May 29, 1928. 1,671,376

G. D. PARKER

BUNDLE BINDING AND TYING MACHINE

Filed March 15, 1926 4 Sheets-Sheet 1

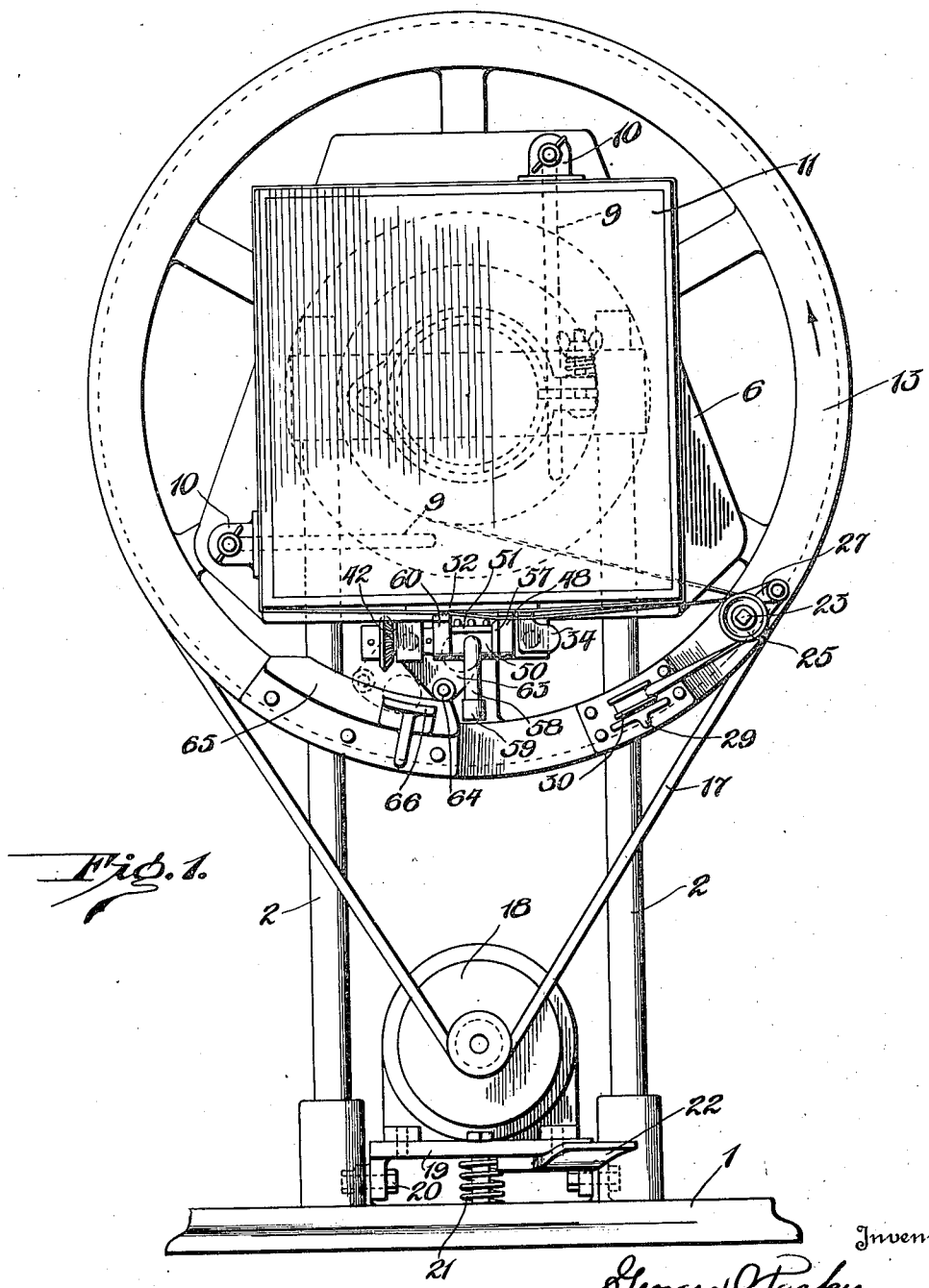


Fig. 1.

Inventor

George D. Parker

By Harry A. Toulmin

Attorney

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G. D. PARKER

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Fig. 2.

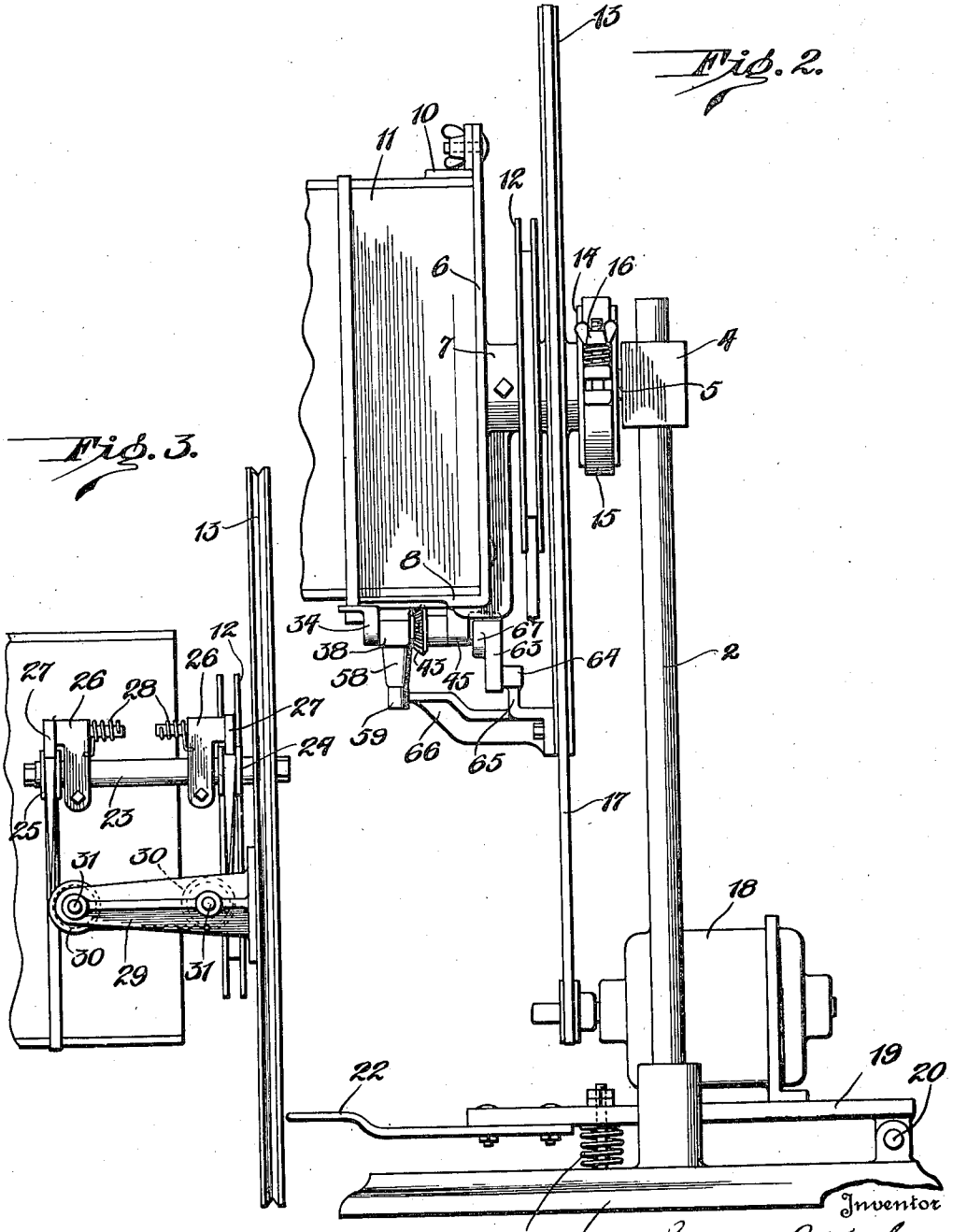


Fig. 3.

Inventor

George D. Parker

By Harry A. Toulmin

Attorney

May 29, 1928. 1,671,376

G. D. PARKER

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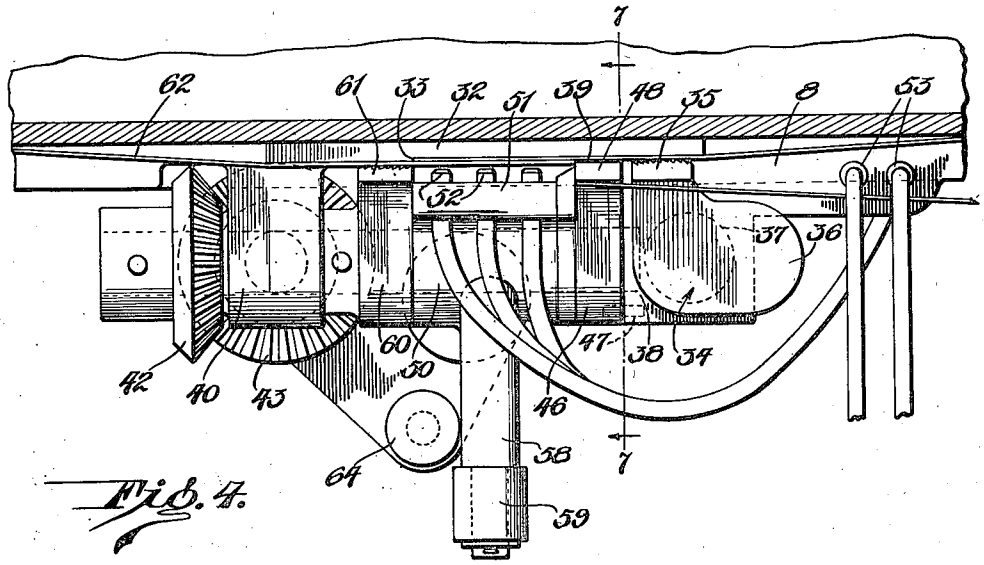


Fig. 4.

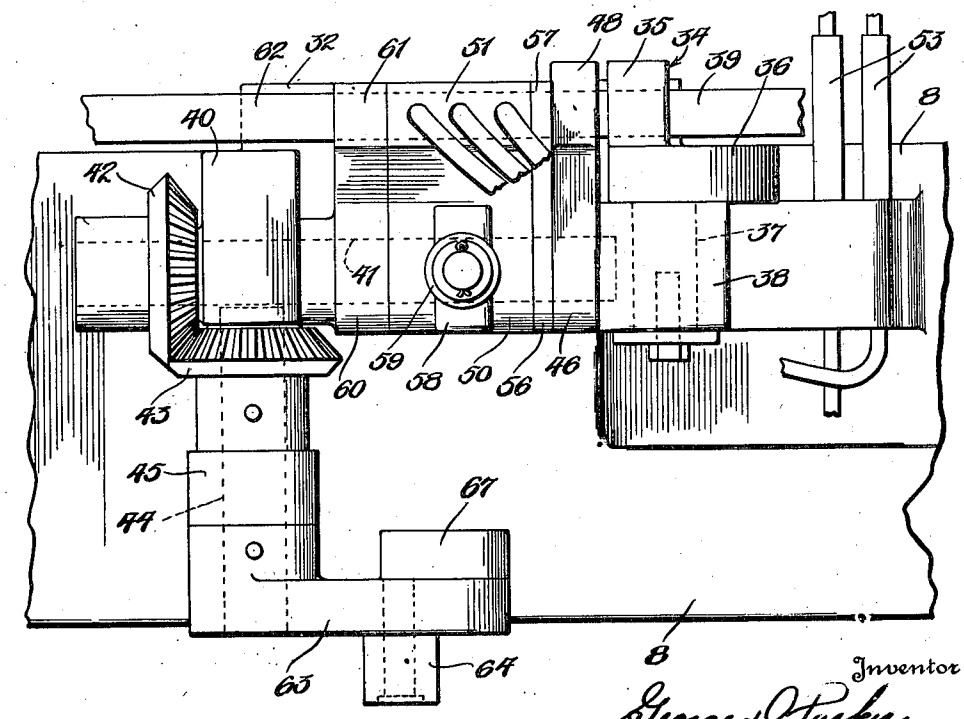


Fig. 5.

Inventor
George D. Parker
By Harry A. Toulmin
Attorney

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G. D. PARKER

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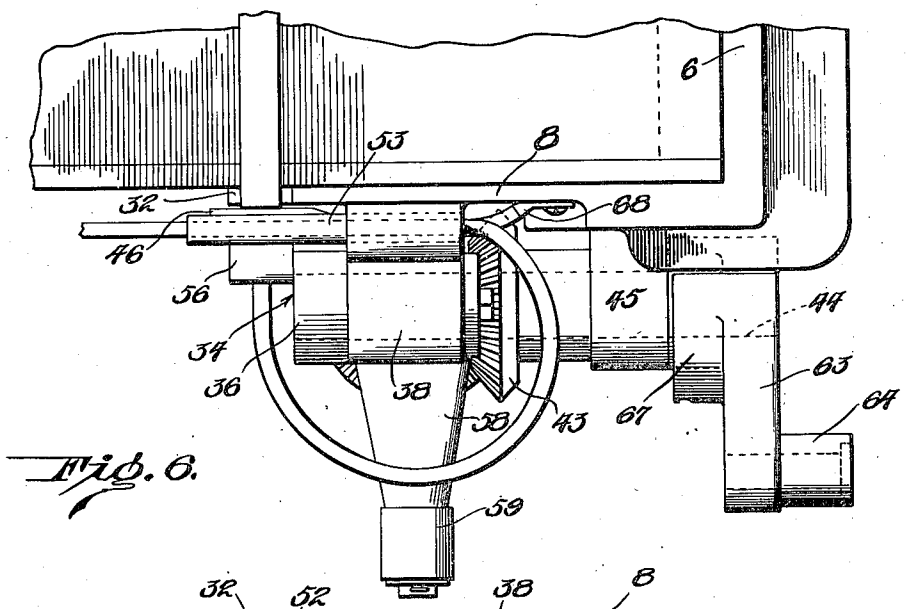


Fig. 6.

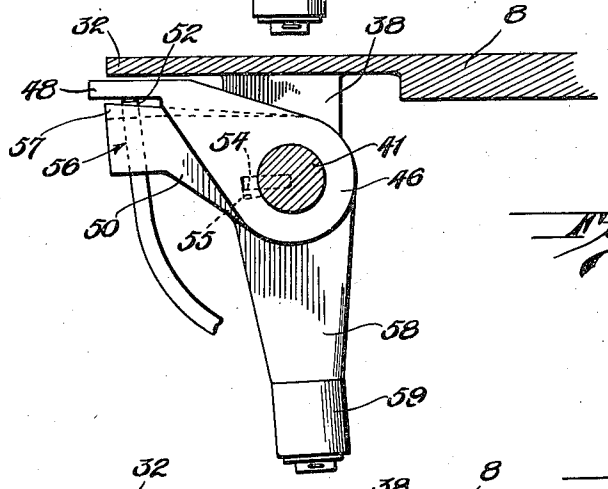


Fig. 7.

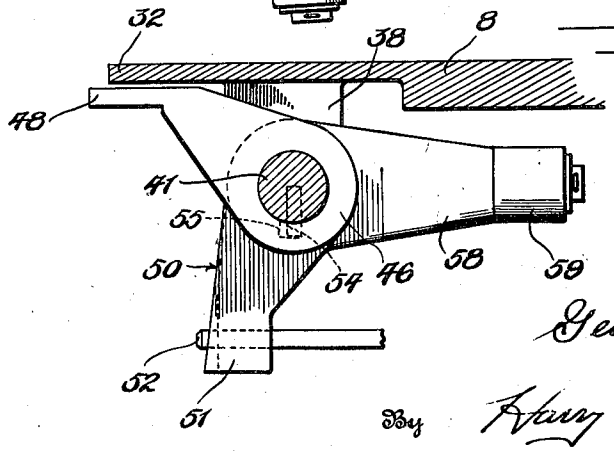


Fig. 8.

Inventor
George D. Parker
By Harry A. Toulmin
Attorney

Patented May 29, 1928. 1,671,376

UNITED STATES PATENT OFFICE.

GEORGE D. PARKER, OF RIVERSIDE, CALIFORNIA.

BUNDLE BINDING AND TYING MACHINE.

Application filed March 15, 1926. Serial No. 94,680.

This invention relates to improvements in bundle binding and tying machines.

This machine comprehends improvements in the mechanism for winding a wire under tension about a box mounted therein, the provision of new and improved wire holding means and means for welding the overlapped ends of the wire binding.

An object of the invention resides in providing a machine for wire binding boxes, bundles, and the like of simplified construction in which a wire welding mechanism operated electrically is adapted to join the ends of the wire binding.

A further object of the invention resides in providing a machine for wire binding boxes in which the support for the box mounts a wire holding and welding mechanism which are operated by the wire winding mechanism in timed relation with each other and with said winding mechanism.

A still further object of the invention resides in providing a special construction of primary wire holder, secondary wire holder, and welding mechanism operated in a predetermined manner in accordance with a cycle of the wire binding operation.

The invention comprehends numerous other objects residing in the construction of the wire binding machine and the association of the various parts, which are more particularly pointed out in the following detailed description and in the claims directed to a preferred form of the invention, it being understood, however, that various changes in the construction and relation of these parts may be made as found desirable without departing from the spirit and scope of the invention as herein set forth.

In the drawings forming part of this application:

Figure 1 is a front elevation of the improved machine for wire binding boxes showing a box in position and provided with a wire binding in position ready to be welded.

Figure 2 is a side elevation of the machine as shown in Figure 1.

Figure 3 is an edge view of the winding wheel showing the wire guiding arms and tension mechanism mounted thereon in associated relation with a box being bound.

Figure 4 is an enlarged detailed front elevation of the wire holding members, the cutting mechanism and the welding mechanism with the operating means therefor.

Figure 5 is a bottom plan view of the structure shown in Figure 4.

Figure 6 is an end elevation of the mechanism shown in Figure 4 as viewed from the right hand side.

Figure 7 is an enlarged detailed sectional view taken on lines 7—7 of Figure 4.

Figure 8 is a view similar to Figure 7 showing the welding mechanism in the inoperative position.

The base of the machine is indicated at 1, on which is mounted a pair of vertically extending parallel standards 2 slidably mounting the supporting member 4 from the central portion of which extends a stubshaft 5. The supporting member 4 is adapted to be suitably mounted in any desired position of adjustment on the standards 2 for a purpose which will be hereafter described.

A box holding mechanism includes the plate member 6 which is provided with a laterally projecting sleeve 7 suitably secured on the stubshaft 5, while the lower end of the plate is formed with a laterally projecting supporting table 8 for the box and several of the hereafter described mechanisms for holding, severing, and welding wire. The plate member 6 is slid as indicated at 9 in Figure 1 for adjustably mounting the clamps 10 adapted to rigidly secure a box 11 on the supporting table 8 for receiving a wire binding. The reel 12 carries a suitable supply of wire binding material, which in the accompanying drawing is illustrated as of flat strip form. A winding wheel 13 is rotatably mounted on the stubshaft 5 and is provided with a brake drum 14, with which the brake band 15 attached to the supporting member 4 engages and normally exerts a braking action through the tension applying mechanism indicated at 16, which may be suitably adjusted to take up wear and vary the braking tension. The reel 12 and the winding wheel 13 are each independently rotatable on the stubshaft between the extension 7 of the box structure and the supporting member 4. It is to be understood that a wire of circular cross section or of other form may be used as well as a flat wire band and it is intended to cover these different forms by this invention.

The winding wheel 13 is formed with a peripheral groove to receive the endless belt 17 driven by the motor 18 mounted on the

movable platform 19 hinged to the rear end of base 1 as indicated at 20. The forward end of platform 19 is supported in normally raised position by the coil spring 21 so that the motor 18 will normally run free of driving cooperation with the belt and the winding wheel will not be operated. A foot pedal 22 is provided on the platform so that it may be conveniently depressed to move the motor into driving engagement with the belt for driving the winding wheel and operating the various mechanisms through a cycle of movement for wire binding a box, bundle or the like.

The winding mechanism for winding the wire around the box shown more particularly in Figure 3 includes shaft 23 secured at one end to the rim of the winding wheel and projecting laterally therefrom to rotatably support guide wheels 24 and 25. The guide wheel 24 is aligned with the reel 12 and receives the wire band which is delivered by the wheel 25 to the box. A pair of arms 26 are mounted on shaft 23 adjacent the guide wheels and rotatably support the tensioning pawls 27 which engage the wire band as it passes over these wheels holding it in engagement with the guide wheels and causing a desired tensioning thereof as it is wound on the box.

Suitable coil springs 28 anchored to the pawls 27 at an end and the arms 26 at the opposite end serve to maintain the pawls in their operative positions. A bracket arm 29 is mounted on the rim of the winding wheel and projects laterally therefrom in spaced parallel relation to the shaft 23. This arm rotatably mounts the idler guide wheels 30 on the stubshafts 31 extending therefrom in substantial alignment with the arms 26.

With this wire winding mechanism it will be understood that the wire at all times will be effectively retained in the guide wheels and that a constant uniform tension will be applied to the wire binding placed around a box during the full cycle of movement of the winding wheel. The wire end when severed will not in any way affect the winding mechanism which will in reality hold the end ready to start the next winding cycle.

The supporting table 8 of the box holding mechanism is provided on the free end with a wire receiving lip 32 having a shoulder formed at 33 on the lower face by the depending portion at the left hand end as shown in Figure 4 which is substantially the same thickness as the wire employed for binding purposes. The shoulder 33 determines the position of the free end of the wire at the start of a binding cycle which is engaged and retained in position by the primary wire holder 34 in cooperation with lip 32. The primary holder 34 is formed with a serrated head 35, a weighted end 36 at the opposite side of the laterally extending pivoting projection 37 from the head 35. The projection 37 is rotatably supported in the bearing 38 formed with the supporting table 8 and depending therefrom, so that the weighted end 36 normally moves the head 35 toward the lip 32 to engage the wire end. The primary holder is mounted in a manner that the tension applied to the wire end as shown at 39 normally tends to move the holder on its pivot with head 35 moving toward the lip to thereby create a greater binding or holding action on the wire end to retain it in position against the lip.

A bearing 40 is formed on the underside of the table 8 adjacent the end in spaced relation with respect to bearing 38. A shaft 41 is rotatably mounted in these bearings 38 and 40 and carries a bevel gear 42 at the free end adjacent the bearing 40 intermeshing with the bevel gear 43 on the operating shaft 44 rotatable in the bearing 40 and a bearing 45 in the rear thereof. Adjacent bearing 38 the operated shaft 41 supports a stationary cutter member and wire holding finger 46. This finger 46 is rotatable on the shaft and is held against rotation relative to the bearing 38 by the pin 47 shown in dotted lines in Figure 4. The finger 46 has a projecting portion 48 cooperating with lip 32 as shown in Figures 4, 5, and 7 for holding the wire end 39 against the lip while the primary holder is being engaged, and for receiving the wire end to be severed in a manner to be described.

An electric welder includes a body 50 having an extension 51 mounting a plurality of spot welding electrodes 52 which have electrical connection through the cables, suitably insulated and supported by the table 8 at 53 with a source of power. The body 50 is loosely mounted on the shaft 41 and has limited movement relative thereto through the pin 54 on the shaft operating in the enlarged recess 55, clearly shown in Figures 7 and 8. The purpose of this construction is to provide for a preliminary movement of the welder toward operative position with a subsequent relative small movement into welding position. Figures 4 and 5 show the welder at the end of this preliminary movement for convenience in illustration. The full operation and advantage of this construction will be hereafter set out.

A movable cutter member 56 is mounted on the body 50 of the welder and movable therewith, said cutter having an extension 57 formed with a beveled cutting edge cooperating with the extension 48 on the wire holding finger to sever the wire end after winding. The severing operation takes place as the welder is moved to the preliminary position as shown in Figure 4. The body 50 has an operating arm 58 depending therefrom which carries a roller 59 at the lower end by which the spot welding electrodes

are moved into cooperative engagement with the ends of the wire band for spot welding said ends.

A secondary wire holder 60 is mounted on the operated shaft 41 and provided with the serrated foot 61 for cooperation with lip 32 in holding the wire end 62 locked in tensioned relation just previous to and during the welding operation. The severing means, welder and secondary holder are therefore all operated simultaneously with the shaft 41 in the rotation thereof and perform their functions separately in this operation. The secondary holder first engages the end 62 of the wire and maintains the tension thereof around the box clamping the wire against the lip 32, and then the severing blade cooperates with the stationary cutter 48 to sever the end from wire leading from spool 12.

An operating plate 63 is mounted on the rear free end of the operating shaft 44 and carries the laterally projecting roller 64 for cooperation with the cam plate 65 mounted on the rim of the winding wheel and projects into the plane of the roller 64 for engaging and moving said roller and the operating plate from the position shown in dotted lines in Figure 1 to the position shown in full lines in Fig. 1. This operation of the plate 63 serves to rotate the shafts 44 and 41 to produce the operation of the secondary holder for engaging the wire end, the severing means for the wire and the movement of the welding electrodes into a position preliminary to engaging and welding the overlapped wire ends. An operating arm 66 forms part of the cam plate structure and is positioned to engage the roller 59 and complete the operation of the body 50 to move the welding electrodes into engagement with the overlapped ends of the wire band and complete the placing of the band under tension on the box by welding the ends. The loose mounting of the body 50 on shaft 41 permits of the relative movement of the body on the shaft through the pin and recess connection 54 and 55.

Figure 8 shows the severing means and the welding electrodes in body 50 in the normally inoperative position, while Figure 7 shows the preliminary position of the welding electrodes at the end of operation by the shaft 41 through the operation of plate 63. A weighted portion 67 on the plate 63 serves to normally rotate shafts 44 and 41 and return the parts to the inoperative position of Figure 7. From Figure 6 it will be noted that one end of the circuit for welding the wire ends extends to the electrodes 52 while the opposite side of the circuit is grounded at 68 on the supporting table 8.

To bind a box or bundle with this machine it is first necessary to place the box or bundle on table 8 with the ends against plate 6 following which the loosely set clamp members or stop 10 are adjusted to firmly mount the box or bundle in the machine. The wire end 39 is then placed under the extension 48 and against the shoulder 33 after which the primary holder is engaged with the end portion, as shown in Figure 4. At the start of an operation the winding wheel 13 is usually positioned slightly rotated in the direction of the arrow from that as shown in Figure 1, so that when the above operations are completed the operator may then depress the foot pedal 22 with his foot to engage the driving pulley on the motor 18 with belt 17 and drive winding wheel 13. The rotation of this winding wheel one revolution will wind one strand of wire about the box, as shown in Figure 1, with the wire substantially tensioned through the operation of the guide rollers 24 and 25 and their associated parts. As the wheel 13 completes the winding operation the cam plate 63 will engage the roller 64 and move the plate 63 from the dotted to the full line position of Figure 1. This movement will move the parts from the position of Figure 8 to that of Figure 7 and thereby first operate the secondary holder 60 to engage the wire and hold it while the severing member 56 severs the end in cooperation with the stationary cutter member 48. The severing member 56 being integral with the body 50, the severing of the wire does not take place until said body 50 is actuated by cam 66. This enables member 60 to firmly grip the wire before the wire is severed, thereby positively maintaining the tension of wire. This operation of shaft 41 moves the welding body and electrodes into the preliminary position so that when the wheel 13 moves slightly farther in the direction of the arrow in Figure 1, the arm 66 will engage roller 59 and complete the operation of body 50 to engage welding electrodes 52 with the wire ends and automatically close the welding circuit through the lip 32 and spot weld the wire ends. This welding completes the provision of the binding on the box, the wire binding having the same tension when finished as during application through the operation of the parts as above mentioned. The foot pedal is released at the completion of this operation when the wire binding is finished and the box removed for the next to receive a binding.

With this construction it will be seen that after starting the operation is automatic but under manual control through the foot lever. The parts are grouped in an assembly and cooperate in performing their functions in timed order as above set forth to substantially simplify the construction and operation of a machine of this type. Even the supporting table besides holding the box functions to assist in holding the wire ends

and with the welding structure permitting material reduction of parts as well as cooperating in the welding operation as one terminal. The winding wheel provides a means of supplying power from the motor to all operated parts and thereby controlling the operation of the machine.

What is claimed is:

1. A machine for wire binding boxes, comprising a support, a box supporting platform carried by the support, means for adjustably securing a box on said platform, a mechanism for applying a binding wire around the box, manually controlled operating means for said mechanism, a primary wire holder mounted on said platform, a secondary wire holder mounted on the platform, a wire severing mechanism, a wire welding means, and means controlled by the manually controlled operating means for operating said secondary holder, severing mechanism and welding means in timed sequence.

2. A machine for wire binding boxes, comprising a support, a box supporting platform carried by the support, means for adjustably securing a box on said platform, a mechanism for applying a binding wire around the box, manually controlled operating means for said mechanism, a primary wire holder mounted on said platform, a secondary wire holder mounted on the platform, a wire severing mechanism, a wire welding means, and means for operating the secondary holder, wire severing mechanism and welding means in timed sequence.

3. A machine for wire binding boxes, comprising a support, box holding means carried by the support, means for applying a binding wire to a box in said holding means, a primary wire holder, a secondary wire holder, a wire severing mechanism, a welding means, operating means for the secondary wire holder and severing mechanism adapted to produce a preliminary operation of the welding means, and independent operating means for completing the operation of the welding means.

4. A machine for wire binding boxes, comprising a support, box holding means on the support, means for applying a binding wire to a box in the holding means, a primary wire holder, a rotary member, a secondary wire holder mounted on the rotary member, a wire severing mechanism operated by the rotary member, wire welding means mounted on the rotary member, and means for operating the rotary member.

5. A machine for wire binding boxes, comprising a support, box holding means on the support, means for applying a binding wire to a box in the holding means, a primary wire holder, a rotary member, a secondary wire holder on the rotary member, a wire severing means, a wire welder mounted on the rotary member, and means for operating the rotary member, said support cooperating with the secondary wire holder and welder in the operation thereof by the rotary member.

In testimony whereof I have signed my name to this specification.

GEORGE D. PARKER.