E. G. STAUDE.

MACHINE FOR TYING BOX BLANK BUNDLES.

APPLICATION FILED MAR. 2, 1910.

1,163,042. Patented Dec. 7, 1915.

4 SHEETS—SHEET 1.

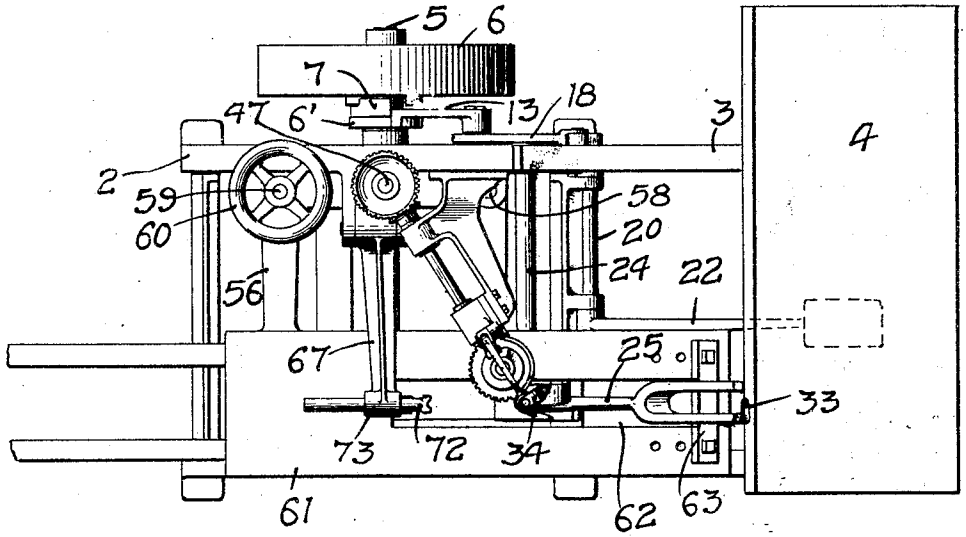


FIG. 1.

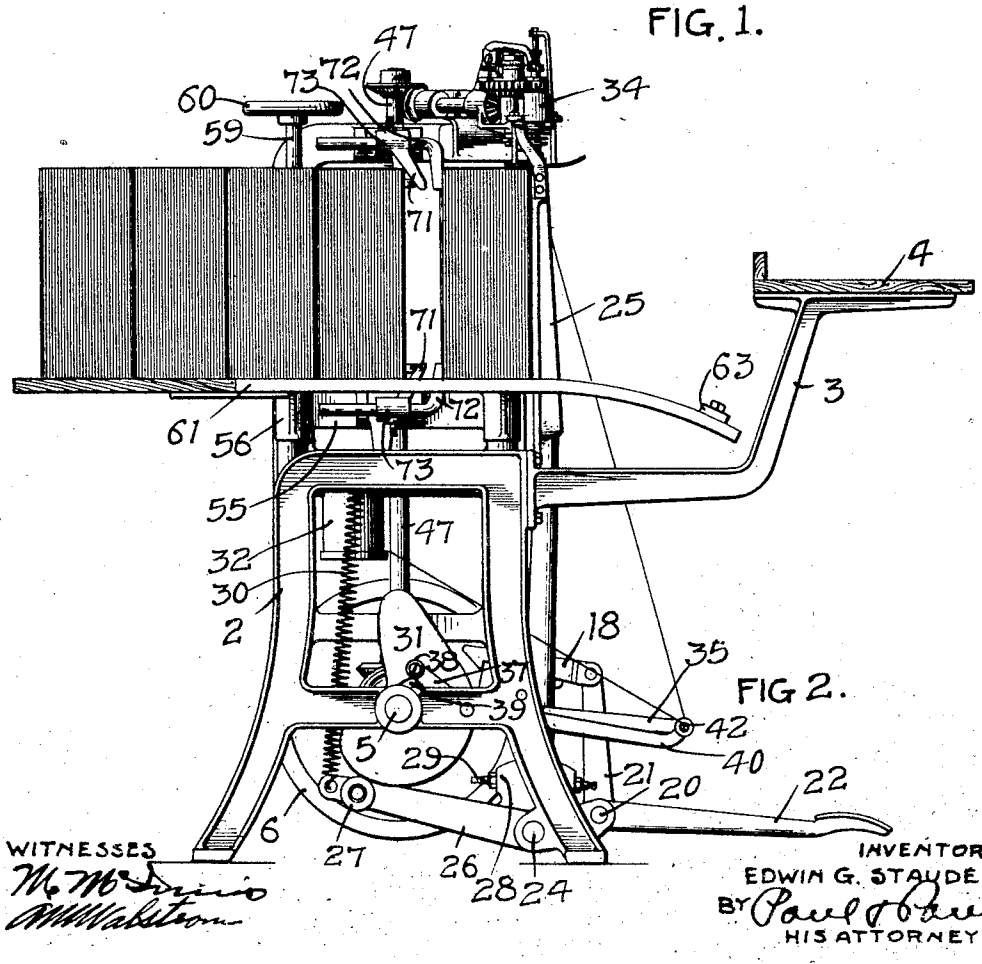


FIG 2.

WITNESSES

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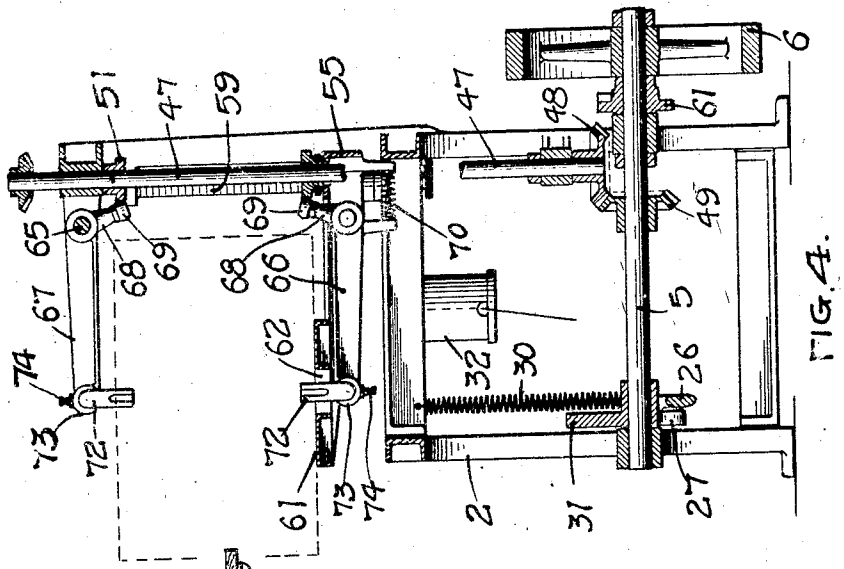


FIG. 4.

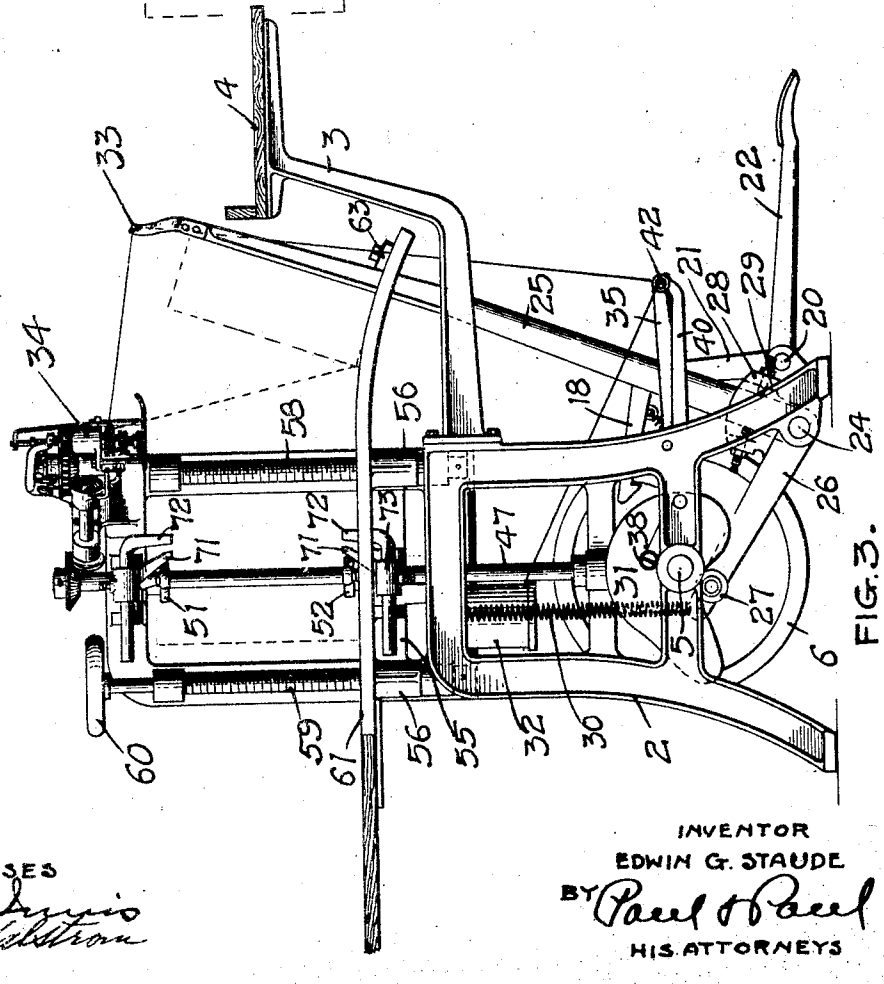


FIG. 3.

WITNESSES

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4 SHEETS—SHEET 3.

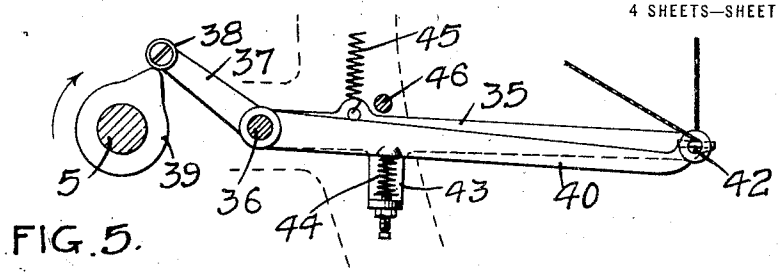


FIG. 5.

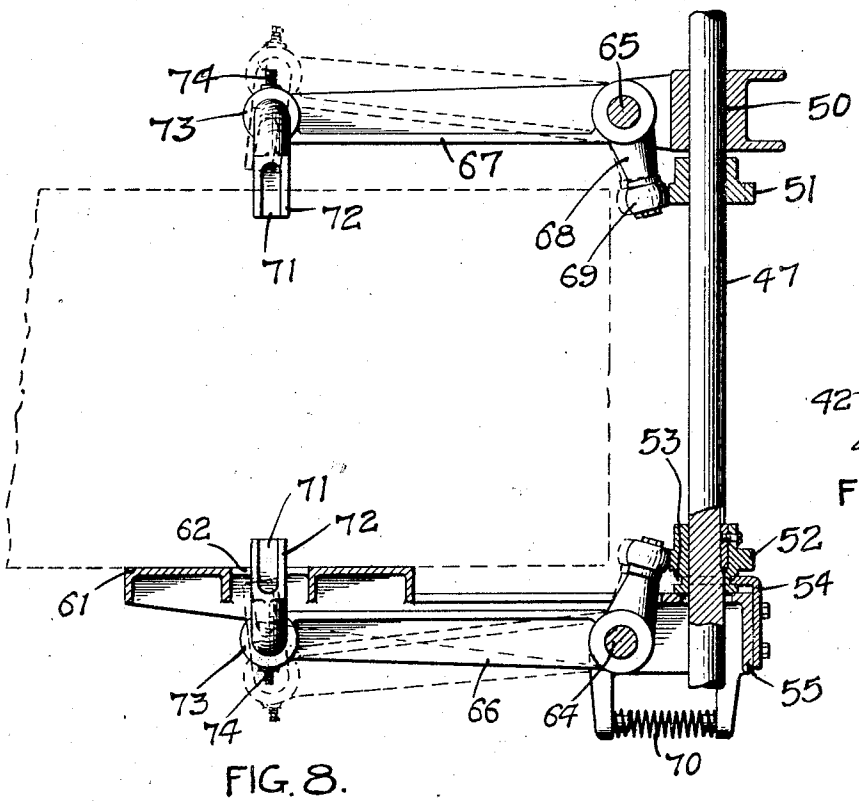


FIG. 8.

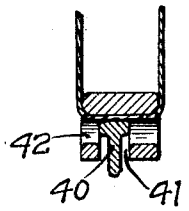


FIG. 7.

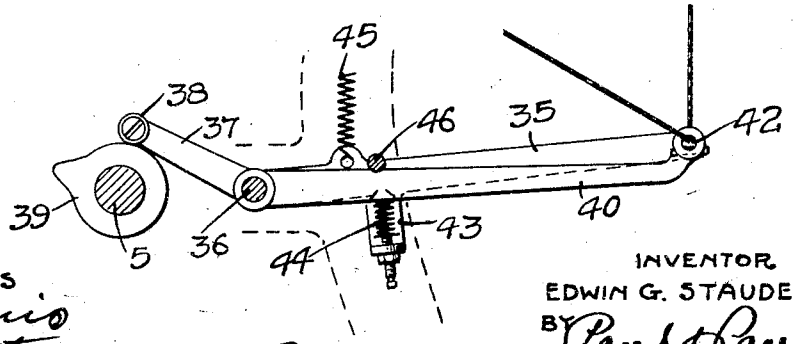


FIG. 6.

WITNESSES

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4 SHEETS—SHEET 4.

FIG. 9.

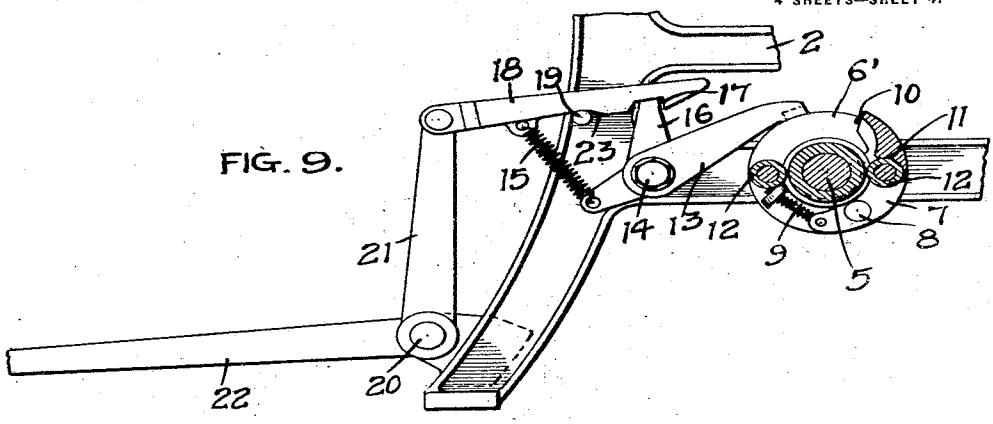
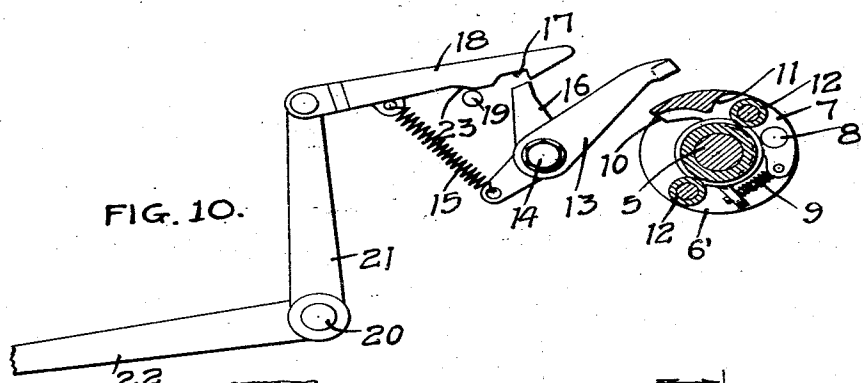


FIG. 10.



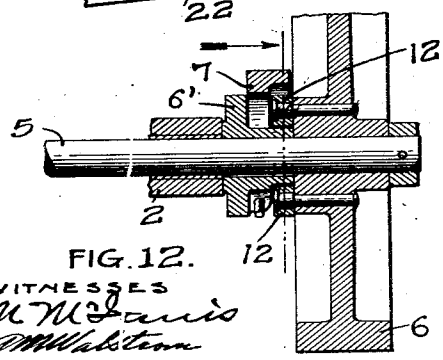


FIG. 12.

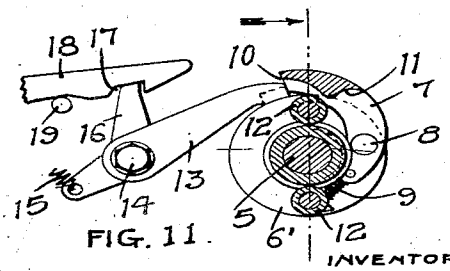


FIG. 11.

WITNESSES

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UNITED STATES PATENT OFFICE.

EDWIN GUSTAVE STAUDE, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO E. G. STAUDE MANUFACTURING CO., OF MINNEAPOLIS, MINNESOTA, A CORPORATION.

MACHINE FOR TYING BOX-BLANK BUNDLES.

1,163,042. Specification of Letters Patent. Patented Dec. 7, 1915.

Application filed March 2, 1910. Serial No. 546,898.

To all whom it may concern:

Be it known that I, EDWIN G. STAUDE, of Minneapolis, Hennepin county, Minnesota, have invented certain new and useful Improvements in Machines for Tying Box-Blank Bundles, of which the following is a specification.

Box blanks, upon delivery from the box making machine, are folded and glued and stacked up in piles of a suitable number for convenience in handling and as they are removed from the stacker are tied up in bundles until such time as required for filling. Generally these bundles are tied by hand, a laborious and tedious operation requiring the services of a number of attendants, and the bundles must be carefully tied or the blanks will slip out and the package will be broken up.

The primary object of my invention, therefore, is to provide means for subjecting the packages of blanks to suitable pressure and tying a cord around them, so that when the package is released, the expansion of the blanks will tighten the cord and positively prevent any of the blanks from slipping out of the package, even though they are thrown from place to place in the store room.

My invention consists generally in a means for subjecting the package of blanks to suitable pressure in combination with an automatic tying mechanism for securing a cord around the bundle.

In the accompanying drawings forming part of this specification, Figure 1 is a top view of a machine embodying my invention, Fig. 2 is a side elevation of the same, showing the machine at work, a package of blanks being held between the compressing means, Fig. 3 is a similar view with the package removed, showing the compressor arm in its retracted position, Fig. 4 is a vertical sectional view taken on a line substantially at right angles to the view of Fig. 3, Figs. 5, 6 and 7 are detail views of the tension device through which the cord passes, Fig. 8 is a vertical sectional view illustrating the mechanism for operating one side of the compressor device, Fig. 9 is a detail view of the clutch mechanism controlling the operation of the machine, Fig. 10 is a similar view showing the clutch released, Fig. 11 illustrates the clutch returned to its locking position, Fig. 12 is a detail, sectional view, showing the drive shaft and pulley, and the clutch in connection therewith.

In the drawing, 2 represents a frame whereon the operating mechanism of the machine is mounted.

3 is a bracket supporting a shelf 4 upon which the packages of blanks are placed.

5 is a drive shaft having a driven pulley 6 operated from a suitable source of motive power, not shown, and running loose normally on said shaft, but rendered operative by means of a clutch mechanism of common construction, illustrated in Figs. 9 and 12, and which I will now describe in detail. A hub 6 is secured on said shaft and has a wing 7 pivoted at 8 thereon and normally held toward the center of said hub by means of a spring 9. The wing 7 has a square face 10 at one end and a seat 11. The pulley 6 has anti-friction rollers 12 thereon, adapted to engage the seat 11 and drive the pulley through said rollers. Normally, however, a dog 13, pivoted at 14, engages the face 10 of the wing and forces it outwardly against the tension of its spring out of the path of the rollers 12, so that as the pulley revolves, normally, the shaft will be stationary. The dog 13 is normally held in position to engage the face 10 by a spring 15. An arm 16 is connected with said dog and is adapted to enter a notch 17 provided in the lever 18, to which one end of the spring 15 is connected to hold said lever in engagement with the arm 16 and against a stop pin 19. A shaft 20 has a link 21 connecting it with the lever 18 and a treadle 22 is mounted on said shaft and adapted to rock the shaft to move the lever 18 lengthwise and bring a cam surface 23 thereon into engagement with the pin 19 for the purpose of raising the lever until it clears the arm 16, whereupon the dog 13 will assume the position shown in Fig. 10, releasing the wing and allowing one of the rollers on the pulley to engage the surface 11 and drive the shaft. The lengthwise movement of the lever 18, pulling on the arm 16, will trip the pawl and release the wing 7 and even if the operator keeps his foot of the treadle the pawl will nevertheless return to its locking position and stop the machine after the shaft has made one complete revolution. It will make,

therefore, no difference whether the operator keeps his foot on the treadle or removes it, the machine will stop after each complete revolution.

A shaft 24 is journaled in the machine frame and carries a compressor arm 25, loosely mounted thereon. Said shaft also has an arm 26 secured thereon, provided with anti-friction rollers 27 and having a hub with lugs 28 thereon, which project on each side of the loosely mounted compressor arm 25 and are provided with set screws 29 which are capable of movement toward or from the compressor arm, for the purpose of regulating its stroke to bring the cord in convenient position for the knotter to perform its functions. A spring 30 is connected with the arm 26 and is put under tension when the arm is forced down to return it and the compressor arm to their normal position. A cam 31 is mounted on the shaft 5 and engages the roller 27 to operate the arm 26. The edge of this cam is so constructed as to cause the compressor arm to be stationary at a predetermined point in its stroke for a sufficient time to allow the tying of the knot in the cord that is passed around the bundle of blanks. This cord is contained in a can 32 and passes through a suitable tension device, to the hereinafter described, and from thence through an eye 33 on the compressor arm to the knotter 34. This knotter is of any suitable construction and as it forms the subject matter of a separate application, I will not attempt to illustrate or describe it in detail herein.

The tension device illustrated in Figs. 5 to 7 inclusive consists of an arm 35 pivoted on a stud 36 and having an upwardly extending arm 37 provided with an anti-friction wheel 38 that is engaged by a cam 39 on the shaft 5. A second arm 40 is mounted on the stud 36 and is adapted to enter a slot 41 provided in the eye 42 in the arm 35. The arm 35 has a bracket 43 depending therefrom between which and the arm 40 a spring 44 is arranged. A spring 45 normally resists downward movement of the arm 35 and a pin 46 is mounted on the frame in the path of the arm 40. The cord passes through an eye 42 and is gripped therein by the end of the arm 40. The engagement of the cam 39 with the anti-friction roller 38 will swing the arm 35 downwardly against the tension of its spring. This movement will relieve the pressure of the spring 44 on the arm 40 and permit the cord to be pulled through the eye until a sufficient length has been obtained to wrap around the package. When the cam passes the roller, the arm 35 will return to its normal position, allowing the spring 44 to force the arm 40 upwardly into engagement with the pin 46 and temporarily grip the cord, as indicated in Fig. 7.

47 is an upright shaft carrying a gear 48 which meshes with a pinion 49 on the shaft 5. The upper end of the shaft 47 has a bearing 50 in the machine frame and carries a cam 51 secured on the shaft. A second cam 52 is splined to said shaft and its hub has an annular groove 53 to receive the inwardly turned end of a strap 54 that is secured to a yoke 55 which is vertically movable on said shaft and has hubs 56 to receive screws 58 and 59, one of which is provided with an operating wheel 60, and is connected with the other screw by a suitable driving connection. By the movement of this wheel the yoke 55, and the mechanism carried thereby, may be raised or lowered to adapt the machine for box blanks of different sizes. A table 61 is carried by said yoke and has a slot 62 therein, wherein the compressor arm 25 is adapted to oscillate, being limited in its movement in one direction by a stop 63. Studs 64 and 65 are journaled in the yoke 55 and in the upper portion of the machine frame and carry arms 66 and 67 which are capable of vertical oscillation and are operated by means of short arms 68 having anti-friction rollers 69 to bear on the cams 51 and 52. The arm 66 is normally held in its raised position by the tension of a spring 70. The outer ends of the arms 66 and 67 are provided with fingers 71, forming fixed stops, said fingers being diagonally arranged and projecting into the path of the incoming box blanks. Said arms also carry adjustable stops 72 mounted in the bearings 73 in the ends of the arms and secured therein by set screws 74. The stops 72 are capable of rotary and longitudinal adjustment in their bearings and have ends turned substantially at right angles to the main portions thereof and project into the path of the bundles of blanks as they are moved over the surface of the table 61 by the compressor arm. In fact, the adjustment of these stops with respect to the compressor arm determines the degree of compression to which the bundles are subjected. The box blanks vary, of course, in length and consequently the height of the bundles will vary, but the operator, by the simple manipulation of the wheel 60, can raise or lower the table 61 and one set of the stops until the machine is adapted for the size of bundle to be compressed and tied. The movement of the arms 66 and 67 is so timed by the position of the cams 51 and 52, that they will be swung to the dotted line position, as shown in Fig. 8, when the proper degree of compression has been obtained and the cord has been tied around the bundle. The package will then move back to the rear of the table, as indicated in Fig. 2, and while another package is being compressed, the diagonally extending fingers 71 will engage the bound package and hold it in place.

By the simple adjustment of the stops in their bearings, the degree of compression

can be regulated and the stops adapted for packages of different thickness. Some blanks of lighter stock make a considerably thinner package than others, although there may be the same number of blanks in the package. After the packages are tied they are removed from the rear end of the table and stacked up in the store room, ready to be filled.

I claim as my invention:

1. A machine of the class described comprising a table adapted to support the articles to be bound thereon, a rocking compressing means, a stop between which and said means the blanks are squeezed and a knotter.

2. A machine of the class described, comprising a suitable frame, a table mounted thereon and adapted to support a package of box blanks, said table being vertically adjustable to adapt it for packages of different sizes, oscillating means for compressing the package, and means for tying a cord around it.

3. A machine of the class described, comprising a frame, a table therein, a compressor arm, stops between which and said arm the package of box blanks is compressed, and mechanism for tying a cord around the package of blanks when so compressed.

4. A machine of the class described, comprising a frame, a table mounted therein, a compressor arm, stops between which and said compressor arm the packages of blanks are compressed and tied, mechanism for tying a cord around the package of blanks, and means for moving said stops out of the path of the package of blanks, for the purpose specified.

5. The combination, with a frame of a table mounted therein, a compressor arm, stops between which and said compressor arm the packages of blanks are squeezed, and means for adjusting said table and one of said stops vertically to adapt the machine for blanks of different sizes, substantially as described.

6. The combination, with a frame, of a table mounted therein, a compressor arm, stops between which and said compressor arm the packages of blanks are squeezed, means for adjusting said table and one of said stops vertically and means for temporarily withdrawing both of said stops from the path of the package of blanks, substantially as described.

7. The combination, with a frame, of a table therein, an oscillating compressor arm, said table having a longitudinal slot wherein said arm operates, means for rocking said arm, said table being adapted to support a package of box blanks in front of said arm, stops between which and said compressor arm the package of box blanks is squeezed, and means for tying a cord around the package in its compressed position.

8. The combination, with a frame, of a table mounted therein, a vertically movable yoke whereon said table is supported, pivoted arms and stops carried thereby, a compressor arm between which and said stops a package of box blanks is placed upon said table, and means for oscillating said arms to temporarily withdraw said stops from the path of said blanks.

9. The combination, with a frame, of a table mounted therein, a vertically movable yoke whereon said table is supported, a compressor arm, a pivoted arm carried by said yoke, a second pivoted arm having a stationary support, stops having bearings in said arms and adapted to project into the path of a package of blanks on said table, means for adjusting said yoke and table vertically to adapt them for box blanks of different sizes.

10. The combination, with a frame, of a table supported therein, a compressor arm operating to feed bundles of blanks on said table, pivoted arms, stops carried thereby and arranged to project into the path of the package of blanks, an upright shaft, cams thereon and means for operating said arms from said cams, for the purpose specified.

11. The combination, with a frame, of a table mounted therein, a compressor arm adapted to feed packages of blanks on said table, stops between which and said compressor arm the packages of blanks are squeezed, means for temporarily withdrawing said stops from the path of a package, means for tying a cord around the package, means projecting between the package that is being tied and the adjoining one in position to engage a package after the compressing and tying operation and during the compression of a second package.

12. The combination, with a frame, of a table mounted therein, a compressor arm operating to move the packages of blanks on said table, pivoted arms and means for operating the same, stops having bearings in said pivoted arms and capable of rotary adjustment therein, said stops normally projecting into the path of a package of blanks on said table and between which stops and said compressor arm the package of blanks is squeezed, and means for tying a cord around the package during the compressing operation.

13. The combination, with a frame, of a table, a compressor arm operating to feed packages of blanks thereon, pivoted arms and means for operating the same, stops journaled in said pivoted arms and capable of longitudinal adjustment therein toward or from said compressor arm and between which stops and said compressor arm the packages of blanks are squeezed, said stops being withdrawn from the path of the packages of blanks by the tilting of said pivoted

arms, and means for tying a cord around the package during the compressing operation.

14. A machine of the class described comprising a frame, a compressor arm, stops between which and said arm the package of blanks is compressed, and mechanism for tying a cord around the package of blanks when so compressed.

15. A machine of the class described comprising a table, an oscillating compressor arm, mechanism for tying a cord around the blanks, means resisting the compressing action of said arm, and means for temporarily moving said resisting means out of the path of the blanks.

16. The combination, with a frame, of a table horizontally mounted thereon, means for adjusting said table vertically to adapt it for blanks of different sizes, a compressing device, a stop between which and said compressing device the package of blanks is squeezed, and mechanism for tying a cord around the package of blanks when compressed.

17. A machine of the class described comprising a table adapted to support the articles to be bound thereon, a rocking compressing means having a device for supporting a tying cord, a stop between which and said means the blanks are squeezed and a knotter coöperating with said compressing means.

18. A machine of the class described comprising a support whereon the articles to be bound are placed, a compressing means provided with a cord supporting device, a stop between which and said compressing means the blanks are squeezed and a knotter coöperating with said compressing means for tying a cord around the articles when compressed.

19. A machine of the class described comprising a suitable support, an oscillating compressor mechanism for tying a cord around the articles on said support, means resisting the compressing action of said compressor and means for temporarily moving said resisting means out of the path of the articles on said support.

In witness whereof, I have hereunto set my hand this 26th day of February, 1910.

EDWIN GUSTAVE STAUDE.

Witnesses:

L. C. CRONEN,

G. E. SORENSEN.