To all whom it may concern:

Be it known that I, Edward Craig, a citizen of the United States of America, and a resident of St. Joseph, Michigan, have invented a certain new and useful Improvement in Box-Blank-Machine Wire Cutters, of which the following is a specification.

This invention relates to devices for automatically cutting the wire employed in the manufacture of wire bound box blanks for that kind in which each blank comprises a plurality of sections which are flexibly connected together by wires, so that the blanks themselves when delivered from the box blank machine are connected together by said wires, thus making it necessary to sever the wires and thus separate or disconnect the blanks from each other.

Generally stated, therefore, the object of the invention is to provide a novel and improved construction wherein the device for cutting the wire is automatically controlled by the blank materials, and by mechanism for intermittently operating the cutting device, which mechanism is operative only when the cutting device is moved downward into one of the spaces between the blanks, whereby it is impossible for said device or cutter to operate while held in elevated position by the materials.

It is also an object to provide certain details and features of construction and combinations tending to increase the general efficiency and the desireability of an automatic wire cutter of this particular character.

To the foregoing and other useful ends the invention consists in matters hereinafter set forth and claimed, and shown in the accompanying drawings, in which—

Fig. 1 is a perspective of the blanks as they appear connected together by the binding wires.

Fig. 2 is a longitudinal section of a portion of a box blank machine, showing the stapler by which the blank materials are secured together by the insertion of staples transversely of each binding wire, and showing a wire cutter involving the principles of the invention.

Fig. 3 is an enlarged end elevation of said wire cutter.

Fig. 4 is a section on line 4—4 in Fig. 2.

Fig. 5 is a view similar to Fig. 2, but showing the stapler in elevated position.

Fig. 6 is a similar view showing the wire cutter in its depressed position in one of the spaces between the blanks, and showing the stapler down, these conditions being essential to the operation of the wire cutter.

Fig. 7 is an enlarged detail section on line 7—7 in Fig. 4.

Fig. 8 is an enlarged detail section on line 8—8 in Fig. 4.

As thus illustrated, the box blanks to be made can be of any suitable, known or approved character. For example, they can be of the well known form in which each blank comprises the box side sections 1, 2, 3 and 4, with cleats 5 secured to the sections 1 and 3, the cleats which are omitted from the sections 2 and 4 being supplied in the subsequent use of the blank in the construction of the wire bound box. The invention shown and described has reference to the cutting of the binding wires 6 over the spaces 7 which are left between the blanks, thereby to provide binding wires of each blank with projecting ends which can be twisted together after the box is filled and closed.

The machine for making the blanks may be of any suitable, known or approved character, and as shown comprises an endless chain belt 8 for feeding the blank materials in a horizontal plane below the staplers, such as the stapler 9 shown in the drawings, whereby the wires and box side sections and cleats are stapled together. The endless chain belts and the work carried thereon travel in the direction indicated by the arrows in Figs. 2, 5 and 6, so that the work travels intermittently and passes under the staplers in the usual manner.

The wire cutter for severing the binding wires over the spaces 7 between the blanks, is constructed and operated as follows: An arm 10 is pivoted at 11 on the frame of the machine, so that said arm swings up and down about a transverse axis, the free end of the arm extending in the direction of travel of the blank materials. A shaft 12 is mounted in bearings 13 on said arm, to extend longitudinally thereof, and the front end of said shaft is provided with a crank arm 14 provided with a roller 15 and connected by a spring 16 with the frame of the machine, said spring tending to rotate the shaft in one direction, and also to hold the free end of the arm 10 down. The other end of said shaft is provided with a blade 17, this end of the shaft being reduced at 18 to receive a collar 19 which is keyed thereon and which is held in place by a nut...
20 on the end of the shaft, whereby said blade is fixed on the end portion of the shaft but is removable therefrom. A similar blade 21 is secured to the free end portion of the arm 10, and the two blades cooperate like scissors blades to cut anything placed between them. A foot or shoe 22 is adjustable secured to the free end portion of the arm 10 to engage the upper surface of the blank materials, being bent in a manner to enable it to ride smoothly on the top surface of the blank materials, and to rise out of a space between the blanks in the manner shown in Fig. 6, after the cutting of the wire. The vertically reciprocating stapler 9 is provided with an arm 23, and this arm is provided with a vertically disposed tappet 24 for engaging the roller 15 of the wire cutter. Said stapler is operated in any suitable or desired manner, as for example by a rotary cam 25 mounted on the shaft 26, and there are as many of these staplers as there are binding wires 6 to be secured to the blanks.

The mode of operation is as follows: The tappet 24 is so adjusted that it does not engage the roller 15 while the foot or shoe 22 is riding on the top surface of the blank materials, whereby the scissors blades 17 and 21 are not operated at such time; or, in any event, the engagement of the tappet 24 with the roller 15, if there be such engagement, is not operative to cause the blades to cut the wire, inasmuch as the two scissors blades are maintained in elevated position directly above the wire, so that even should they be given some relative movement by the tappet they will not cut the wire. However, as soon as the foot or shoe 22 drops into the space 7 between the blanks, the two blades 17 and 21 then receive the wire between them, and as soon as the stapler 9 moves downward and the tappet 24 engages the roller 15, the latter having been slightly raised, the two blades will be relatively operated like ordinary scissors blades, to sever the wire between them. Then the foot or shoe 22 strikes the edge of the next box section, which is the first section of the next blank, and the cutter is thus raised out of the space 7 and caused to ride or float on the top surface of the next blank. The operation is repeated as soon as the cutter drops into the next space between the blanks. Thus the cutter is automatically controlled conjointly by the blank materials and the stapler, for the cutter must be dropped into a space between the blanks, and the stapler must descend at the right time in order to cause the operation of the cutter to cut the wire in the manner the stapler and its operating devices and the tappet 24 which reciprocates up and down with the stapler constitute the mechanism for operating the wire cutter. The cutter rides or floats on the top surface of the blank materials, but the mere dropping of the cutter between the blanks is not sufficient to cause the operation of the cutter, mechanism being provided for positively causing the operation of the cutter at the proper time, so that the cutter can drop into one of said spaces, as shown in Fig. 6, and the different parts or elements of the machine can be so timed in their operation that the wire will then be cut at or near the center of the space between the blanks, thus providing the binding wires of the blanks with end portions of the desired length, so that these end portions can be readily twisted together after the boxes are completed and filled and closed.

While one wire cutter is shown in the drawings, it will be understood that there will be as many of these wire cutters as there are binding wires for the blanks. In Fig. 1 the blanks are shown as having three binding wires, and in such case there will be three wire cutters associated with the three staplers of the box blank machine.

What I claim as my invention is—

1. In a machine for making wirebound box-blanks, the combination of means for feeding the blank materials along with spaces therein, a cutter disposed in position to drop of its own weight into each space, and provided with pivotal cutting means to engage the wire, operating like shears to cut the wire by the pivotal action thereof, and mechanism to automatically operate said cutting means about the pivot to sever the wire.

2. A structure as specified in claim 1, said cutter and its cutting means comprising a pivoted arm, a blade secured to the free end of said arm, a shaft extending longitudinally of said arm, a blade on said shaft, the two blades being arranged to receive the wire between them, and means on said shaft to engage said mechanism.

3. A structure as specified in claim 1, said cutter being pivoted to float up and down and having means to drag on the materials and whereby the cutter is automatically lifted out of each space.

4. A structure as specified in claim 1, said mechanism comprising a stapler provided with a vertically reciprocating element to engage the cutter and operate the cutting means at the proper time to sever the wire.

5. A structure as specified in claim 1, in combination with a spring to hold the cutter down while being operated by said mechanism.

6. A structure as specified in claim 1, said mechanism comprising a reciprocating element which is operative to actuate said cutting means only when said cutter is depressed in one of said spaces.

7. A structure as specified in claim 1, said cutter being arranged to swing up and down.
about a transverse axis and provided with a longitudinal shaft having said cutting means at one end thereof and having its other end provided with means to engage said mechanism.

8. The combination of means for feeding wire along with other materials, with predetermined points where the wire must be severed after the work is finished, a cutter having cutting means to sever the wire at said points, means controlled by the feeding motion of said materials to automatically bring said cutter by its own weight into operative position, a rotary operating element leading to said cutting means, and mechanism to operate the cutting means by rotation of said element when the cutter assumes said position.

9. A structure as specified in claim 8, said cutting means comprising a pair of scissor blades mounted to sever the wire between them, said controlling means including a shoe which rides on the materials to support the cutter in elevated position until the moment arrives for cutting the wire, and said mechanism being operable only upon the depression of the cutter into operative position.

10. A structure as specified in claim 8, said cutting means comprising scissor blades, said cutter comprising a pivoted arm on which one blade is fixed, said rotary operating element having fixed thereto the other blade, and means on said rotary element to engage said mechanism.

11. In a machine for making wire bound box blanks, the combination of a wire cutter having cutting means for severing the binding wire between the blanks, a stapler for inserting staples to fasten the binding wire to the blank materials, means independent of the stapler for automatically inserting the cutter in the space between the blanks and means including a rock shaft whereby said cutting means is operated by the motion of the stapler.

12. A structure as specified in claim 11, in combination with means for engaging the blank materials to automatically control the operation of the cutter.

13. A structure as specified in claim 11, the cutting means being operated by the down stroke of the stapler.

14. In a machine for making wire bound box blanks, the combination of means for feeding the blank materials horizontally, a wire cutter to sever the wire between the blanks, a stapler to fasten the wire to the blank materials, and instrumentalities including a swinging rock shaft adapted to be swung upward by the blank materials and rocked by the stapler whereby the cutter is controlled conjointly by the blank materials and the stapler.

15. In a machine for making wire bound box blanks, the combination of means for feeding the blank materials along with spaces therein, a cutter disposed in position to drop into each space, and mechanism to automatically operate said cutter to sever the wire, said cutter comprising a pivoted arm, a blade secured to the free end of said arm, a shaft extending longitudinally of said arm, a blade on said shaft, the two blades being arranged to receive the wire between them, and means on said shaft to engage said mechanism.

16. In a machine for making wire bound box blanks, the combination of means for feeding the blank materials along with spaces therein, a cutter disposed in position to drop into each space, and provided with cutting means to engage the wire, and mechanism to automatically operate said cutter to sever the wire, said cutter being arranged to swing up and down about a transverse axis and provided with a longitudinal shaft having said cutting means at one end thereof and having its other end provided with means to engage said mechanism.

17. The combination of means for feeding wire along with other materials, with predetermined points where the wire must be severed after the work is finished, a cutter to sever the wire at said points, means controlled by said materials to automatically bring said cutter into operative position, and mechanism to operate the cutter when it assumes said position, said cutter comprising a pair of scissor blades mounted so that when the cutter moves down into operative position the wire will be between the scissor blades, said means including a shoe which rides on the materials to support the cutter in elevated position until the cutting moment arrives, and said mechanism being only operable upon the depression of the cutter into operative position.

18. The combination of means for feeding wire along with other materials, with predetermined points where the wire must be severed after the work is finished, a cutter to sever the wire at said points, means controlled by said materials to automatically bring said cutter into operative position, and mechanism to operate the cutter when it assumes said position, said cutter comprising scissor blades, a pivoted arm on which one blade is fixed, a shaft on which the other blade is fixed, and means on said shaft to engage said mechanism.

EDWARD CRAIG.