

(No Model.)

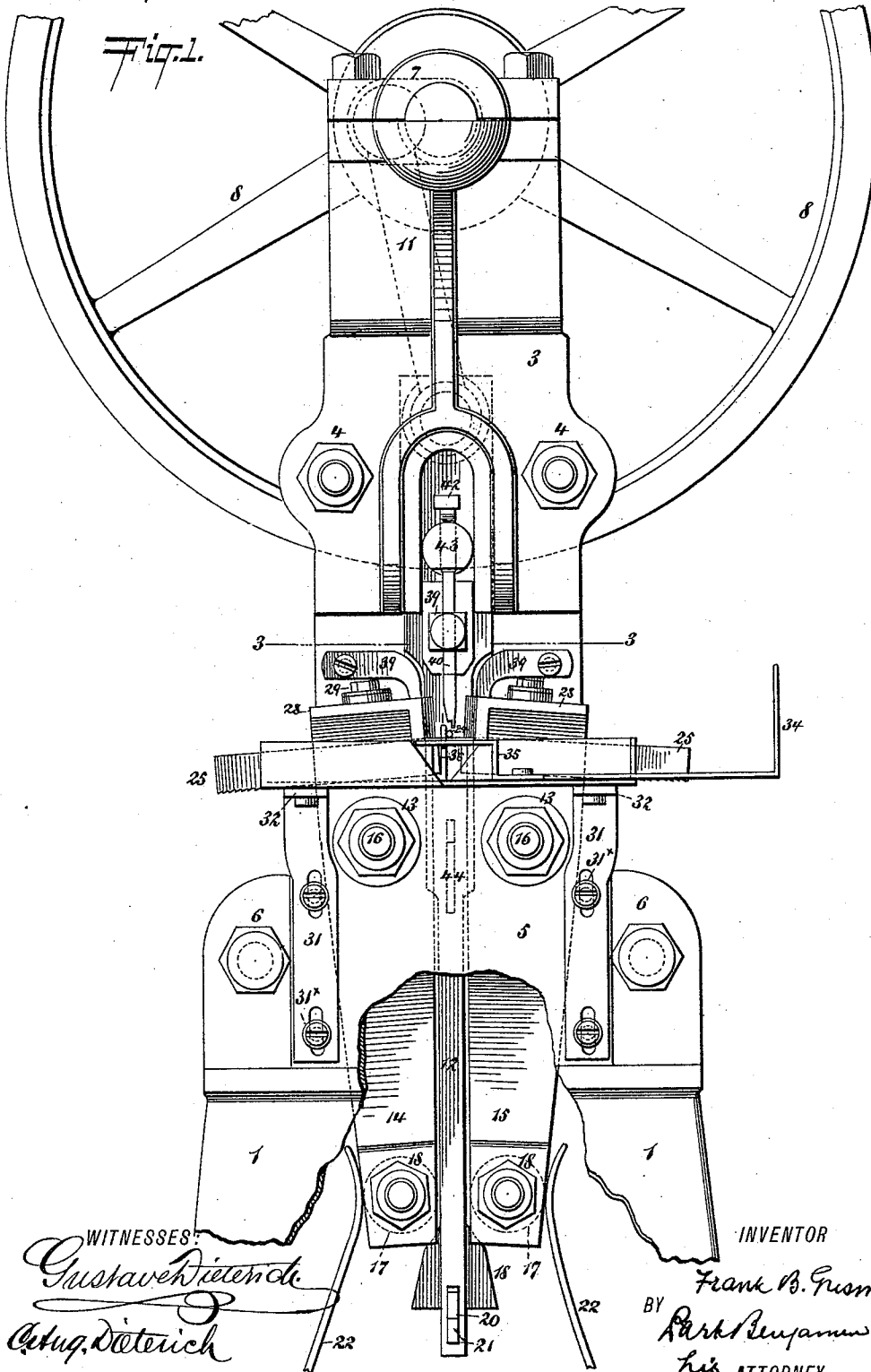
4 Sheets—Sheet 1.

F. B. GRISWOLD.

MACHINE FOR APPLYING HEADS OR HOOKS TO WIRE BALE BANDS.

No. 464,663.

Patented Dec. 8, 1891.

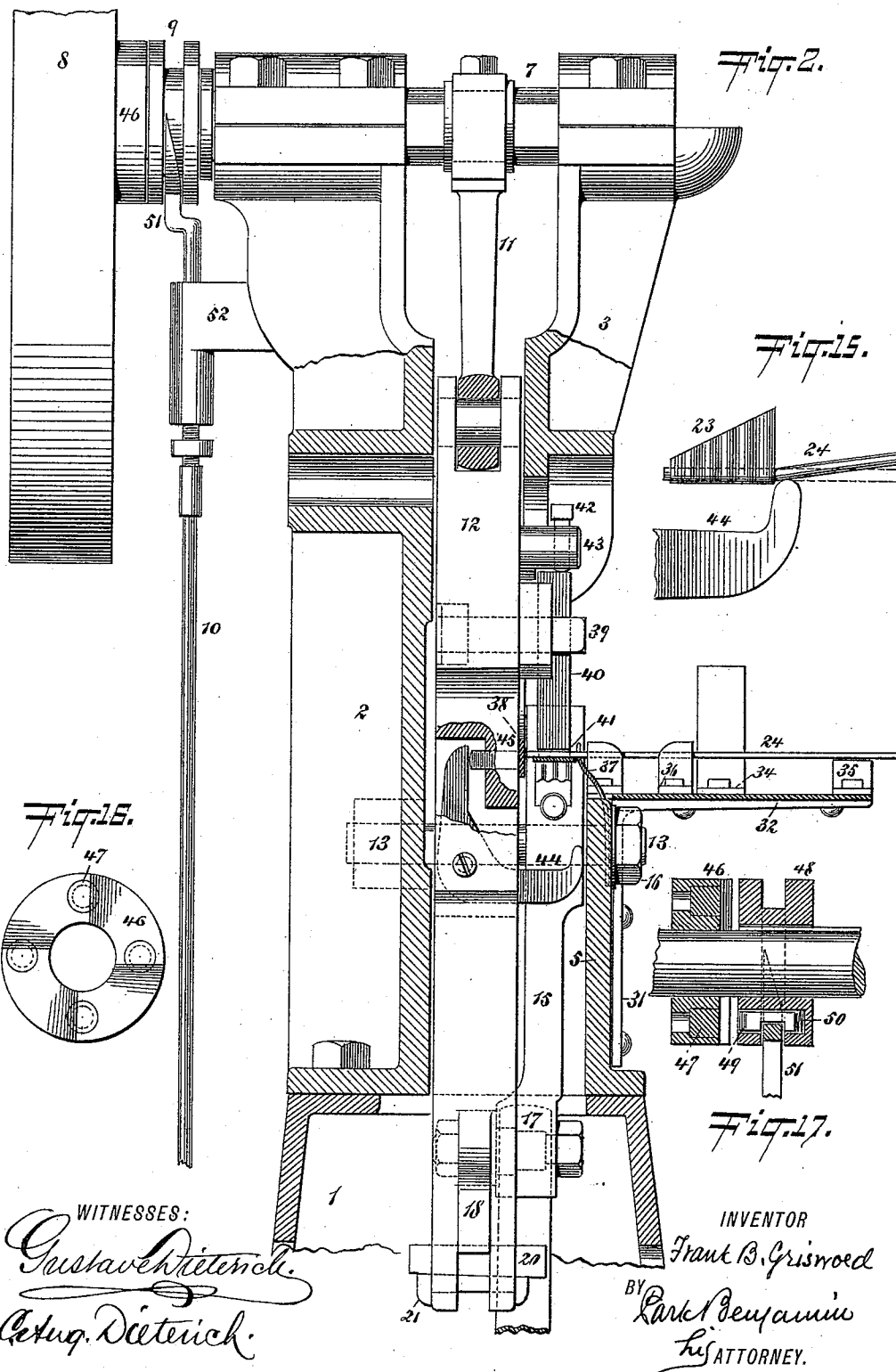


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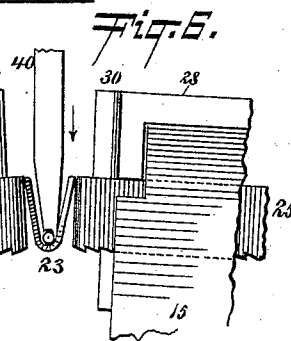
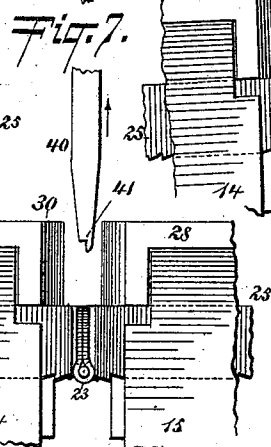
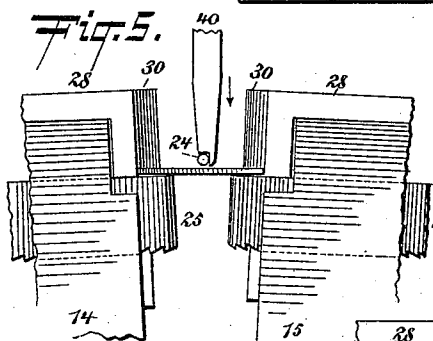
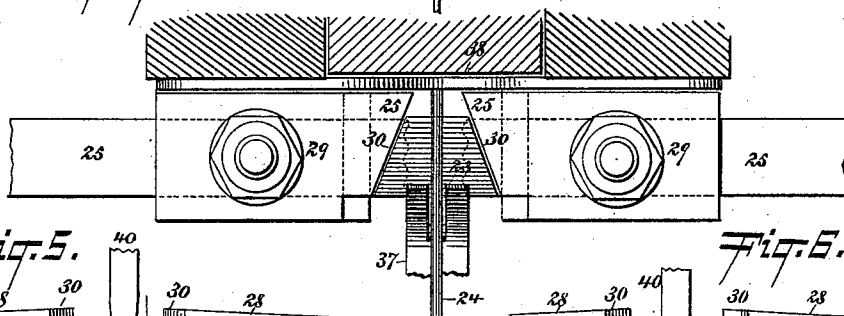
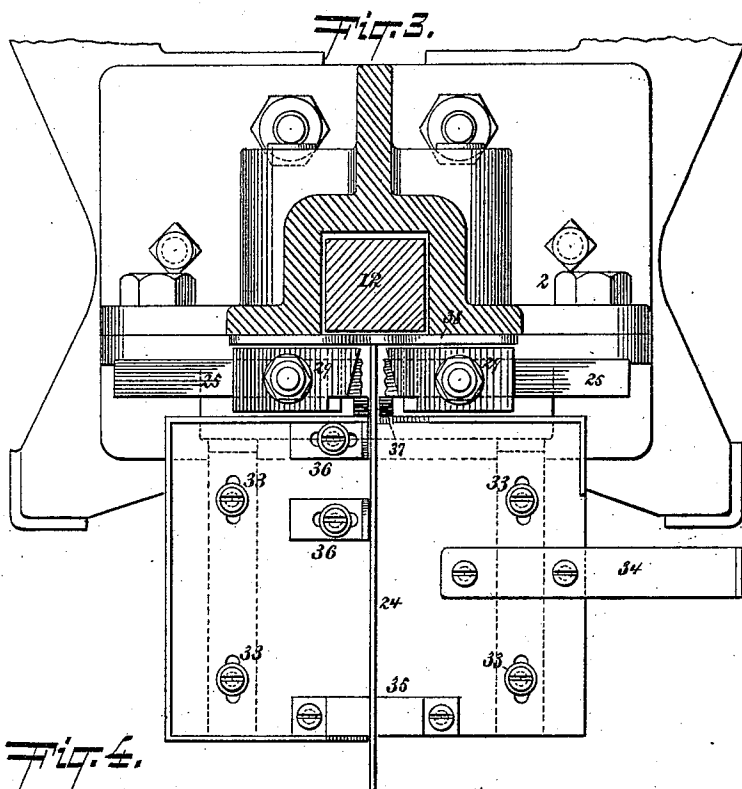


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No. 464,663.

Patented Dec. 8, 1891.



WITNESSES:

Gustav Dietrich
Carl Dietrich

INVENTOR

Frank B. Griswold
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his ATTORNEY.

(No Model.)

4 Sheets—Sheet 4.

F. B. GRISWOLD.

MACHINE FOR APPLYING HEADS OR HOOKS TO WIRE BALE BANDS.

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Patented Dec. 8, 1891.

Fig. 8.

Fig. 9.

Fig. 13.

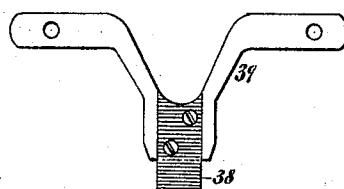
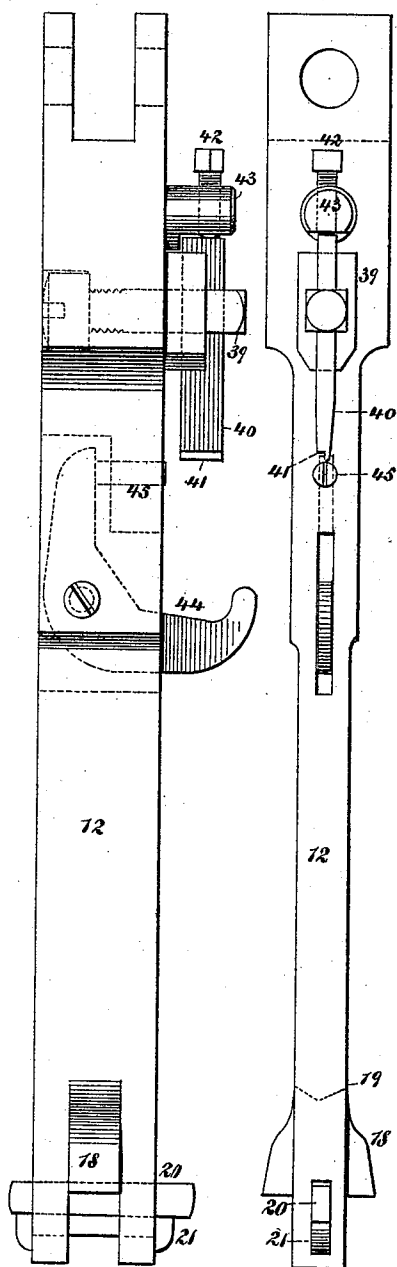


Fig. 14.



Fig. 12.

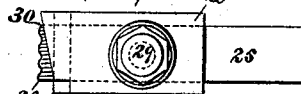
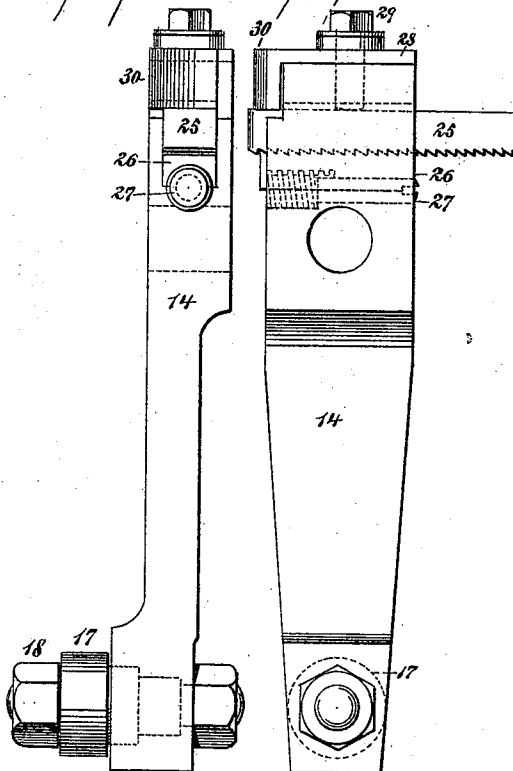


Fig. 10.

Fig. 11.



WITNESSES:

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UNITED STATES PATENT OFFICE.

FRANK B. GRISWOLD, OF TROY, NEW YORK.

MACHINE FOR APPLYING HEADS OR HOOKS TO WIRE BALE-BANDS.

SPECIFICATION forming part of Letters Patent No. 464,663, dated December 8, 1891.

Application filed June 23, 1891. Serial No. 397,193. (No model.)

To all whom it may concern:

Be it known that I, FRANK B. GRISWOLD, of Troy, Rensselaer county, New York, have invented a new and useful Improvement in Machines for Applying Heads or Hooks to Wire Bale-Bands, of which the following is a specification.

The object of my invention is to apply to the end of a wire bale-band a hook or head composed of a piece of sheet or plate metal folded or doubled over the end of the wire. The said head is intended to engage with a loop formed on the opposite end of the bale-band. Heads of this description are applied by my present machine automatically and with great certainty, rapidity, and efficiency.

My invention consists in the construction and arrangement of the machine, as hereinafter set forth.

In the accompanying drawings, Figure 1 is a front elevation of my machine. Fig. 2 is a side view showing certain portions in vertical section. Fig. 3 is a horizontal section and plan on the line 3 3 of Fig. 1. Fig. 4 is a partial section and plan view showing the disposition of the wire to be operated upon between the compressing-jaws. Figs. 5, 6, and 7 are front elevations illustrating the operation of the descending former and the compressing-jaws at various stages, as will be hereinafter more fully explained. Fig. 8 is a side view of the plunger which carries the former or bending-tool, the arm for bending the wire in rear of the head of the tie, and also the cam which operates the compressing-jaws. Fig. 9 is a front view of said plunger. Figs. 10, 11, and 12 are respectively front, side, and top views of one of the compressing-jaws. Figs. 13 and 14 are respectively elevation and plan views of the stop which the end of the wire meets when it is inserted in the machine. Fig. 15 represents the bail-tie head or hook which it is the object of this machine to manufacture, and also illustrates the mode of bending the wire in rear of the head by the action of the projecting arm on the plunger, which is illustrated in Figs. 8 and 9. Figs. 16 and 17 are detail views of the form of clutch employed in governing the machine.

Similar figures of reference indicate like parts.

The machine is supported on legs 1 at con-

venient height above the floor, portions only of these legs being indicated in the drawings.

The main framing of the apparatus consists, first, in a rear plate 2, Fig. 2, which is bolted to the legs 1; second, an upper front plate 3, which is bolted by means of the bolts 4, Fig. 1, to the rear plate 2, and, lastly, an outer or covering plate 5, Figs. 1 and 2, which is secured by the bolts 6 to rear plate 2. It will be seen, therefore, that the rear plate 2 is the main supporting-plate of the machine. In the upper portions of the plates 2 and 3 are bearings which receive the horizontal crank-shaft 7. The shaft 7 is rotated by the belt-pulley 8 whenever the clutch 9, Fig. 2, is thrown into operation. This clutch, which will be hereinafter described, is operated by means of the rod 10, the lower end of which communicates with a foot-treadle, which is not shown. The crank-arm of the shaft 7 actuates the connecting-rod 11, Fig. 2 and dotted lines, Fig. 1, and the connecting-rod 11 in turn gives vertical motion to the plunger 12, which, as shown in Fig. 3, reciprocates in a recess in plate 2 and between the plates 2 and 3, forming the main frame. Pivoted by the bolts 13 to the rear plate 2 are two compressing levers or jaws 14 and 15. The pivot-bolts 13, it will be observed, extend through these levers and also through the front cover-plate 5, the setting-up nuts 16 being outside of the cover-plate 5. At the lower ends of the levers 14 and 15 are rollers 17, secured in place by bolts which pass through openings in said ends. The plunger 12 extends down between the rollers 17 on the levers 14 and 15. The lower end of the plunger 12 is forked, and in the fork is inserted the cam 18. The upper face of the cam 18 is a double incline, as shown at 19, dotted lines, Fig. 9, and the bottom notch in the fork is similarly shaped, so that these parts fit together. The lower part of the cam 18 is notched to receive the wedge 20. This wedge passes through a transverse opening in the arms of the fork, through which opening also passes a key 21. By driving in the wedge 20 after the cam and the key are inserted in position the cam is tightly secured in place. As the plunger 12 moves up and down, the inclined cam-surface of the cam 18 meets the rollers 17 on the levers 14 and 15. Consequently when the plun-

ger 12 rises the lower ends of the rollers 14 and 15 are forced apart by the action of the cam 18, and their upper portions on the other side of the fulcrum-pivots 13 are therefore caused to approach one another. When the plunger 12 descends so that the cam 18 is no longer between the rollers 17, as shown in Fig. 1, then leaf-springs 22, which are fastened to the main frame and which bear against the outer portions of the lower ends of the levers 14 and 15, bring these lower ends together, and thus cause the upper ends or compressing-faces of the levers 14 and 15 to separate. Therefore as the plunger 12 goes up the upper extremities of the levers come together and compress whatever is between them, and as the plunger 12 comes down the working ends of the levers open.

The object and purpose of this machine, as has already been stated, is to apply to one end of a wire intended to form a band or strap to encircle a bale—such as a hay-bale or cotton-bale—a piece of metal which forms substantially a hook, with which hook a loop formed on the other end of the band or wire engages. A bale-tie of this description is fully described and claimed in Letters Patent No. granted to John Wool Griswold. It consists of a flat piece of metal (shown in plan at 23, Fig. 4) having two parallel edges and two edges oppositely inclined. This piece of metal is doubled or folded over the end of the wire 24, and after being so folded or doubled is compressed and simultaneously corrugated. (See Fig. 15.) The jaws which produce the compression also produce the corrugation, and by reason of this compression and corrugation the piece of sheet metal 23, or, in other words, the head or hook of the bale-tie, becomes firmly fastened to the end of the wire 24.

My present machine is organized and arranged for the purpose of applying this head 23 to the band or wire 24 in the manner just described. Broadly stated, its operation is as follows: The attendant inserts a blank head 23 in proper position. He places the end of the wire over it. He then, by pressing on the foot-treadle, throws the clutch into gear. The machine then works automatically to double the blank over the wire to compress and corrugate it, as described, and to bend the wire 24 in rear of the head 23 in the manner indicated in Fig. 15, so that when the eye on the end of the band comes over the hook 23 it will lie properly in the angle between hook and wire, while the extremity of the wire 24 in turn will lie over the twisted shank of the eye. I will now proceed to describe how this is done. Referring to Figs. 10, 11, and 12, in the upper portion of each lever, as 14, there is a transverse opening, which receives a rack-bar 25, also a second and lower rack-bar 26, the teeth of which engage with those of the bar 25. The lower side of the bar 26 is concave and is threaded. The lower side of the slot in the lever 14 is also concave, but is not threaded. These two portions coming to-

gether form a cylindrical opening threaded on its upper-half periphery, which receives the adjusting-screw 27. It will be clear that the rack-bar 25 may be adjusted longitudinally upon the rack-bar 26 so that it will project more or less into the space between the jaws. A still nicer adjustment without longitudinal movement of the adjusting-screw may be given by turning the screw 27, which moves both rack-bars 25 and 26. The opposing vertical faces of the rack 25 are corrugated, as shown in Fig. 12 and in dotted lines in Fig. 4. On the upper extremity of the lever 14 there is a guide or cap-piece 28. This is secured in place by the set-screw 29, which passes down upon the bar 25, thus aiding in clamping said bar 25 in position. The inner faces 30 of the guide-piece 28 are inclined or beveled conformably to the incline or bevel of the sides of the blank 23, and it will be noticed that the bars 25 project inwardly between the levers 14 and 15 beyond these inclined faces 30, so that the upper surfaces of these projecting ends of the bars 25 form a support, upon which the blank 23 rests when it is placed between the compressing-jaws, while at the same time the faces 30 of the parts 28 bear against the inclined edges of the blank. This is plainly shown in Fig. 4 of the drawings. The result of this construction is that the attendant has simply to lay the blank between the inclined faces 30 of the jaws so that it rests upon the upper faces of the bars 25, when the blank will then be in exactly the right position to be further operated upon. By adjusting the bar 25 once for all the degree of subsequent compression to be given to the blank is regulated.

In order to insure uniformity of product while using blanks which may vary slightly in size though not in outline, I provide a notched spring-plate 37, which is secured to the main frame 5. The blank is placed in the machine so that the longer of its two parallel edges rest on the rounded upper part of the notched plate or spring 37. It is evident that unless the blank rests squarely on the projecting ends of the bars 25 the forming-tool 40, hereinafter to be described, and which descends upon the blank cannot bend it, and that unless the blank is pressed firmly to its seat on bar 25, it may be moved horizontally. This horizontal movement is prevented by the pressing action of the spring 37, which forces the blank against the inclined sides 30 of the bar 28.

Secured to brackets on the front plate 5 is a metal tray 32. This tray is secured to the horizontal arms of the brackets by bolts 33, which pass through slots in the tray, so that the said tray may be adjusted nearer to or farther from the machine proper. The brackets 31 are secured to front plate 5 by bolts 31*, passing through slots in the vertical arms of said brackets, so that said brackets and the attached tray are thus made vertically adjustable.

On one side of the tray is bolted a hook 34, upon which the wires to be operated upon rest. These wires are not shown in the drawings. Near the front plate 33 there is a bent bar 35, upon which the wire being acted upon rests. This bar raises the wire above the level of the tray, and its surface is nearly in the same horizontal plane as the entering blank wire, which is of course at a distance equal to the thickness of the blank 23 above the upper edges or surfaces of the bars 25 on the levers 14 and 15. It will be understood, therefore, that the attendant, taking one of the wires which rest on the hook 34, moves the same laterally to the left of the drawing, Fig. 3, so that the body of the wire rests upon the bar 35, while one side of the wire bears against the gages 36, which are secured upon the tray 32. (See Fig. 1.) He holds the wire in contact with these gages 36 with his fingers, and he also pushes the wire longitudinally forward through a notched plate 37, which is secured to the main frame of the plate 5, until the extremity of the wire meets a removable hardened-steel stop-plate 38, Fig. 13, which by means of its arms 39 is fastened to the rear frame-plate 2, which is in front of the guideway therein for the plunger 12. (See Fig. 3.) Meanwhile a blank 23 has been placed between the jaws in the manner already described. Now when the wire 24 (see Fig. 3) rests upon the guide-bar 35 and against the adjustable gages 36 and passes through the notched plate 37 and abuts against the stop-plate 38 that wire is in the position shown in Fig. 4—namely, directly over the middle blank 23—and is therefore in proper position to have the blank accurately doubled or folded upon it. Referring now to Figs. 8 and 9, upon the plunger 12 is a tool-post 39, which receives the forming-tool 40. When the wire 24 is adjusted in place in the manner already stated, it then comes not merely directly above the middle line of the blank 23, but also directly under the lower end of the forming-tool 40, so that it will be received in a notch or recess 41 in the extremity of said tool. The forming-tool is held in its tool-post in the usual way, and it may be adjusted therein by means of the set-screw 42, which passes through a lug 43 upon the plunger 12. By turning down this screw 42 the forming-tool 40 is caused to project more or less beyond the tool-post. Assume the parts now to be in the position shown in Fig. 1 and likewise in Fig. 4. The compressing-levers 14 and 15 are open. The cam 18 is below the rollers 17. The wire 24 and the blank 23 are in place. The attendant now presses the foot-treadle, throws the clutch into operation, and starts the machine. The plunger 12 now descends and the forming-tool 40 meets the wire 24, as shown in Fig. 5. The downward motion of the plunger continues. The forming-tool 40 then enters the space between corrugated faces of the bars 25, doubling the blank 23 and forcing it down between the

said corrugated faces of the bars 25, as shown in Fig. 6. The crank-shaft 7, continuing its rotation, now lifts the plunger 12 and the forming-tool 40, so that the forming-tool 40 rises out of the space between the bars 25, leaving, however, the blank between them. Then as the plunger 12 continues its upward motion the cam 18 comes between the rollers 17, forces the lower ends of the levers 14 and 15 apart, and consequently their upper extremities together, so that the blank is now strongly compressed with the wire in its fold between the corrugated faces of the bars 25, as shown in Fig. 7. I have already stated that the wire 24 does not extend in this form of bale-tie straight from the hook or head 23, as is indicated in dotted lines in Fig. 15, but is bent so that the hook stands at a slight angle to the wire, the object, as before explained, being to make a better connection between the hook and the loop which engages with it. In order to produce this slight bend of the wire, I pivot in the plunger 26 a two-armed lever 44, one arm of which, as shown, protrudes beyond the outer face of the plunger 12 and is disposed directly below the forming-tool 40. This arm is bent upward, as indicated. Now as the plunger 12 continues its upward motion after operating in the manner already stated the protruding arm of the lever 44 meets the wire 24 just in rear of the head 23, as shown in Fig. 15, and bends the body of the wire slightly upward. This happens while the blank is still held between the corrugated faces of the jaws. After this is done the crank-shaft has reached a position to cause the downward movement of the plunger 12, when the cam 18 once more descends below the roller 17, and the springs 22, acting upon the levers 14 and 15, cause the compressing-jaws to open, when the attendant removes the now-finished work, and at the same time, the clutch-pulley having completed its revolution, releases itself, stopping the machine until another blank and another wire is inserted in the manner already described. The vertical arm of the two-armed lever 44 is received in the slot in the plunger 12, in which said lever is pivoted. Against this vertical arm bears a set-screw 45, which is received in the plunger 12. By adjusting the set-screw 45 the projecting end of the arm 44 may be raised or lowered, so as to bend the wire 24 to a greater or less extent, as may be desired.

The clutch mechanism illustrated in Figs. 16 and 17 is as follows: The inner face of the hub of the tight pulley 46 is notched, as shown in Fig. 16. The bottoms of the notches are formed in removable steel pins 47, so that wear may be provided for. Arranged transversely the loose pulley 48 is a sliding key or pin 49, which is normally pushed outward by a spring 50. The pin 49, when it projects from the pulley 48, enters and engages with notches in pulley 46. 51 is a yoke on the end of rod 10, which enters the groove or channel on the

periphery of pulley 48 and is received in a notch of the key or pin 49. The effect of moving down the rod 10, which, as already explained, is done by means of a foot-treadle, is to allow the pin 49 to be pushed outwardly by spring 50, and hence to engage with the driving-pulley 46. The rod 10 passes through a guide-sleeve 52, in which is arranged a spring which normally keeps the yoke 51 in position in the groove in pulley 48.

Referring now to the tray 32 and bar 35 thereon, it will be evident that as the blank is pushed downward, and hence is compressed and corrugated below the plane in which it rests when introduced into the machine, the wire must be so supported as to have sufficient flexibility to be bent down to follow the blank. For this reason the wire is held above the tray-surface by the bar 35 at a height about equal to the extent of vertical downward movement of the end of the wire. When the jaws open, the elasticity of the wire thus bent down causes its end to fly back, or, rather, upward from between the jaws, so that the completed work may then easily be withdrawn.

I claim—

1. The combination of compressing-jaws, means of supporting above the space or interval between said jaws the blank to be doubled or folded and compressed between them, a forming or bending tool arranged to descend upon the central portion of said blank and to fold or double the same between said jaws, and mechanism for actuating said jaws and said tool, the said parts being constructed and operating and the said mechanism being timed to cause, first, said forming-tool to force said blank into the space between said jaws, and thus to double or fold said blank; second, said forming-tool to be withdrawn from between said jaws, and, third, said jaws to compress the parts of said double or folded blank together.

2. The combination of compressing-jaws, each having on its upper portion a shoulder or recess to receive in a flat or horizontal portion the blank to be compressed between said jaws, a forming or bending tool arranged to descend upon the central portion of said blank and to fold or double the same between said jaws, and mechanism for actuating said jaws and said tool, the said parts being constructed and operating and the said mechanism being timed to cause, first, said forming-tool to force said blank into the space between said jaws, and thus double or fold said blank; second, said forming tool to be withdrawn from between said jaws, and, third, said jaws to compress the parts of said doubled or folded blank together.

3. The combination of compressing-jaws, a bending or forming tool reciprocating into and out of the space or interval between said jaws, means for supporting a sheet-metal blank above said interval and also a wire above said blank and beneath said forming-

tool, and mechanism for actuating said jaws and said tool, the said parts being constructed and operating and the said mechanism being timed to cause, first, said forming-tool to force said blank and wire into the space between said jaws, thereby folding said blank upon said wire; second, said forming-tool to be withdrawn from between said jaws, and, third, said jaws to compress said folded blank upon said wire.

4. The combination of compressing-jaws having corrugated faces, a bending or forming tool reciprocating into and out of the space or interval between said jaws, means for supporting a sheet-metal blank above said interval and also a wire above said blank and beneath said forming-tool, and mechanism for actuating said jaws and said tool, the said parts constructed and operating and the said mechanism being timed to cause, first, said forming-tool to force said blank and wire into the space between said jaws, thereby folding said blank upon said wire; second, said forming-tool to be withdrawn from between said jaws, and, third, said jaws to compress and corrugate said folded blank upon said wire.

5. The combination of compressing-jaws, a bending or forming tool reciprocating into and out of the space or interval between said jaws, means for supporting a sheet-metal blank above said interval, and a wire above said blank and beneath said forming-tool, a reciprocating arm or lever for bending said wire at an angle to said blank, and mechanism for actuating said arm, said jaws, and said tool, the said parts constructed and operating and the said mechanism being timed to cause, first, said forming-tool to force said blank and wire into the space between said jaws, thereby folding said blank upon said wire; second, said forming-tool to be withdrawn from between said jaws; third, said jaws to compress said folded blank upon said wire, and, fourth, said bending-arm to meet and bend said wire at an angle to said compressed and folded blank.

6. The combination of the pivoted compressing-levers 14 15, the reciprocating plunger 12, and the cam 18 upon said plunger, acting upon and oscillating said levers, substantially as described.

7. The combination of the pivoted compressing-levers 14 15, the reciprocating plunger 12, the cam 18 upon said plunger, and the springs 22, the said cam 18 acting upon said levers to oscillate them in one direction and the springs 22 acting upon said levers to oscillate them in the other direction, substantially as described.

8. The combination of the pivoted compressing-levers 14 15, having corrugated compressing-faces, the reciprocating plunger 12, and the cam 18 upon said plunger, acting upon and oscillating said levers, substantially as described.

9. The combination of the pivoted compressing-levers 14 15, the reciprocating plun-

ger 12, the cam 18 upon said plunger, acting upon and oscillating said levers, and the bending or forming tool 40, carried by said plunger and moved thereby into and out of the space or interval between said levers.

10. The combination of the pivoted vibrating compressing-levers 14 15, having beveled inclined faces 30, ledges or shoulders below said inclined faces and straight or parallel faces below said ledges, and a forming or bending tool 40, moving into and out of the space or interval between said levers.

11. The combination, with the vibrating lever 14, having the inclined or beveled face 30, of the transverse bar 25, having its extremity below said face 30, and means for longitudinally actuating said bar in said lever.

12. The combination, with the vibrating lever 14, of the transverse bar 25, having one side notched or indented and engaging adjustably with a similarly notched or indented portion of said lever, and a means of holding said bar in adjusted position.

13. The combination, with the vibrating lever 14, of the transverse bar 25, having one side notched or indented and engaging adjustably with a similarly notched or indented portion of said lever, and the clamping-screw 29 for holding said bar in adjusted position.

14. The combination, with the vibrating lever 14, of the transverse bar 25, notched or indented on one side, the bar 26, notched or indented on one side to engage with said bar 25 and having a concave semi-cylindrical threaded portion forming a nut with a similar semi-cylindrical unthreaded portion of said lever 14, and a screw 27, entering said nut.

15. The combination, with the vibrating lever 14, of the cap or guide piece 28, having the inclined inner face 30 and the adjustable bar 25, arranged in a slot in said lever and having its extremity below said inclined in-

ner face 30, and means for securing said cap-piece 28 and bar 25 in place.

16. The combination of the vibrating lever 14, the cap-piece 28, having the inclined inner face 30, the adjustable bar 25, arranged in said lever and having its extremity below said inclined inner face 30, and the clamping-screw 29, passing through said cap-piece 28 and said lever 14 and bearing upon said bar 25.

17. The combination of the vibrating levers 14 and 15 and the reciprocating plunger 12, carrying the cam 18, acting upon said levers, and the bending-tool 13, the said tool being moved by said plunger into and out of the space or interval between said levers.

18. The combination of the vibrating levers 14 and 15, the vertically-reciprocating plunger 12, carrying the cam acting upon said levers, and the bending or forming tool 40 and means for vertically adjusting said tool.

19. The combination of the vibrating levers 14 and 15, the vertically-reciprocating plunger 12, and carried upon said plunger the cam 18, acting upon said levers, the forming-tool 40, and the bending-arm 44, the said tool and arm moving into and out of the space between said levers.

20. In combination with the vibrating compressing-levers 14 and 15 and the vertically-reciprocating bending or forming tool 40, the support-plate 32 for the wire 24 to be acted upon by said tool, provided with the gage 36 and the raised support-bar 35.

21. In combination with the vibrating compressing-levers 14 and 15 and the vertically-reciprocating bending or forming tool 40, the stop-plate 38 for regulating the position of the wire 24 to be acted on with reference to said levers.

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Witnesses:

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