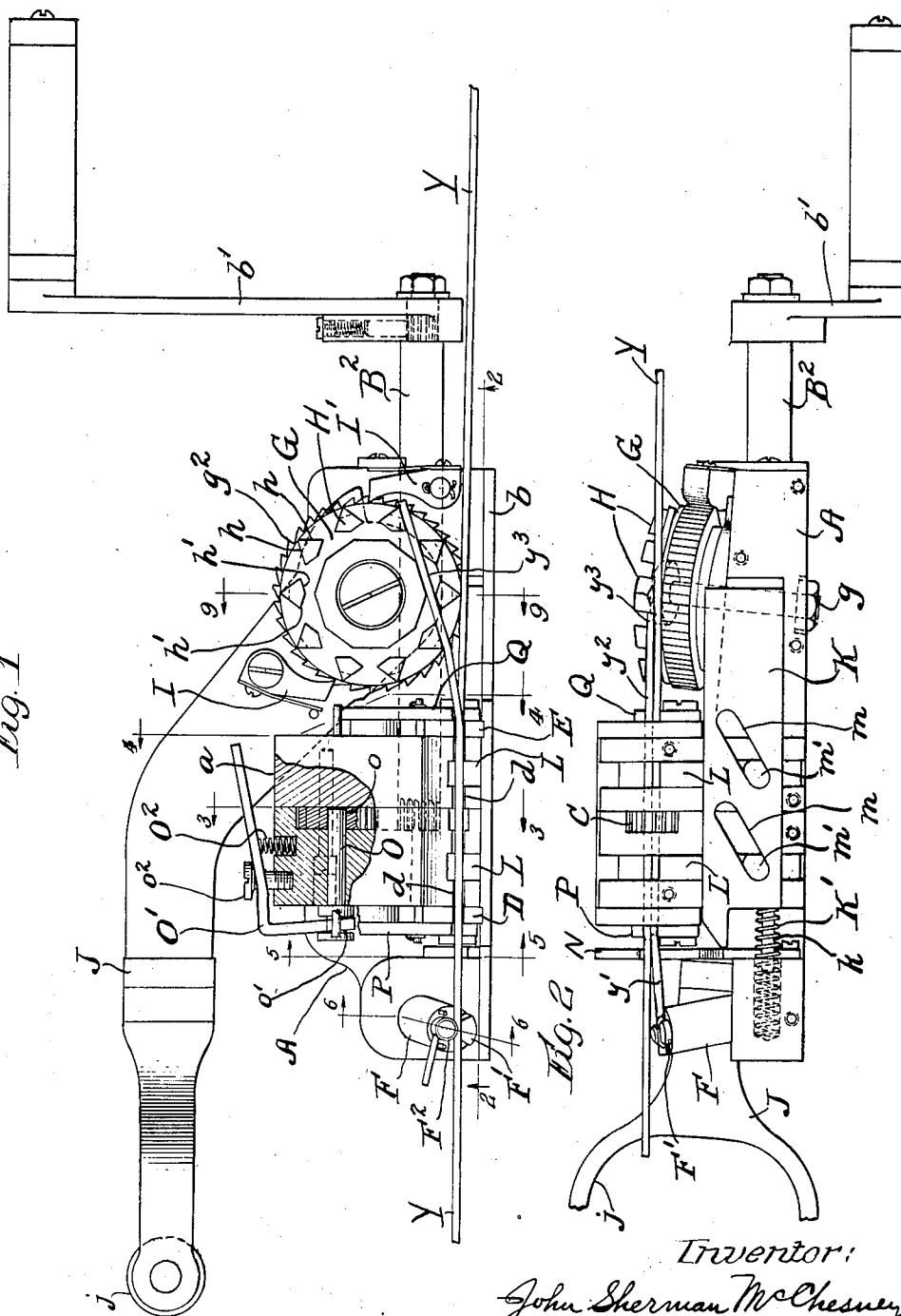
1,821,389

PACKAGE WIRING MACHINE

Filed Sept. 6, 1923

4 Sheets-Sheet 1

Fig. 1



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Fig. 3

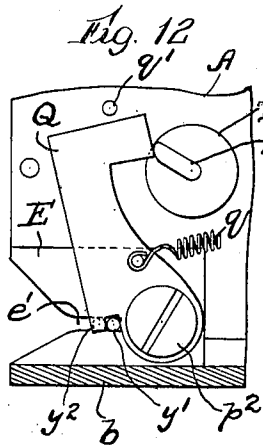
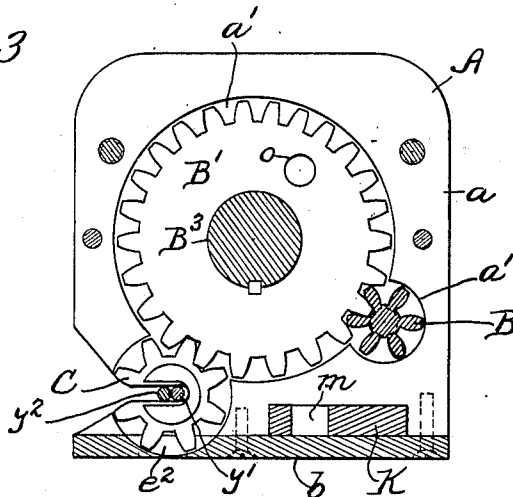


Fig. 4

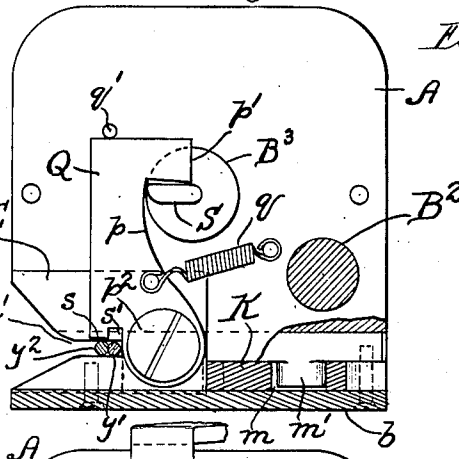
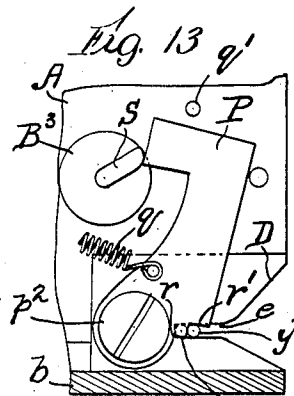
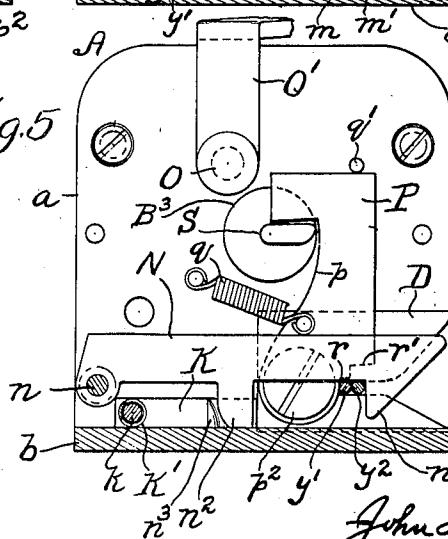


Fig. 5



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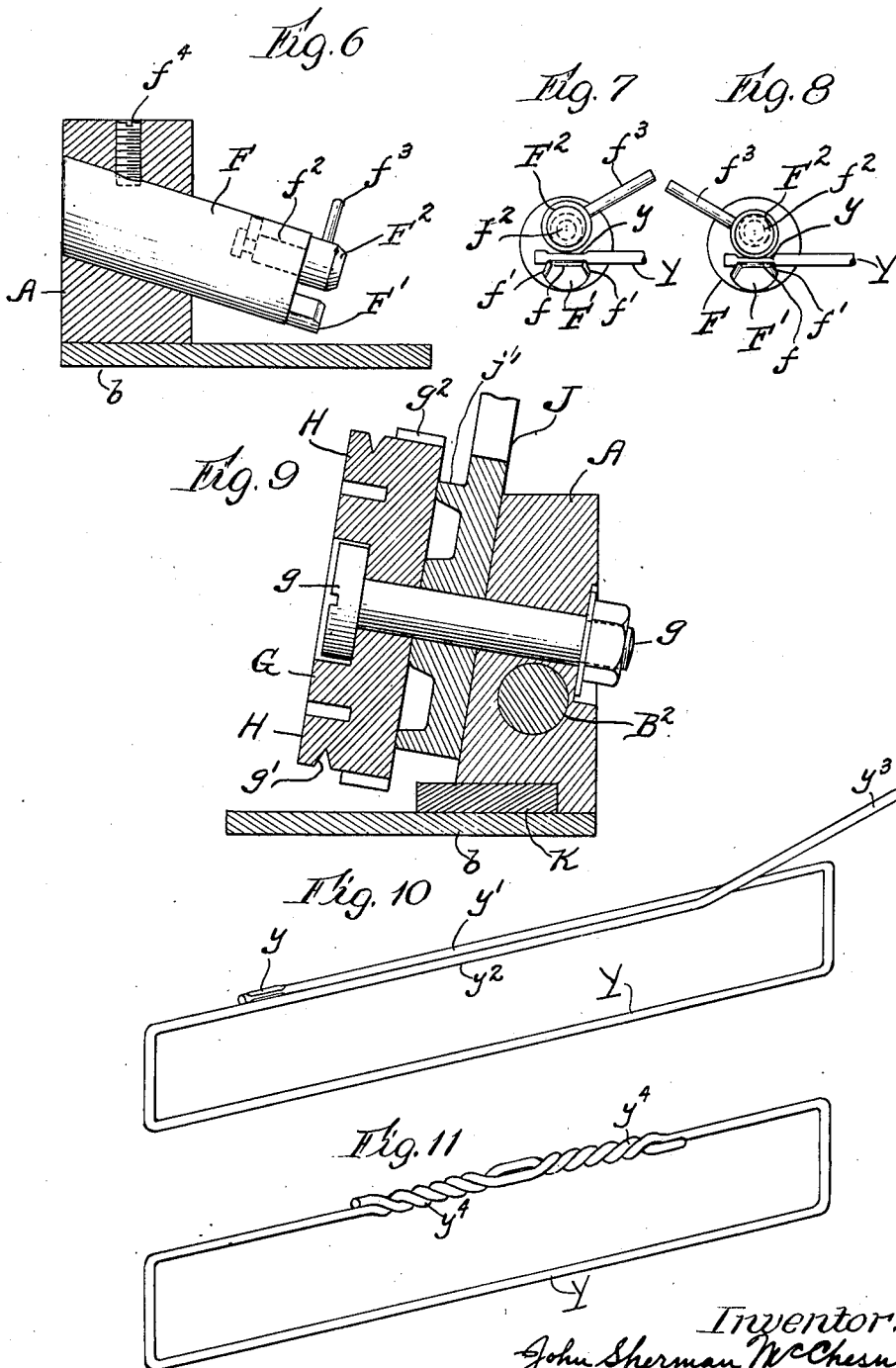
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Filed Sept. 6, 1923

4 Sheets-Sheet 3



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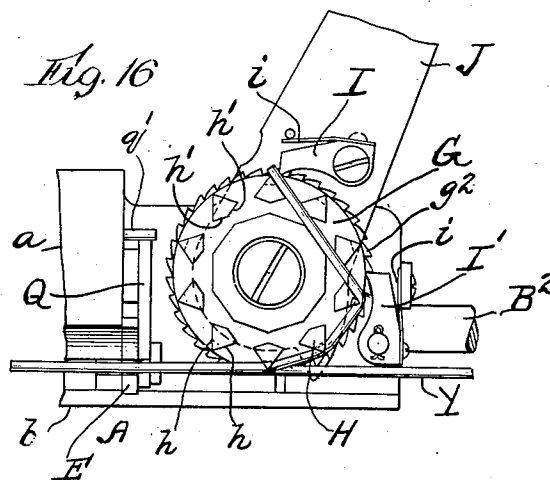
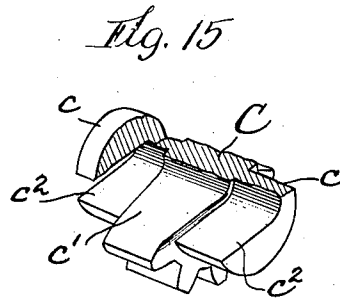
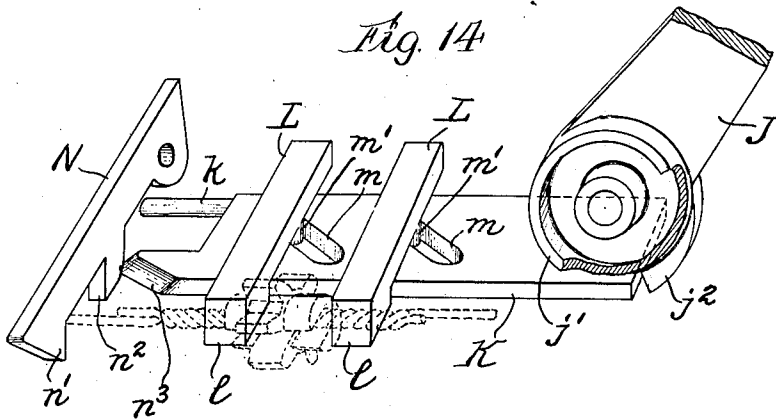
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PACKAGE WIRING MACHINE

1,821,389

Filed Sept. 6, 1923

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

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PACKAGE WIRING MACHINE

Application filed September 6, 1923. Serial No. 661,234.

This invention is a wiring machine, wherein a tie is applied under the required tension to a package, such as a box or crate, and said tie fastened securely by twisting together the end portions thereof, the several operations being semi-automatic and the machine being adapted for use by an unskilled operator in a manner to apply the tie quickly and in the required position around the package, the effect of which is that the tie performs the function of a binder for tightly binding the package and also serves as a seal for said package to preclude pilfering the contents thereof.

The invention may be embodied in a power operated machine, similar in some respects to inventions of patents heretofore granted upon prior applications filed by me, and it may be embodied also in a portable implement or machine adapted to be placed by hand against or upon the package and to be operated quickly by manual effort, the embodiment shown in the drawings being a portable implement adapted for manual operation.

One part of the invention is a holding means unitary with the machine for retaining one end portion of a tie in a fixed relation to said machine while the operator performs the manual operation of passing said tie around the package (box or case) and of positioning said tie in the desired relation to the certain operative parts of said machine prior to the tensioning operation. Said holding means is positioned to facilitate the introduction of the tie, the latter being within the view of the operator, and said holding means being so related to other parts of the machine that access is obtainable easily thereto when inserting the tie. Furthermore, the holding means is adapted for use in conjunction either with a deformed tie wire or with plain round tie wire; and, again, said holding means co-operates with the tie for gripping the same securely in a manner to preclude slipping under the strain applied to the tie in the operation of tensioning the same.

Another feature of the invention is a tension device for straining the tie, said ten-

sion device including a pawl, a ratchet, and a head with an operating member for imparting a rotative intermittent or step motion to the ratchet and the head, and said ratchet operated head being provided with a plurality of peculiarly formed tie-engaging elements relatively spaced to each other on a face of the ratchet operated head and unitary therewith. The tie-engaging elements are of angular formation and are relatively positioned to bite or bind against the tie, said rotative head being mounted for rotation on an axle inclined to the horizontal plane of a twister pinion, whereby the rotative head and the tie-engaging elements thereof are easily accessible and normally within the view of the operator, to the end that the tie is easily inserted and said tie is gripped by a partial rotative movement of said head.

A further feature of the invention is a device for ejecting or stripping the twisted portion of the tie from the twister pinion, thereby facilitating the dislodgment of the tie from the machine, or as it may be termed, shifting the machine bodily from engagement with the tie after the latter shall have been tensioned and secured around the package, (box or case). Said stripper or ejector embodies a plurality of tie-engaging members positioned adjacent the twister pinion, preferably at opposite sides of said pinion, a slidable part co-operable with said tie-engaging members for imparting movement conjointly thereto, and an actuator in the form of a cam contacting said slidable part and operated by the movement of one of the elements of the machine such as the pawl carrying lever, whereby the ejector or stripper is actuated automatically upon the completion of the twist in the tie.

A further feature of the invention is a latch device for retaining in parallel relation the end portions of a looped tie, said latch device being operated automatically by the cam-actuated slidable member of the stripper, whereby the latch device is retracted from contact with the tie at or prior to the action of the ejector or stripper.

A further feature is a double cutter mech-

anism by which surplus wire is severed from the tie subsequently to the formation of the twist, a function of said double cutter being to sever the respective lengths adjacent said twist.

Other functions and advantages of the invention will appear from the following description taken in connection with the drawings, wherein—

Figure 1 is a front elevation, partly in section, of the invention as embodied in a portable hand operated machine.

Figure 2 is a horizontal section view in the plane of the dotted line 2—2 of Figure 1 looking in the direction of the arrow, and illustrating certain operating parts in bottom or inverted plan.

Figure 3 is a vertical cross section on the line 3—3 of Figure 1, showing the twister mechanism for uniting the parallel portions of the tie by intertwisting said parallel portions.

Figure 4 and Figure 5 are vertical cross sectional views on the planes indicated by the dotted lines 4—4 and 5—5, respectively, of Figure 1, looking in the direction of the arrows, and showing the two movable cutters for severing surplus wire from the tie, the lines of cut being adjacent the twist of said tie.

Figure 6 is a vertical sectional elevation on the line 6—6 of Figure 1, illustrating the holding means for one end portion of the tie.

Figures 7 and 8 are front views of a tie-engaging holder including a gripper member, said views illustrating said gripper member in opened and closed positions respectively.

Figure 9 is a vertical cross section on the line 9—9 of Figure 1, illustrating the rotatable head of the tension device.

Figure 10 is a perspective view of a tie in the condition it assumes when looped around a package, with the end portions of said tie in parallel relation, the particular tie illustrated being a deformed wire one end portion of which is preformed for insertion into the holder, whereas the other end portion is deflected for engagement with the rotatable head of the tension means.

Figure 11 is a perspective view of the completed tie after it has been tensioned, twisted, and the surplus wire cut from the ends, said cuts being at points close to the twist.

Figures 12 and 13 are views corresponding to Figures 4 and 5, respectively, illustrating the double cutter in the cutting positions.

Figure 14 is a perspective view of the parts composing the automatic stripper or ejector, said view illustrating also the automatic latch.

Figure 15 is a detail view partly in perspective, and partly broken away, of the twister pinion.

Figure 16 is a detail view of the tensioning means illustrating the action of the rotatable head in placing tension on the tie.

In the embodiment illustrated in the drawings, the machine is shown as a portable manually-operated device adapted to be moved with facility from one box and placed upon or against another box, and to be operated by hand, certain of the operating parts being semi-automatic. As shown, the frame A of the machine is constructed with a gear housing *a* and a base *b*, both unitary with the frame. A practical feature is that the base *b* is composed of a thin plate, preferably of steel, in order that the twister mechanism and the tension mechanism of the machine may lie close down to the package, so as to minimize the distance that the tie must be raised away from said package for the purpose of having said tie engage with the operating parts of the machine, thus enabling the tie to be tensioned around the package to the best advantage. The gear housing is composed of complementary parts adapted for assemblage to encase the gears associated with the twister, said parts of the gear housing being held firmly together by screws and said relatively thin base plate *b* being fastened fixedly to the bottom part of the frame. As shown in Figures 1 and 3, the complementary parts of the gear housing are recessed at *a'* for the accommodation of a gear pinion B and a gear B', said gear pinion B being made fast with an operating shaft B² which is journaled in appropriate bearings of the frame A, and said shaft being shown as having a member, such as a hand crank *b'* for imparting rotative movement to the gear pinion. The gear B' is fast with a shaft B³ journaled in bearings of the gear housing *a*, the ends of said shaft protruding beyond the gear so as to receive cams, presently described, for actuating the members of the double cutter mechanism. Said gear B' meshes with the teeth of a twister pinion C, Figures 3 and 15, provided with journals *c* by which said twister pinion is mounted for rotative movement in appropriate bearings of the gear housing *a*. Said twister pinion is provided with a slot *c'* extending radially thereof, and the journals *c* of said twister pinion are provided with other slots *c''*, the latter being somewhat wider than the slot *c'*, all the slots *c'* *c''*, being in register or alinement, see Figure 15, whereby the slotted body C of the twister pinion is adapted to grasp the parallel parts of the tie, whereas the wider slots *c''* in the journals accommodate the twists given to the tie by the rotative movement of the twister pinion. The gear housing is formed to provide bearings for the journals *c* of the twister pinion C, and is formed also with a slot or throat *d* immediately above the flat thin plate *b*, through which slot or throat *d*

is adapted to pass the parallel parts of the tie, and with which slot or throat is adapted to register the slots e' , e'' of the twister pinion C when the latter occupies a normal position, in which position said twister pinion C is retained by a suitable locking device, to the end that the wire tie may easily be placed in the machine during the manual operation of passing said tie around the package.

The gear housing carries or supports two tie-retaining members herein shown as slotted plates D, E, Figures 1, 4, 5, 12 and 13. These plates are made in separate pieces from the gear housing, although they may be made as integral parts thereof, and said plates are positioned against opposite sides of the gear housing, exteriorly thereof, and attached rigidly thereto.

The plates D, E, are provided with slots e , e' , respectively, and said plates are positioned for said slots e , e' , to register or align with the throat or slots d of the gear housing. The slots are sufficiently long to accommodate the parallel parts of the tie, and the width thereof slightly exceeds the diameter of the tie, whereby the slotted plates are adapted to serve as retainers for the parallel parts of the tie and to preclude said parallel parts from turning relatively to each other when the twister pinion is rotated to impart twists to said tie for joining the end portions thereof. The slots in the retaining plates are open at one end for the ready insertion of the tie, it being preferred to enlarge or flare said open ends, as shown in Figures 4, 5, 12 and 13. The twister pinion C is between the two retaining plates D, E, and said twister is close down to the bottom of the machine, it being preferred to form a curved recess e^2 in the thin bottom plate b (see Figure 3) in order to position the twister pinion as close as possible to that under face of the machine which is adapted to rest upon the package.

One end portion of the tie is to be held in a fixed position on the machine, and in this invention provision is made for holding said tie by a device adapted for engagement either with a plain round wire or with a deformed wire, as may be desired. For certain purposes, it may be found desirable to employ a deformed wire as a means for tying or binding a package, and the holder shown in Figures 1, 2, 6, 7 and 8, is especially useful for anchoring a tie of a particular character, the same being shown in Figures 6, 7 and 10, as a tie composed of a round wire Y with a flattened and shouldered portion γ within one end portion thereof. The holder shown comprises a post F, a jaw F', and a gripper F², said jaw being unitary with the post, whereas the gripper is movably mounted on the post to occupy a co-operative relation to the

jaw. As shown, the jaw is integral with the post, and is positioned on the end face of said post, protruding for an appreciable distance from it so as to fully expose the jaw to easy access. For co-operation with a flattened and shouldered portion γ of the tie wire Y, the jaw is formed with a straight upper face f and with beveled or inclined end faces f' , whereby a flat portion of the tie is adapted to rest on the flat face f of the jaw, whereas the shouldered portion of said tie is in contact with a beveled face or faces f' of the jaw, see Figures 7 and 8. The gripper may be of various forms, but as shown, it is an eccentric pivoted at f^2 and provided with a short arm f^3 adapted to serve as an operating piece for turning the gripper relatively to the jaw F'. The eccentric gripper has a smooth annular face and occupies a position relatively to the jaw so that in the free position (i. e. the non-gripping position of Figure 7) the space between the flat face f of the jaw and the working face of the eccentric gripper exceeds the normal dimensions of the deformed wire tie, but after the flattened and shouldered tie is placed between the jaw and the gripper, as depicted in Figure 7, said eccentric gripper is turned or rotated by hand to the position of Figure 8, whereupon the face of the gripper is in contact with the shouldered and flattened tie, the space being less than the width of the deformed tie. The gripper and the jaw thus co-operate to increase or to decrease the space intermediate the jaw and the eccentrically pivoted gripper, and by this arrangement the gripping means is opened or closed according as it becomes necessary to introduce or remove the deformed tie or to firmly hold said tie in a fixed relation to the machine. The post F of the tie holder is made fast with the machine frame A in any desired way, as by a binding screw f^4 , and said post occupies such relation to the gear housing as to fully expose it to free and unobstructed access. The post is at one side of the gear housing, being placed for an appreciable distance away from the retaining plate D, and it is preferred to incline said post to the horizontal and the vertical, in order that the wire tie may be introduced with ease and facility. As shown in Figures 1 and 6, the post F of the tie holder is inclined to the vertical, and as shown in Figure 2, said post is inclined also to the horizontal, the effect of which is to position the gripper and the jaw clear of all the adjacent parts of the machine and thereby expose the same not only to the view of the operator, but so as to enable the workman to introduce the shouldered and flattened tie without hindrance and in a manner to observe at all times the relation

of the flattened and shouldered tie to the holding means.

Although I have shown and described the tie holder as especially adapted for co-
 5 operation with a shouldered wire preformed to produce a flattened portion, it will be understood that the jaw and gripper of said holder may be used for anchoring a plain
 10 flat wire or a plain round wire in a fixed relation to the machine, it being obvious that the shape or form of the jaw and the gripper may be changed according to the character of the wire used as a tie for binding the package.
 15 Various forms of devices for placing tension on the tie may be employed in the machine, but in the drawings there is illustrated a preferred tension device which is efficient in holding the tie against slipping
 20 during the tensioning operation and is constructed and positioned with the special object of facilitating the connection or attachment of said tie by having the parts at all times under observation by the operator
 25 so that he can see what he is doing. The tension device shown includes a head G idly mounted on an axle or stud bolt g , the latter being inclined as shown in Figure 9; and attached fixedly to frame A on one side of
 30 the gear housing, a , and in spaced relation thereto. The inclination of axle g positions the tension head G in an inclined relation to the bed plate b and to the gear housing so as to cant the tension head and thus expose the
 35 outer face of said tension head to the view of the operator, whereby the tie is under observation when positioning it relatively to the tie-engaging elements provided on said
 40 outer exposed face of said head. As shown in Figures 1 and 16, the tie-engaging members are in the form of lugs H integral with the head and protruding from the exposed
 45 outer face thereof, each lug being peculiarly formed to present sharp angles or corners adapted to bite against the tie. It is preferred to fashion the lug to present a substantially triangular contour, with two long
 50 sides h h and with a base formed by two short sides h' h' , the angle of which is less than the angle of the long sides, the apices formed by the two short inclines h' and the two long inclines h being in a plane radial
 55 to the axis of the head. These lugs H are spaced relatively to each other in a circular series on the face of the inclined head, and said lugs present sharp angles adapted to bite against the wire, as shown in Figure
 60 16, when said wire is deflected to pass between two of said lugs, whereby the wire may be fitted to the lugs of the head so that a slight turn of said head is sufficient to connect the wire to said head in a manner to effectively preclude slipping during the
 65 operation of straining the wire in placing the required tension thereon. After the

wire is anchored at one end on the machine by engagement with the jaw and gripper of the holding post, said wire is passed at y' through the slots in the retaining plates D E, and in the twister pinion, it is then
 70 passed around the package, forming the loop shown in Figures 10 and 11, the wire is then again carried at y^2 through the slots in the retaining plates and the twister pinion, bringing two portions y' y^2 of said wire
 75 in parallel relation (see Figure 10) within the slots of the retaining plates, and the free part y^3 of the wire is deflected upwardly and moved laterally against the exposed face of the tension head into contact with the
 80 sharp corners of the adjacent lugs H and between two or more of said lugs, whereupon the tension head is turned slightly so as to connect the wire to the head by the bite of the lugs on said wire. By reason
 85 of the angular position of the head G and the exposure to view of the angular lugs, the introduction of the wire is facilitated because said wire and the head are at all times exposed to view, and the wire is held
 90 securely in the head by the bite of the angular lugs into contact therewith.

As shown, the head is provided with a peripheral groove, g' , and with ratchet
 95 teeth g^2 , the latter being cooperable with a feed pawl I and with a check pawl I', each pawl being pressed by a spring i into operative relation to the ratchet formation of said
 100 tension head. Said check pawl I' is pivoted on the machine frame, whereas the feed pawl I is pivoted to an operating member shown as a lever J provided at the free end with a hand grip j . Said lever is provided
 105 at the opposite end with a laterally projecting flange j' which contacts with the inner face of the tension head so as to space the lever and the tension head, said lever turning freely on the stud bolt or axle g , whereby the lever is mounted in the
 110 machine for oscillatory movement with respect to the gear housing. The lever is formed at its pivoted end with a projection j^2 serving the function of a cam for imparting movement in one direction to a sliding part K constituting one element of the stripper
 115 or ejector for the tie Y.

Said stripper or ejector includes two slidable members L L comprising straight
 120 pieces with enlarged heads l of angular formation, see Figure 14. These stripper members are fitted in guideways provided on the bed plate b and the gear housing a so as to extend across the throat d , said
 125 stripper members being positioned crosswise of the slide K which has underlapping relation to said stripper members. Said slide K is in the form of an elongated plate positioned upon the bed plate b to extend
 130 lengthwise thereof, see Figure 2, one end of the slide being in contact with the cam

member j^2 of the actuating lever J and the other end of the slide being provided with a pin k , on which is positioned a coiled spring K' acting against the slide to impel it in one direction and thus press the slide for the other end thereof to normally contact with said cam j^2 . It will be seen that the spring K' imparts movement in one direction to the slide, whereas the movement of lever J acts through the cam j^2 to impart movement in an opposite direction to the slide. The stripper members are actuated simultaneously by the movement of slide K, and to this end, the slide is formed with a plurality of inclined slots m extending diagonally across the same intermediate its ends, whereas the stripper members are provided with studs or rollers m' which are fitted in said diagonal slots, see Figures 2 and 14. The stripper members are thus operated by the movement of the slide, and these stripper members are positioned on opposite sides of the twister pinion C and between said twister pinion and the retaining plates D, E, so that the heads l of the stripper members are adapted for contact with the twisted portions y^4 of the tie Y, see dotted lines in Figure 14.

With the power lever J in the overhanging position of Figures 1 and 2, the cam slide K is moved by the spring to retract the stripper members L with respect to the slotted twister gear, thus permitting the tie to be placed in the slots of the retaining plates and the slot of the gear. The power lever is operated by a succession of relatively short strokes to place the tension required on the tie, but a movement of the power lever to the full line position, shown in Figure 14, brings into service the cam j^2 to give a full stroke to the cam slide K and thereby move the stripper members L forwardly to the full limit, the effect of which is to eject the twisted portions y^4 of the tie from the slots $e e'$ of the retaining plates D E and from the slot of the twister gear; in other words, the twisted tie is stripped or ejected from the twister gear, or, conversely, the machine is shoved backwardly from the applied tie, thus facilitating the removal of the machine from the tensioned and twisted tie wire.

To retain the side by side positioned or parallel parts $y' y^2$ of the tie in the desired relation to each other during the operation of tensioning the tie and of twisting the same by the rotative movement of the twister gear, I provide a detent or latch N, the same being positioned adjacent the retaining plate D. The heel of the detent is pivoted at n to the frame A, whereas the free end of said detent is provided with a beak n' adapted to engage one length y^2 of the tie in a manner to preclude the machine from being displaced with respect to the

tie during the action of the twister pinion when engaged in twisting the tie at y^4 . The detent is released automatically from the tie subsequently to the twisting operation, and to this end said detent is provided intermediate its ends with a cam lug n^2 which lies in the path of a finger n^3 provided on the end portion of the cam slide K, whereby the movement of the power lever J to the full stroke position of Figure 14 imparts such travel to the cam slide as to move the stripper members L to eject the tie from the twister gear and also to raise the pivoted detent N sufficiently for the beak n' to clear the length y^2 of the tie Y.

The gear B' in mesh with the twister pinion C, is provided at a certain point with an aperture o , with which engages a locking pin O, the latter being slidable in the gear housing a , see Figures 1 and 3. The outer end of the pin is grooved at o' , for engagement with an angle lever O', pivoted at o^2 on the gear housing and engaged by a spring o^2 , the latter acting to turn the angle lever and to impel the pin O into the aperture o of the gear. Before turning the crank b' to impart motion to the train of gears B B' for rotating the twister gear, the operator should press on the angle release lever O' and withdraw the pin O from the aperture o in the gear B', whereupon the angle lever is released. Now by turning the crank, the twister gear C is operated a predetermined number of times until the gear B' turns to present the aperture o opposite the pin O, whereupon the spring O² acts on the angle lever and the pin to force the latter into the aperture o , thereby locking the gear B' and the gears B and C, such locking of the twister gear C taking place at the time when the slot c thereof is in register with the slots $e e'$ of the retaining plates D E. The described mechanism permits the rotation of the twister gear to a predetermined extent and acts as a means for automatically locking the train of gears so as to lock the twister gear at a point which insures registration of its slot with the slots of the retaining plates.

In this invention provision is made for cutting surplus wire from the tie by the action of a double cutter, the latter acting on the respective lengths $y' y^2$ of the tie to cut the latter close to the twists y^4 . Two cutters are employed, as indicated at P Q, the same being positioned at the respective sides of the gear housing, and said cutters are of such formation that they act to sever from the tie the surplus ends which respectively are engaged by the tie holder and by the rotatable tension head. Said cutters are actuated at a time subsequently to the formation of the twists y^4 in the tie, and said cutters are operated automatically by the rotative movement of one of the elements of the machine, preferably by the gear B' of the

gear train and prior to the automatic stoppage of said gear train by the locking pin O. Each cutter is a single piece of metal with a cam face p beneath a stop shoulder p' , said cutter being vertically positioned alongside one of the retaining plates D or E and having its lower end pivoted thereto as by a screw p^2 . A spring q is connected to each cutter for holding the same normally in a position at which the tie may be inserted readily into the slots of the machine, the movement of the cutter under the tension of the spring being arrested by a stop q' positioned in the path of the upper portion of said cutter. The lower edge portions of the two cutters P Q are differently fashioned in order that the cutting edges of said cutters will act to sever the respective parallel portions y' y^2 of the tie. The cutter P of Figures 5 and 13 is of stepped formation to result in a cutting edge r and a clearance shoulder r' above said edge r , whereby the movement of cutter P to the position of Figure 13 results in the cutting edge r severing the length y' of the tie, but the clearance shoulder r' being raised above the edge r does not act to cut the length y^2 of said tie. On the return of cutter P to normal position by the tension of the spring, the cutter swings to the position of Figure 5, with the edge r and shoulder r' well above the path of the tie. The other cutter Q is so formed near the lower edge thereof as to result in a cutting edge s and a notch s' , the latter extending upwardly from the cutting edge, as shown in Figures 4 and 12. The cutter Q when held in the normal position by spring q is swung for the cutting edge s to lie above the path of the tie, see Figure 4, but when pressed to an active position as in Figure 12, the edge s' severs the length y^2 of the tie, the other length y' of said tie being received within the notch s' . The two cutters P Q are thus constructed and operated to sever the respective lengths y' y^2 of the tie, and the cutters act to cut the tie close to the twists y^4 , one cutter P severing that portion of the tie between one twist y^4 , and the tie holder F, whereas the other cutter Q severs that portion of the tie between the other twist y^4 and tension head G, whereby the surplus material is severed automatically after the completion of the twists in a manner to release the tie from the machine and to leave no protruding or free ends on the tie (see Figure 11) which are liable to catch on the floor or other surface over which the package may slide or to injure the hands of the workmen engaged in handling the package. The cutters are operated automatically upon the rotation of the gear B' forming one of the train of gears for actuating the cutters by the action of cams S provided on the exposed ends of gear shaft B³, said cams S contacting the

cam edges p of the respective cutters and the rotation of said cams S being timed to actuate the cutters subsequently to the twisting of the tie by the twister pinion and practically concurrently with the reciprocating movement of the strippers L for ejecting the completed tie from the slotted twister gear and the slotted gear housing.

The operation will be understood from the foregoing description, but may be summarized briefly as follows: The machine is placed by hand against a package in the required position to be occupied by a tie, and a preformed or plain wire tie as Y of the proper length to pass around the package is selected and manipulated by hand so that the shouldered part y is held by the gripper F, one length y' of said tie passes through the slots of the retaining plates D E, the slot of the gear housing and the slot of the twister gear, and beneath the cutters P, Q, the major length of the tie is looped around the package, and the other length y^2 passes again through the slots of the retaining plates, the gear housing and the twister gear, and the free end y^3 of said tie length y^2 is connected to the tension head G. The power lever J is operated by a succession of relatively short strokes or movements to impart intermittent or step rotation to the tension head, the length of said movements of the power lever not being sufficient to move the strippers L far enough to throw the parallel portions y' y^2 of the tie out of the twister gear C, nor to disengage the beak n' of the detent N from contact with said parallel parts y' y^2 of the tie. It is to be noted that the parts y' y^2 of the tie are held by the slots of the retaining plates D E in parallel relation to each other during the operation of the power lever, and that the beak of the detent N precludes the parallel lengths y' y^2 of said tie from slipping out of the twister gear, this function of precluding displacement of the tie lengths y' y^2 relative to the twister gear being also obtained by setting the tie holder F and the tension head backwardly from the line of the looped tie, see Figure 2. The power lever J is operated a desired number of times for taking up slack in the tie, and for placing the required tension thereon so as to apply the tie tightly around the package and to embed said tie in the corners of said package. The required tension having been placed on the tie, the check pawl I' holds the parts against retrograde movement while performing the subsequent operations. The operator releases the pin O from gear B' by pressing down on the angle release lever O', and the crank b' is operated to impart movement through the gear train to the twister gear C, the rotation of which intertwists the tie to produce the

twists y^4 intermediate the ends of the twister gear C and the retaining plates D E, the latter holding the parallel parts $y' y^2$ of the tie against turning in the slots $e e'$ of said plates during said rotation of the gear C and the detent N precluding bodily movement of the machine away from the tie Y during said rotative movement of the twister gear. Prior to the stoppage of the twister gear by the locking pin O snapping into the aperture o of the gear B', and subsequently to the formation of the twists y^4 in the tie, the cams S act on the cutters P Q to sever the lengths $y' y^2$ of the tie close to said twists, whereupon the twister gear and other parts reach their normal positions and are locked by pin O engaging with gear B', the cutters P Q being returned by springs q to normal. The operator now swings power lever J to the extreme position toward the right, as in Figure 14, whereupon cam j^2 rides on the edge of cam slide K to impart movement to the strippers L and to detent N, said detent being lifted away from the wire tie and the strippers acting on the tie at opposite sides of the twists y^4 to eject the tie from the slots of the machine or to dislodge the machine relatively to the tie by shoving it bodily in a backward direction, the surplus lengths of the tie where attached to the tie holder and the tension head having been severed by the automatic operation of the cutters P Q so as to release the tie and the machine in a manner to facilitate the removal of the machine from the tie and the package. Obviously, the cut off end portions of the tie are disengaged from the tie holder and from the tension head, whereupon the machine may be shifted to another position for applying a second tie to the package or shifted to another package ready for another operation.

Having thus fully described the invention, what I claim as new and desire to secure by Letters Patent is:

1. In a wire tying machine, a tie holder embodying a jaw provided with a relatively flat face and beveled end faces, and an eccentrically pivoted gripper provided with a smooth annular face in opposing relation to the flat face of said jaw.

2. In a wire tying machine, a tie holder embodying a jaw having beveled end faces, and a gripper movable relatively to said jaw, said jaw and the gripper being co-operable with a deformed tie and movable relatively one to the other to assume an open position wherein the space between the gripper and jaw exceeds the normal dimensions of the deformation in said tie, whereby the tie may be introduced and removed with facility and to assume a closed position wherein the deformed tie overlies the beveled end faces of the jaw.

3. A wire tying machine including twisting means, and a tie holder inclined in a plane substantially parallel to the axis of the twisting means with respect to said twisting means and to the path or position of a tie insertable therein.

4. A wire tying machine including a twister gear, and a tie holding post inclined relatively to said twister gear in a plane parallel thereto, said tie holding post being provided with gripping means movable to open and closed positions.

5. A wire tying machine including a twister gear, and a tie holding post inclined with respect to the position of a tie in a plane parallel thereto adapted for co-operation with said gear, said tie holding post being provided with tie gripping means which partake of the inclination of said post.

6. In a wire tying machine, a tie holding post inclined with respect to the position of a tie in a plane parallel thereto adapted for insertion into the machine, a jaw unitary with said post, and a movable gripper supported by the post in position for co-operation with said jaw.

7. In a wire tying machine, a tension head provided with a series of lugs protruding from a face of said head, said lugs being spaced relatively one to the other and each lug provided with inclined faces with respect to each other and meeting each other to produce sharp corners and clearance spaces so positioned that at least two of said sharp corners of each lug are adapted to bite against the surface of a tie.

8. In a wire tying machine, a tension head provided on one of its faces with protuberant lugs, the faces of each lug being inclined to a radius of the head and said faces meeting each other to produce sharp corners so positioned that at least two of said corners of each lug are adapted for biting contact with a tie adapted to be passed between said adjacent lugs.

9. In a wire tying machine a tie receiving member, and a tension head provided on one of its faces with a succession of lugs each of angular formation and adapted for biting engagement with a tie, said head being rotatable on an axis inclined to said tie receiving member of said machine.

10. In a wire tying machine, a twister, tension means including an operating member, a stripper co-operable with said twister, and means operated by the operating member for imparting movement to said stripper.

11. In a wire tying machine, a twister, a stripper, tension means, and an operating member co-operable with said tension means and said stripper.

12. In a wire tying machine, a twister, a stripper including a plurality of members co-operable with said twister, and means for

conjointly operating said stripping members.

13. In a wire tying machine, a twister, a plurality of stripper members positioned at the respective sides of the twister and movable relatively thereto, and means for imparting movement simultaneously to said stripper members.

14. In a wire tying machine, a twister, a plurality of stripper members slidable relatively to said twister, and a single member co-operable with said stripper members for imparting movement simultaneously thereto.

15. In a wire tying machine, a twister, a plurality of stripper members slidable relatively to said twister, a single member co-operable with said plurality of stripper members, and a cam for imparting slidable movement to said single member for effecting the conjoint operation of said stripper members.

16. In a wire tying machine, a twister, a plurality of stripper members movable relatively to said twister, a cam slide connected with said stripper members, a retractor for said cam slide, and means for positively moving said cam slide.

17. In a wire tying machine, a twister, a plurality of stripper members movable relatively to said twister, a single member for conjointly moving said stripper members, tension means, and an operating member for imparting movement to the tension means and to the stripper operating member.

18. In a wire tying machine, a twister, a plurality of stripper members movable relatively to said twister, a single member for conjointly moving said stripper members, tension means, and an operating member movable within certain limits for actuating the tension means and movable also to other positions for effecting the movement of the stripper operating member.

19. In a wire tying machine, a twister, a stripper, tension means, and an operating member co-operable with the stripper and with the tension means for effecting the independent operation of the stripper and the tension means.

20. In a wire tying machine, a twister, a tension head, an operating member for imparting a rotative step movement to said tension head, a stripper in movable relation to the twister, and means operated by the movement of the operating member to a position for effecting the operation of said stripper.

21. In a wire tying machine, a twister, a tension head, an operating member for imparting a rotative step movement to said tension head, said operating member having a cam, a stripper in movable relation to the twister, and a slide co-operable with the stripper and actuated by the cam of said operating member.

22. In a wire tying machine, a slotted twister adapted for the reception of parallel portions of a tie, a detent engageable with said tie for retaining the latter against displacement during the rotation of said twister, and means for effecting the release of said detent automatically from the tie subsequently to the operation of said twister.

23. In a wire tying machine, a slotted twister adapted for the reception of parallel portions of a tie, a detent engageable with said tie for retaining the latter against displacement during the rotation of said twister, a stripper co-operable with the twister, and means operated conjointly with the movement of the stripper for effecting the release of said detent from the tie.

24. In a wire tying machine, a slotted twister adapted for the reception of parallel portions of a tie, a detent engageable with said tie for retaining the latter against displacement during the rotation of said twister, a stripper co-operable with the twister, and a stripper actuating member co-operable with said detent for shifting the latter free from the tie.

25. In a wire tying machine, a twister, actuating means therefor, and a plurality of cutters operated by the twister actuating means, said cutters being positioned to sever simultaneously the respective lengths of a tie adjacent the twists produced in said tie by the rotation of said twister subsequent to the twisting operating.

26. In a wire tying machine, a tie holder, a tie tension head, a twister intermediate the tie holder and said tension head, and a plurality of cutters positioned to sever simultaneously the respective lengths of a tie at points intervening the twister, the tie holder and the tension head after the twisting operation.

27. In a wire tying machine, a tie holder, a tie tension head, a twister intermediate the tie holder and said tension head, and a plurality of cutters positioned to sever the respective lengths of a tie at points intervening the twister, the tie holder and the tension head, said plurality of cutters being actuated simultaneously automatically with the rotation of the twister and subsequently to the action of said twister on said tie.

28. In a wire tying machine, a twister, and a plurality of cutters operated simultaneously and with said twister, one of said cutters having a notched cutting edge and the other cutter provided with a step formed edge whereby the cutters operated to straddle one length of a tie and to sever the other length of the same tie.

29. In a wire tying machine, a twister, a plurality of cutters positioned for simultaneously severing the respective lengths of a tie adjacent the resulting twists produced by the twister, and cutter actuating means

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timed for effecting the operation of said cutters subsequently to the action of the twister on the tie.

30. In a wire tying machine, the combination of a plurality of devices for holding, tensioning and tying two bights of a wire, actuating means for said tensioning device and said tying device, an ejector acting to bear forcibly against said wire after it is tied and to eject said tied wire from the machine, and means for automatically actuating said ejector.

31. In a wire tying machine, the combination of a plurality of devices for holding, tensioning and tying two bights of a wire, actuating means for said tensioning device and said tying device, a reciprocating ejector positioned for contact with said wire and operable for forcibly ejecting the same from the machine after said wire is tied, and means operated by said actuating means for actuating said ejector.

32. In a wire tying machine, the combination of tensioning means, twisting means including a slotted pinion, wire holding means located on either side of said pinion, an ejector positioned for engagement with said wire after it is tied and operable for dislodging the tied wire from said slotted pinion, a cam member for actuating the ejector in one direction, and means for returning the ejector to normal position.

33. In a wire tying machine, the combination of tensioning means, twisting means including a slotted pinion, wire holding means located on either side of said pinion, cutting means for severing the wire subsequent to the twisting of said wire, an ejector positioned for engagement with said wire after it is tied and operable for dislodging the same from said slotted pinion, and means for actuating said ejector in timed relation to the twisting pinion and the cutting means.

34. In a wire tying machine, the combination of a plurality of devices for holding, tensioning and tying two bights of a wire, actuating means for said tensioning device and said tying device, an ejector acting to bear forcibly against said wire after it is tied and to eject the tied wire from the machine, and means controlled by said devices for actuating said ejector.

35. In a wire tying machine, the combination of a plurality of devices for holding, tensioning and tying two bights of a wire, actuating means for said tensioning device and said tying device, an ejector acting to bear forcibly against said wire after it is tied and to eject the tied wire from the machine, and means controlled by said devices for actuating said ejector, said means embodying a slide.

36. In a wire tying machine, the combination of devices for holding, tensioning and

tying together two bights of a wire, an ejector acting to bear forcibly against the wire after it is tied, and eject it from the machine, means for actuating said tensioning and tying devices, and means actuated from said first-named means for automatically actuating the ejector.

37. In a wire tying machine, the combination of devices for holding, tensioning and tying together the two bights of a wire, a slidably-mounted ejector acting to forcibly bear against the wire after it is tied and eject it from the machine, means for actuating said tensioning and tying means, and means actuated from the first-named means for actuating the ejector after the twisted wire has been severed.

38. In a wire tying machine, the combination of devices for holding, tensioning and tying together two bights of wire, actuators for said tensioning device and said tying device, an ejector acting to bear forcibly against the wire after it is tied and eject it from the machine, and means associated with and controlled by one of said actuators for automatically actuating said ejector.

39. In a wire tying machine, the combination of devices for holding, tensioning and tying together two bights of wire, actuators for said tensioning device and said tying device, a slidable reciprocating ejector acting to bear forcibly against the wire after it is tied and eject it from the machine, and means associated with and controlled by one of said actuators for automatically actuating said ejector.

40. In a wire tying machine the combination of devices for tensioning and tying together two bights of wire, actuators for the tensioning and tying devices, and an ejector operated by one of said actuators to cause the ejector to bear forcibly against the wire after it is tied and eject it from said machine.

41. In a wire tying machine, the combination of devices for tensioning and tying together two bights of wire, actuators for said tensioning and said tying devices, an ejector operated by one of the said actuators to bear forcibly against the wire after it is tied and eject it from said machine, and a spring to return the ejector to initial position.

42. In a wire tying machine, the combination of devices for tensioning and tying together two bights of wire, an ejector acting to bear forcibly against the wire after it is tied to eject it from the tying device, actuators for operating said tensioning device and said tying device, means associated with one of said actuators for automatically actuating the ejector, and means for holding the wire in said machine during tensioning and tying operations.

43. In a wire tying machine, the combina-

tion of devices for tensioning and tying together two bights of wire, actuating devices for said tensioning device and said tying device, an ejector carried by said machine for ejecting the bights of wire after they have been tied, said ejector arranged to be operated by one of said actuating devices, and a detent for retaining said bights of wire in normal position in said machine during the tying operation and arranged to be moved out of retaining position during the ejecting operation.

In testimony whereof I have hereto signed my name this 4th day of September, 1923.

JOHN SHERMAN McCHESNEY.