L. B. WYGANT.

ELECTRICAL BALE TIE WELDER.

APPLICATION FILED JULY 10, 1917.

1,309,168.

Patented July 8, 1919.

3 SHEETS—SHEET 1.

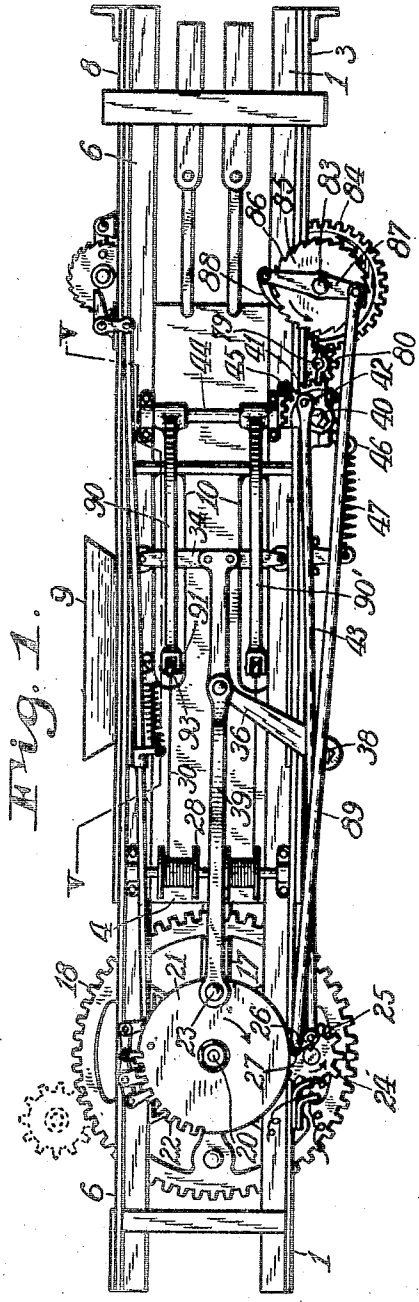


Fig. 1.

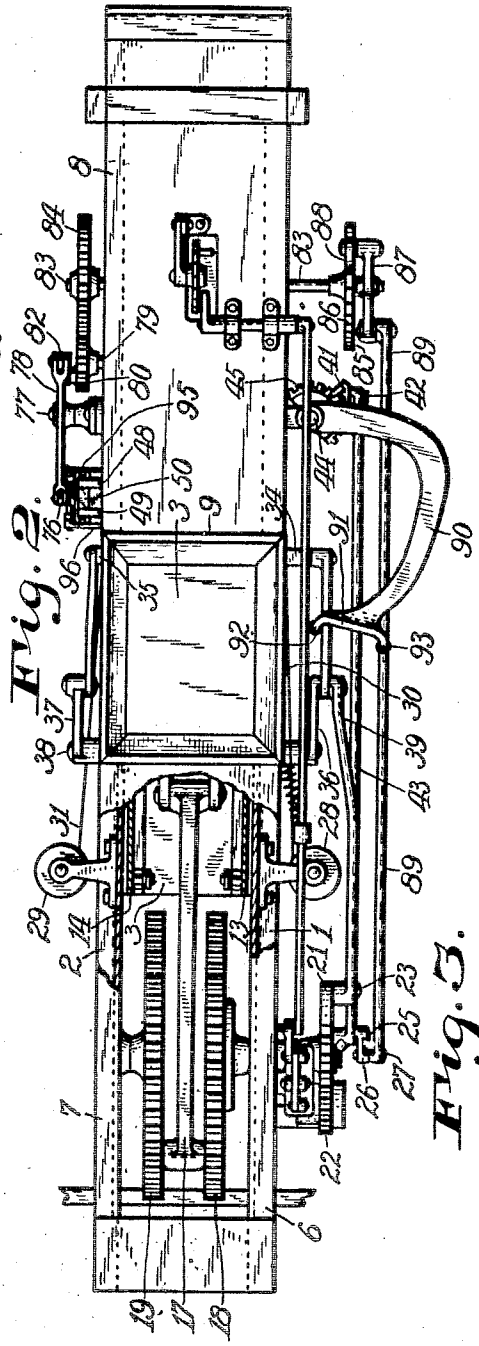


Fig. 2.

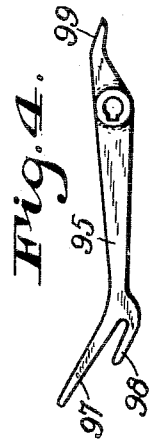


Fig. 4.

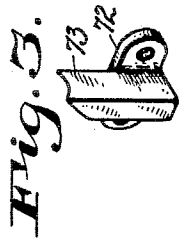


Fig. 5.

WITNESSES:

J. H. Gardner

Myrtle McCoy.

INVENTOR:

Lewis B. Wygant,

BY

E. T. Silvius,

ATTORNEY.

L. B. WYGANT.

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3 SHEETS—SHEET 2.

Fig. 5.

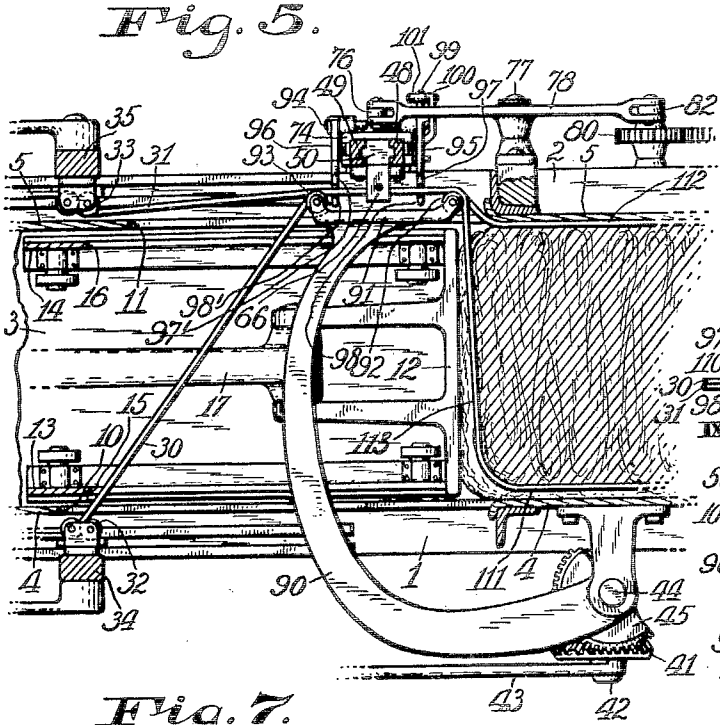


Fig. 6.

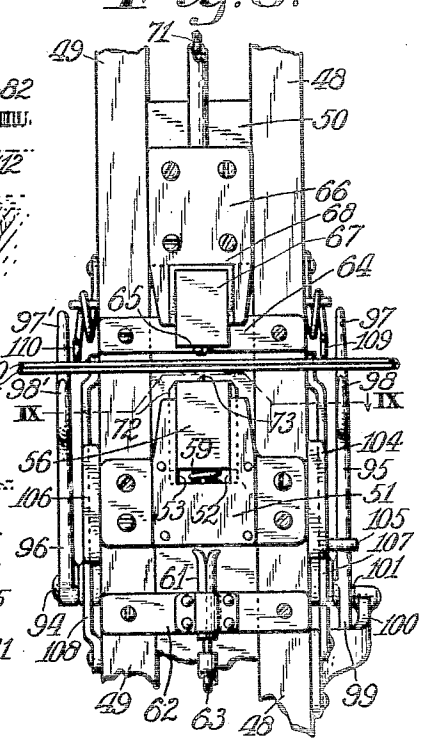


Fig. 7.

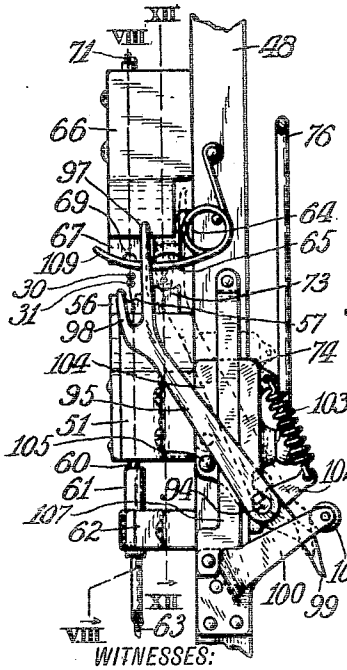


Fig. 8.

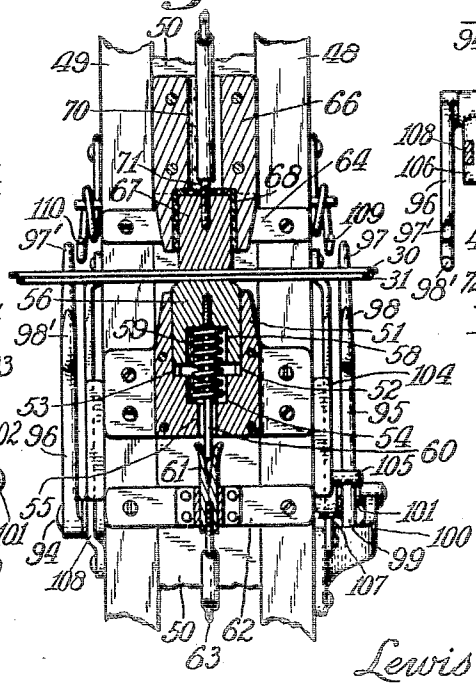


Fig. 9.

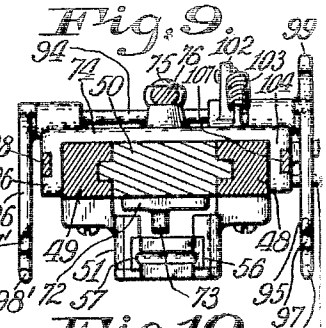
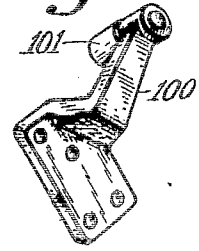


Fig. 10.



WITNESSES:

J. H. Gardner.

Myrtle McCoy.

INVENTOR:

Lewis B. Wygant,

BY

E. T. Silvius,

ATTORNEY.

L. B. WYGANT.

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3 SHEETS—SHEET 3.

Fig. 11.

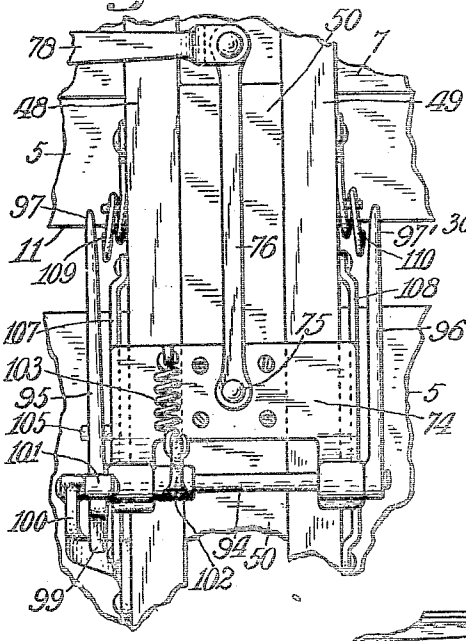


Fig. 12.

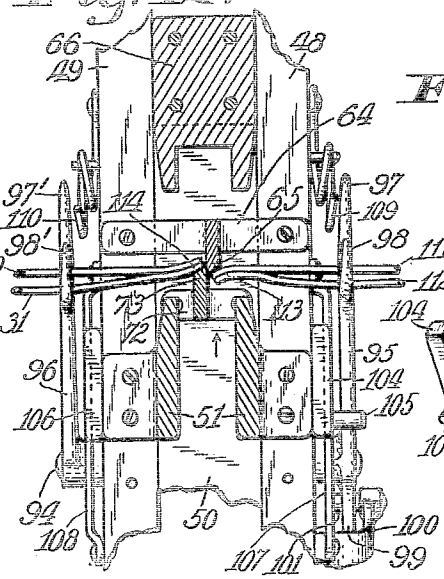


Fig. 13.

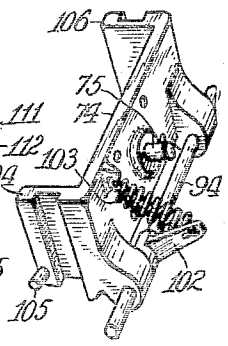


Fig. 14.

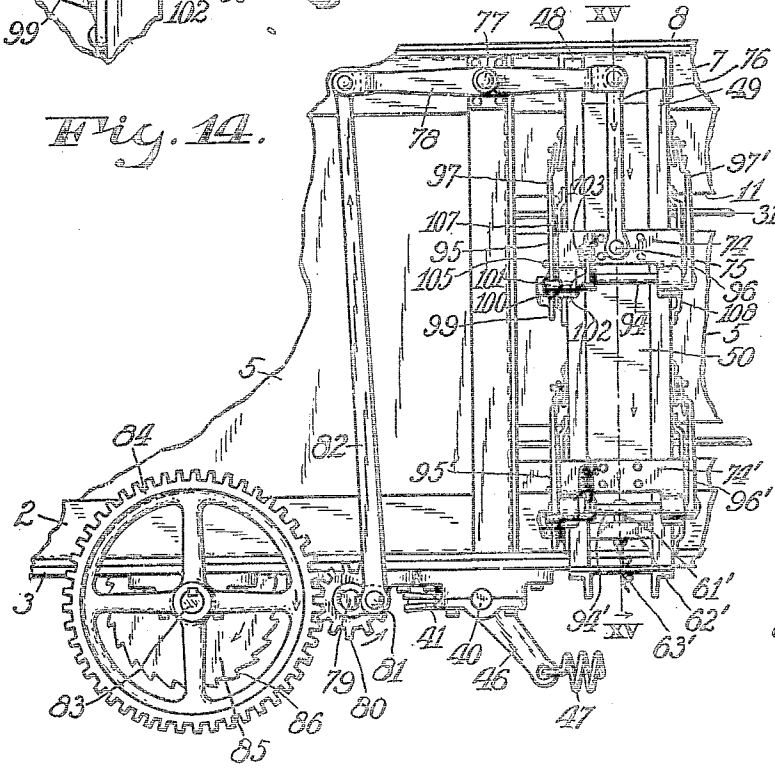
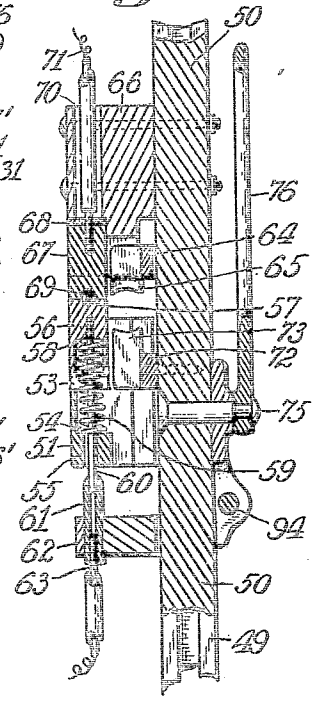


Fig. 15.



WITNESSES:

J. A. Gardner

Myrtle M. Coy.

INVENTOR:

Lewis B. Wygant,

BY

E. D. Silvius.

ATTORNEY.

UNITED STATES PATENT OFFICE.

LEWIS B. WYGANT, OF VINCENNES, INDIANA.

ELECTRICAL BALE-TIE WELDER.

1,309,168. Specification of Letters Patent. Patented July 8, 1919.

Application filed July 10, 1917. Serial No. 179,784.

To all whom it may concern:

Be it known that I, LEWIS B. WYGANT, a citizen of the United States, residing at Vincennes. in the county of Knox and State of Indiana, have invented a new and useful Electrical Bale-Tie Welder, of which the following is a specification, reference being had to the accompanying drawings and to the letters and figures of reference marked thereon.

This invention relates to improvements in tie-welding baling presses of the type described in Letters Patent No. 1,232,643, granted to me July 10, 1917, and has reference more particularly to improved means for electrically welding two wire portions together and severing the welded wire portions.

An object of the invention is to provide improved means for electrically uniting wires to form bands on bales of hay or other substance which may be formed in baling presses, an aim being to electrically weld the wire or wires outside of the baling press with the minimum risk of igniting the substance being baled. Another object is to provide means whereby the operations of welding and severing the banding wires may be conducted outside of the baling chamber so as to be under the observation of an operator or attendant. A further object is to provide improved welder heads and cutting appliances, and improved means for operating and controlling them, and which shall be of simple and inexpensive construction and suitable for use in baling presses, and be reliable and efficient and also durable and economical in use.

With the above-mentioned and other objects in view, the invention consists in electrical welding apparatus and controlling appliances therefor of novel construction and arrangement; the invention consisting further in novel means for severing wires after having been electrically united, and also consisting in various novel parts and combinations and arrangements of parts as hereinafter particularly described and further defined in the accompanying claims.

Referring to the drawings,—Figure 1 is a side elevation of a baling press having the invention embodied therein; Fig. 2 is a top plan of the improved baling press partially broken away; Fig. 3 is a perspective view of one of the cutters whereby to sever the banding wires; Fig. 4 is a plan of a device for transferring the welded portions of the wires to the cutters to be severed; Fig. 5 is a fragmentary horizontal section approximately on the line V—V on Fig. 1; Fig. 6 is a fragmentary elevation showing the welding apparatus and the cutting apparatus; Fig. 7 is a fragmentary side elevation of the welding apparatus and the cutting apparatus; Fig. 8 is a sectional elevation approximately on the line VIII—VIII on Fig. 7; Fig. 9 is a fragmentary section approximately on the line IX—IX on Fig. 6; Fig. 10 is a perspective view of one of the devices comprised in the invention; Fig. 11 is a fragmentary elevation of the baling press and parts of the invention thereon; Fig. 12 is a sectional elevation approximately on the line XII—XII on Fig. 7 but with the working parts in different positions; Fig. 13 is a perspective view of an assembly of coöperating parts comprised in the invention; Fig. 14 is a fragmentary side elevation of the baling press having the improvements thereon; and, Fig. 15 is a fragmentary section approximately on the line XV—XV on Fig. 14.

Similar reference characters on the various figures of the drawings indicate corresponding parts or features of construction herein referred to in detail.

For a clear understanding of the invention, portions of the baling press forming the subject matter of said Letters Patent are illustrated and will be briefly referred to; the frame or body part of the baling press comprising bottom rails 1 and 2, a floor plate 3 secured to the rails, side plates 4 and 5 secured to the rails respectively, top rails 6 and 7 secured upon the side rails respectively, and a top plate 8 secured upon the top rails, so as to constitute a compression or baling chamber provided with a hopper 9 through which to feed the substance into the baling chamber. The side plates have horizontal slots 10 and 11 therein respectively to permit the banding wires to be drawn into the baling chamber. A ram head 12 is movably arranged in the baling chamber and it has side plates 13 and 14 in which are horizontal slots 15 and 16 respectively, the ram head having a continuing slot or slots to permit the passage of the banding wire out through the ram head. The ram head is provided with a pitman 17 which is operated by gear wheels 18 and 19 suitably driven, one of the gear wheels

having a shaft 20 fixed thereto. An intermittent-motion wheel 21 is rotatably mounted on the shaft 20 and has a segment of its periphery provided with gear teeth 22, the remainder of the periphery being smooth to form a circular guide. The wheel 21 is provided with a crank pin 23 on its outer side. An intermittent-motion pinion 24 is mounted below the wheel 21 and adapted to be intermittently rotated a revolution at a time by the gear teeth 22, the pinion having a crank pin 25 thereon. For the purposes of the present invention an arm 26 is rigidly secured to the crank pin 25 and is provided with a crank pin 27 that is located so as to be carried in advance of the crank pin 25 as the pinion rotates. Spools 28 and 29 are mounted on opposite sides respectively of the main frame of the machine, and wires 30 and 31 are unwound from the spools respectively to be operated on by the electrical welding apparatus, the wires being guided respectively by means of tensioning devices 32 and 33 mounted on cross-heads 34 and 35 that are movably guided on the main frame and connected to rocker arms 36 and 37 respectively which are secured to a shaft 38 mounted on the under side of the machine frame, so that the wires are guided on opposite sides respectively of the baling chamber. A connecting rod 39 is connected with the rocker arm 36 and also with the crank pin 23. A rock-shaft 40 is mounted on the under side of the main frame and has a gear segment 41 secured thereto which has a wrist pin 42 to which a connecting rod 43 is connected, the latter being connected also with the crank pin 25. A shaft 44 is vertically arranged and rotatively mounted on one side of the main frame of the machine so as to be outside of the baling chamber and it is provided with a gear segment 45 that is in mesh with the gear segment 41. Preferably the rock-shaft 40 has an arm 46 to which a spring 47 is connected, the spring being suitably anchored under the baling chamber for assisting to turn the rock-shaft in one direction. The ends of the wires 30 and 31 are to be brought together and united to form a loop into which the material is packed and forced along through the baling chamber, as will be understood. In the present case the wires are again united on the outside of the baling chamber to complete the band or bale tie. In some cases each bale is provided with two bands or ties, as will be understood.

The improved welding apparatus is mounted on the main frame on the opposite side thereof from that on which the shaft 44 is mounted and so as to be outside of the baling chamber; and as explanatory of one form of construction comprises two guide bars 48 and 49 which are suitably mounted in upright position on the frame of the machine, a suitable cross-head 50 being arranged between the guide bars and suitably guided thereby for vertical movement. A suitable welder head 51 is arranged between the guide bars and the machine frame and secured to the bars. The welder head has a recess extending downward from the top thereof, guides 52 and 53 being provided at the opposite sides of the recess. The welder head preferably has also a pocket 54 extending downward from the recess, and a channel 55 extending downward from the pocket and through the welder head. The welder head has a block or die 56 which is adapted to constitute an electrical terminal and is arranged in the recess and movably guided by the guides 52 and 53, the top of the block having a groove 57 therein to receive the banding wires, the lower portion of the block having a socket 58 therein. A coil spring 59 is seated in the pocket 54 and in the socket 58 and yieldingly supports the electrical terminal block. An electrical contact rod 60 is secured to the block 56 and extends downward through the channel 55 to operate as a circuit connector when the block is forced downward. A suitable electrical contact device 61 is mounted on a bracket 62 which is secured to the guide bars 48 and 49 so as to support the device below the rod 60, the latter being held away from the device excepting when the electric circuit is required, a circuit wire 63 being connected with the device 61. It will be understood that the wire 63 may be arranged to serve either as a feed wire or a ground connection. A shear base 64 is secured to the guide bars 48 and 49 and has a cutter or shear blade 65 rigid thereon and supported in the space between the terminal block 56 and the cross-head 50 and so as to be slightly higher than the terminal block. It will be observed that the block 56 faces upward and that the cutter 65 faces downward. It should be understood also that when it is desired to form two baling bands in the machine two similar sets of welding appliances are provided, in which case the duplicate set is arranged below the welder head above described and includes a contact device 61′ mounted on a bracket 62′ and having a circuit wire 63′. Each set of the welding appliances includes also a movable welder head 66 which is arranged above the stationary welder head and rigidly secured to the cross-head 50, an electrical terminal block or die 67 being provided with insulation 68 and secured to the head 66, the front of the block facing downward and having a groove 69 therein which is opposite to the groove in the lower terminal block. The head 66 has a channel 70 therein through which a circuit wire 71 extends which is secured to the terminal block 67. Movable shear blades are provided to coöperate with

the stationary cutters or blades and each one comprises a base 72 secured to the cross-head 50 and a cutter or shear blade 73 rigid on the base and facing upward so as to coöperate with the cutter 65 on upward movement of the cross-head, which movement causes the block 67 to be carried away from the block 56. The arrangement is such that when the cross-head is moved downward the upper ones or movable welder heads are moved downward toward the stationary heads, and the movable cutters are drawn downward away from the stationary cutters.

One form of mechanism whereby to operate and control the cross-head 50 is illustrated and comprises head plates 74 and 74′ rigidly secured to the cross-head 50, one for each set of welding appliances, the plates preferably being made separately but constituting portions of the cross-head. The upper one of the plates has a wrist pin 75 thereon to which a link 76 is connected. A pivot 77 is secured to the machine frame and supports a working-beam 78 that is connected at one end with the link 76. A shaft 79 is rotatably mounted under the machine frame and has a pinion 80 thereon which is provided with a crank pin 81. A connecting rod 82 is connected with the crank pin and also with the opposite end of the working-beam 78, so that when the pinion is rotated a complete revolution the cross-head is caused to move downward and then upward to its starting point. Another shaft 83 is rotatably mounted under the machine frame and extends across to the opposite side thereof, a gear wheel 84 being secured to the shaft and meshing with the pinion 80. At the opposite side of the machine frame a ratchet wheel 85 is secured to the shaft 83 and has ratchet teeth 86 thereon, a lever 87 being rotatively mounted on the shaft adjacent to the wheel 85 and having a pawl 88 thereon that engages the ratchet teeth. A connecting rod 89 is connected with the lever 87 and also with the crank pin 27, so that the ratchet wheel is partially rotated on each movement of the pinion 24, the arrangement being such that a partial rotation of the wheel 84 causes a complete rotation of the pinion 80.

One of the wires being on one side of the baling chamber and extending adjacent to the welder heads, the opposite wire is to be pushed from the opposite side of the machine through the baling chamber and both wires to the welder heads, and for this purpose push bars 90 and 90′ are provided, one for each bale band, and in the present case as preferably constructed they are curved and rigidly secured to the upright shaft 44. Each push bar has a head 91 thereon provided on its opposite ends with rollers or guide devices 92 and 93 that are spaced apart so as to span the welder heads and take the wire portions over to the space between the heads and hold the wire portions while being electrically united.

A device is provided for moving the united wire portions away from the welder heads and holding them between the cutters to be severed; and, as an example of such appliance the plates 74 and 74′ are respectively provided with rotative shafts 94 and 94′ to which two arms 95 and 96 and arms 95′ and 96′ are secured respectively so as to swing adjacent to the outer sides of the guide bars 48 and 49 respectively. Each arm has two fingers 97 and 98, or similar fingers 97′ and 98′, to form a crotch to receive the wire portions, the finger 97 being longer than the other to serve as a guide to position the wire portions fairly with the grooves in the terminal blocks of the welder heads when the wire portions are brought to place by the push rod. The arm 95 has a finger 99 thereon that extends downwardly beyond the shaft 94 to control the arms. A bracket 100 is secured to the guide bar 48 and has a guide pin or roller 101 thereon that is arranged to be engaged by the finger 99 on upward movement of the cross-head which carries the arm. The shaft 94 has also a lug 102 secured thereto to which a spring 103 is connected, the spring being connected also to the plate 74 for retracting the arms after operation. The plate 74 has a wing 104 that extends along the outer side of the guide bar 48 and it has a stop pin 105 thereon against which the arm 95 is held by means of the spring 103. Preferably the plate has also an oppositely arranged wing 106 thereon extending adjacent to the outer side of the guide bar 49. Preferably the wings are slidingly arranged in connection with the guide bars 107 and 108 secured to the outer sides of the bars 48 and 49 respectively, for guiding or assisting to guide the cross-head. Preferably two guides 109 and 110 are mounted on the guide bars 48 and 49 respectively so as to lead the banding wires from the welder heads to the cutters.

During the formation of the bales there are wire band portions 111 and 112 on opposite sides respectively of the bales, and when each bale is sufficiently filled one wire is pushed over so that an end portion 113 of the band is formed to be united to the portion 112. After the united portions are cut the remaining wires 30 and 31 have a welded portion 114 and becomes a loop into which the substance is packed to form another bale.

In practical use an electrical current is suitably provided and the substance to be baled is fed into the hopper 9 when the ram head is retracted, the repeated forward movement of the ram head causing the substance to be packed into the chamber in the wire loops previously formed by the banding wires. When the proper amount of

the substance is packed to form a bale the rotating wheel 21 causes the pinion 24 to be rotated, with the result that the push bar 90 is operated and first engages the banding wire 30 and pushes it through the baling chamber to the wire 31, and then pushes both wires to the space between the welder heads which are then brought to the wire portions by the operation of the rod 89 and the device described which connects the rod with the cross-head 50. The welding is automatically accomplished and when the welded portions of the wires are released from the welder heads on up movement of the cross-head, the cross-head carries the arms 95 and 96 upward until they take in the wire portions; and while the cross-head continues to move, the finger 99 on engagement with the guide pin or roller 101 causes the arms to be thrown over so as to carry the welded wire portions between the cutters, after which the lower cutter is carried on up by the cross-head until the wire portions are severed. The several parts are promptly retracted to be ready for the succeeding welding operation. When the machine is continuously operated the banded or tied bales are rapidly produced in succession and forced out of the baling chamber. The various movements and results of the operation of the various parts of the mechanism will readily be understood from the detailed description of the construction and functions thereof without requiring further explanation.

Having thus described the invention, what is claimed as new is—

1. An electrical bale-tie welder including electrical welder heads and also cutting appliances separately located, a guide and carrier means for pushing banding wires to the welder heads, and means including the guide and carrier for drawing the wires away from the welder heads and to the cutting appliances.

2. An electrical bale-tie welder including a welder head and a cutter blade stationarily supported, a welder head and a cutter blade movably supported, means for guiding two wire portions to the welder heads, and means for guiding the wire portions from the heads to the cutter blades.

3. An electrical bale-tie welding apparatus having a stationary cutter and a movable cutter, a pair of coöperating devices for moving two portions of banding wire to the welding apparatus to be united, and a pair of coöperating devices for moving the united portions of the baling wire from the welding apparatus to the cutters to be severed.

4. An electrical bale-tie welder having two welder heads and means for moving one of the heads toward or from the other, two coöperating cutters, means for moving one banding wire to another and both wires together to the welder heads to be united, and means for moving the united wires from the welder heads to the cutters to be severed.

5. An electrical bale-tie welder including a pair of welder heads, one of the heads being movable, a pair of cutter blades, one of the blades being movable, a movably-supported device for pushing two wire portions to the welder heads, and a movably-supported device for taking the wire portions from the welder heads to the cutter blades.

6. An electrical bale-tie welder including a welder head stationarily supported, a welder head arranged above the stationary head and supported for vertical movement, a pair of coöperating cutters mounted adjacent to the welder heads, means for taking two wire portions laterally to the welder heads, and means for taking the wire portions laterally from the welder heads to the cutters.

7. An electrical bale-tie welder having two welder heads and two cutters, means for periodically moving one of the heads toward the other and simultaneously moving one of the cutters away from the other or vice versa, means for moving two wire portions to the welder heads to be united, and means for moving the united wire portions from the welder heads to the cutters.

8. An electrical bale-tie welder including two stationary guide bars having two cutter blades mounted thereon in spaced-apart relation, a cross-head movably guided by the bars and having two cutter blades mounted thereon in spaced-apart relation to coöperate with the other cutter blades respectively, means for electrically uniting pairs of wire portions, and means for taking the pairs of united wire portions from the uniting means to the coöperating cutter blades.

9. In an electrical bale-tie welder, the combination of two welder heads arranged one above the other, means for stationarily supporting one of the welder heads, means for movably supporting the other of the two welder heads, an electrical terminal block movably mounted in one of the welder heads, and an electrical terminal block mounted in the remaining one of the welder heads.

10. In an electrical bale-tie welder, the combination with a baling chamber, and means on each side of the chamber to guide banding wires, of a pair of separate coöperating electrical welder heads mounted on one side of the chamber, one of the heads being guided for vertical movement to or from the other and a push-bar pivotally supported on the opposite side of the baling chamber to take one of the wires to the other and both wires to a position between the separate welder heads.

11. In an electrical bale-tie welder, the combination of a pair of coöperating welder heads for electrically uniting wire portions,

a movable push-bar having two guide portions to engage and take one wire portion to another wire portion and both wire portions to the welder heads, coöperating cutting devices, and movable means for taking the united wire portions laterally away from the welder heads and to the cutting devices to be severed.

12. In an electrical bale-tie welder, the combination of a frame, guide bars secured to the frame, a cross-head movably guided by the guide bars, two welder heads mounted respectively on the guide bars and the cross-head, a working-beam mounted on the frame, a link connected to the cross-head and the working-beam, a wheel mounted on the frame and having a crank pin, a connecting-rod connected to the working-beam and the crank-pin of the wheel, and means for rotating the wheel.

13. In an electrical bale-tie welder, the combination of a frame, a pair of welder heads mounted on the frame, one of the heads being movable relatively to the other, a pair of coöperating cutters mounted in proximity to the welder heads, one of the cutters being movable relatively to the other, a push-bar movably mounted on the frame to take wire portions to the welder heads, a throw-over device to take the wire portions from the welder heads to the cutters, and a guide supported to coöperate with the throw-over device.

14. In an electrical bale-tie welder, the combination of an upright guide bar, a welder head and an electrical contact device stationarily mounted on the guide bar, a coil spring uprightly supported in the welder head above the contact device, an electrical terminal block movably guided in the welder head and seated upon the spring, an electrical contact rod secured to the block and extending downward toward the contact device, a movable cross-head vertically guided by the guide bar, and a welder head secured to the cross-head and having an electrical terminal block thereon.

15. In an electrical bale-tie welder, the combination of a guide, a cross-head movably arranged on the guide, two welder heads mounted respectively on the guide and the cross-head, two cutters mounted respectively on the guide and the cross-head, means for moving the cross-head periodically to and fro, a shaft rotatively mounted on the cross-head and having two arms secured thereto to swing on opposite sides respectively of the welder heads and the cutters, the arms being adapted to take two wire portions away from the welder heads and to the cutters, and means for controlling the movement of the arms on movement of the cross head.

16. In an electrical bale-tie welder, the combination of a stationary guide having a guide pin thereon, a cross-head movable on the guide and have a stop-pin thereon, a pair of coöperating welder heads, one of the heads being mounted on the guide and the other on the cross-head, a pair of coöperating cutters, one of the cutters being mounted on the guide and the other on the cross head, and an arm pivotally mounted on the cross-head, and spring-pressed to the stop-pin, the arm having a crotch to receive and take wire portions from the welder heads to the cutters, the arm having also a finger to engage the guide pin on movement of the cross-head in one direction to operate the arm.

In testimony whereof, I affix my signature in presence of two witnesses.

LEWIS B. WYGANT.

Witnesses:
U. M. Willmore,
G. R. Dunphy.