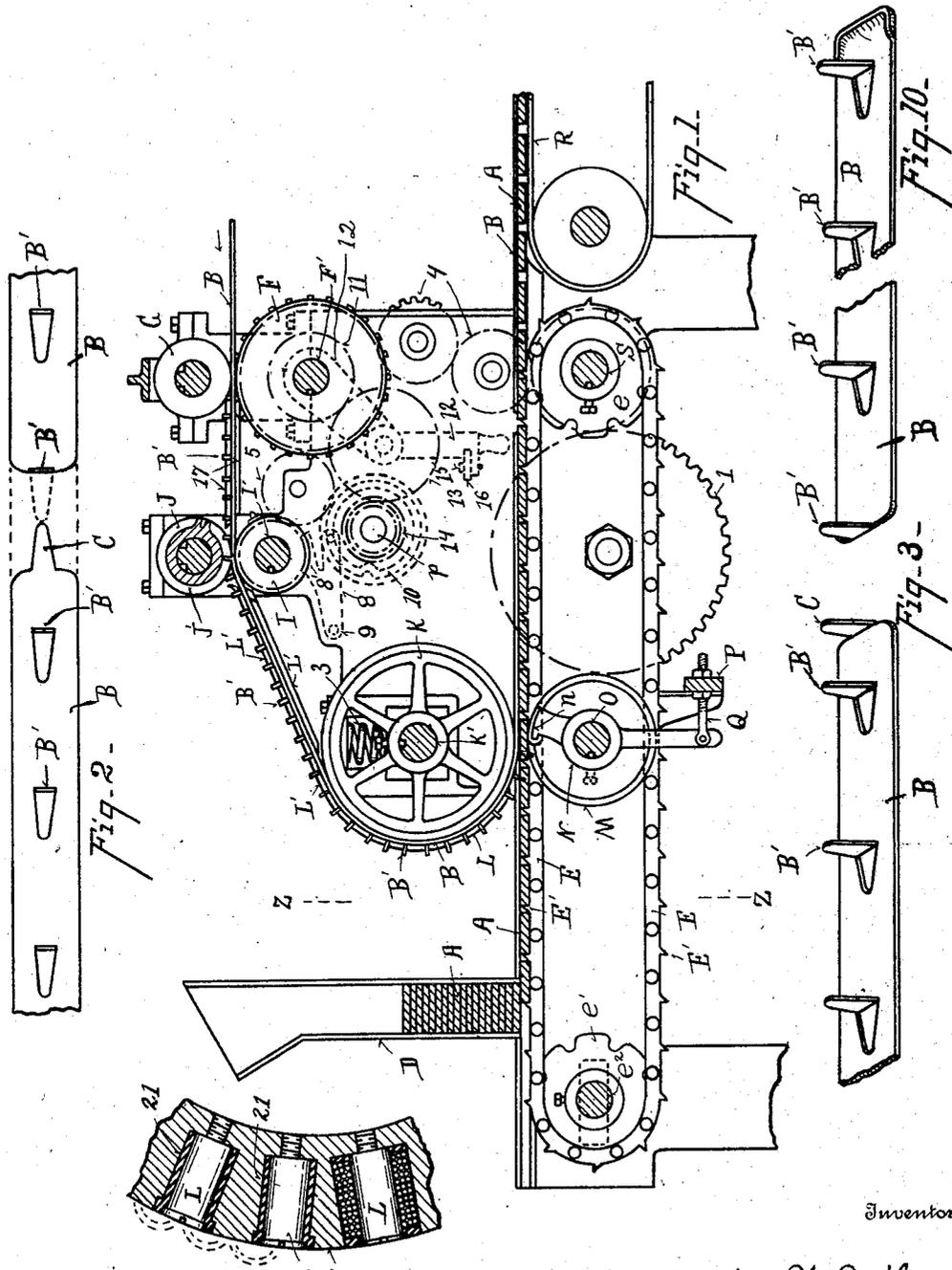


C. W. MILES.
BOX FORMING MACHINE.
APPLICATION FILED NOV. 9, 1901.

NO MODEL.

3 SHEETS—SHEET 1.



Inventor

Casper W. Miles

Witnesses

J. V. Sayre
Edwin Pendergast

Fig. 4.

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3 SHEETS—SHEET 2.

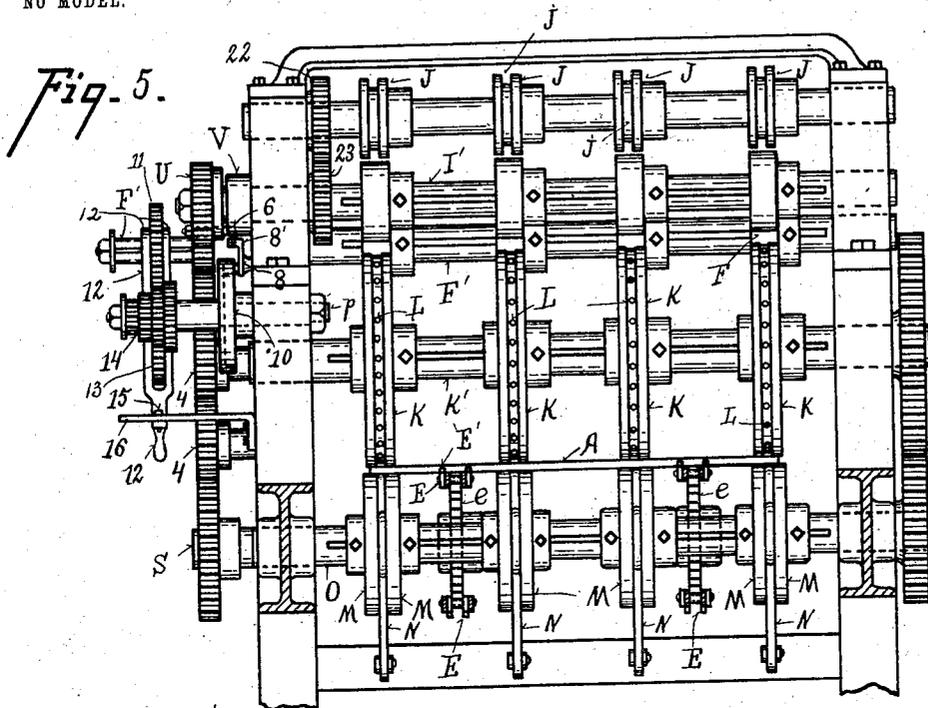


Fig. 5.

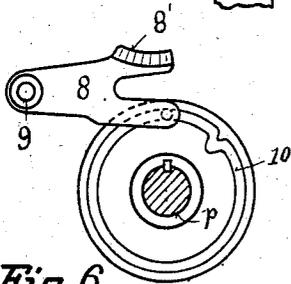


Fig. 6.

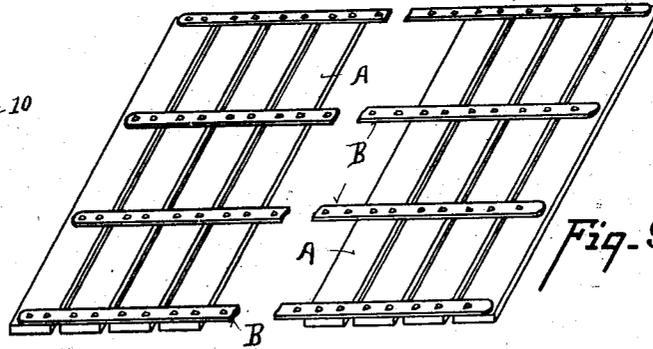


Fig. 9.

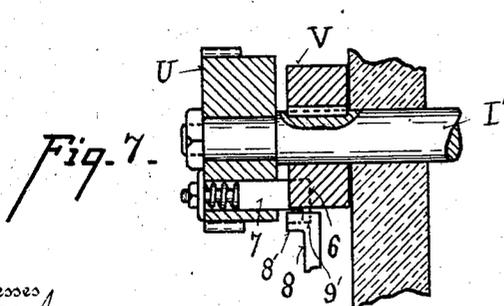


Fig. 7.

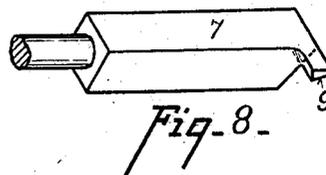


Fig. 8.

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3 SHEETS—SHEET 3.

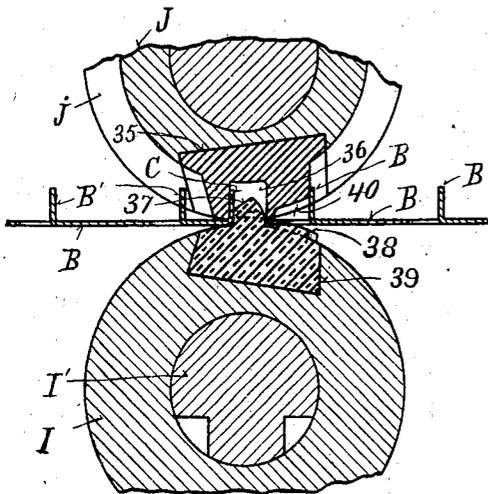


Fig. 11.

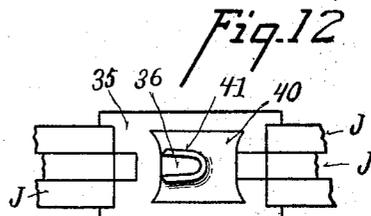


Fig. 12

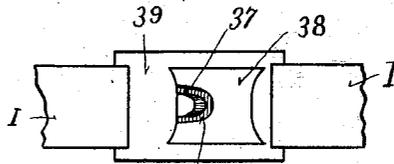


Fig. 13

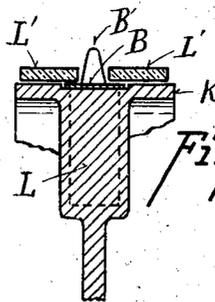


Fig. 14.

Inventor

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Witnesses

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UNITED STATES PATENT OFFICE.

CASPER W. MILES, OF CINCINNATI, OHIO, ASSIGNOR TO WILLIAM S. STUCKENBERG, OF INDIANAPOLIS, INDIANA.

BOX-FORMING MACHINE.

SPECIFICATION forming part of Letters Patent No. 732,769, dated July 7, 1903.

Application filed November 9, 1901. Serial No. 81,697. (No model.)

To all whom it may concern:

Be it known that I, CASPER W. MILES, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Box-Forming Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in box-forming machines. One of its objects is to provide improved mechanism for forming the shoos composing the bottom, sides, and top of packing-boxes and for binding the several slats or boards composing the same together by means of metal bands.

Another object is to provide improved means for clenching over the tongues which bind the metal bands to the slats and for feeding the bands and slats during the clenching operation.

Another object is to provide improved means for automatically severing the metal bands into suitable lengths to form the shoos and to trim the ends or form tongues at the extreme ends of the bands which serve to bind the ends of the bands to the slats of the shook, so as to prevent the projection of sharp corners or rough ends, which would be liable to injure the workmen in handling the same.

Another object is to provide improved mechanism whereby the cut-off mechanism may be set to cut off bands of varying lengths, according to the size of box which it is desired to make.

It also consists in certain details of form, combination, and arrangement, all of which will be more fully set forth in the description of the accompanying drawings, in which—

Figure 1 is a central longitudinal section through the machine. Fig. 2 is a diagram in plan view showing the preferred manner of severing the bands into sections of proper length to form a shook. Fig. 3 is a perspective view of the respective ends of the bands and the teeth formed thereon. Fig. 4 is a detail section through one of the band-feeding wheels. Fig. 5 is a cross-section through the machine on line $z z$ of Fig. 1. Fig. 6 is a de-

tail view of the tripping-lever and cam. Fig. 7 is a sectional detail of the clutch for driving the cut-off mechanism. Fig. 8 is a perspective view of the clutch-pawl. Fig. 9 is a perspective view of a completed shook. Fig. 10 shows a modification of Fig. 3. Fig. 11 is a central vertical section through the band-severing rolls and dies in the act of severing the band. Figs. 12 and 13 are plan views of the respective severing-dies. Fig. 14 is a detail sectional view through the band-feeding rolls and guides.

The mechanism illustrated is designed to form shoos to be used for the bottom, sides, and top of packing-boxes, said shoos being composed of a series of slats or boards A, which are firmly bound together into a composite whole by means of metal bands B, which are secured to the slats at short intervals by means of tongues B', formed integral with the bands, and which pass through the slats and are clenching upon the opposite side thereof, the shook and ends of the box being shipped in knockdown form and put together whenever desired for use.

D represents the slat-hopper; E, chain belts having teeth E', by means of which the slats are severally and regularly fed from the hopper. The chains are supported upon sprocket-wheels $e e'$, the sprockets e' being loose upon the shaft e^2 , which is adjustable to tighten the chain.

The metal bands are first fed between the punch-rolls F G, which strike up the teeth B' at regular intervals. The bands then pass between the cut-off rolls I J, which are normally at rest, but which at appropriate intervals are caused to revolve a single revolution at a time in order to cut the bands into proper lengths to form the shoos and to trim the ends and form the tooth C at the ends of the bands. The bands then pass over the rolls K, being held in place thereon by means of magnets L, assisted by the guides L', whereby the bands are delivered in contact with the upper face of the slats upon the chain belts and the teeth of the bands are caused to perforate the slats, which are supported on the under side opposite the rolls K by means of the rolls M. In order that the rolls K may grip the slats, they are slightly recessed in the

center to receive the bands. The rolls K M assist the chain in feeding the slats during the act of clenching.

N represents clenching-bars which are mounted loosely upon the shafts O between the rolls M, the lower ends being held to the cross-bar P by means of the eyebolts Q. The upper ends of the clenching-bars are provided with steel shoes n, which bear against the under side of the slats as they are gripped between the rolls K M and slide on the under side of the slats, so as to clench over the ends of the teeth and to bed them into the under face of the slats. The shooks thus formed are preferably delivered onto the belt R and fed by means of belts or rolls direct to the drying-room and are then ready for use. By severing the bands before applying them to the slats, so that the ends of the bands will not project beyond the end slats of the shook, the ends of the bands are closely attached to the end slats of the shook, the shooks are delivered separately, and no sharp corners or rough edges are left projecting to injure the workmen in handling the shooks or boxes.

The machine is preferably driven from a belt-pulley on the shaft S, from which motion is transmitted by means of idler-gear 1 to the shaft O, which is in turn geared to drive the shaft K' of the rolls K. The journal-boxes of the shaft K' are preferably held down with a yielding pressure by means of springs 3. The rolls F and shaft F' are driven from the shaft S through intermediate gears 4.

U represents a clutch member mounted loosely upon the shaft I', which clutch member U is continuously driven through intermediate gear 5 from the gear-driving shaft F' and should be arranged so as to drive the rolls I J at the same peripheral speed as the rolls F.

V represents a clutch member keyed to the shaft I' and provided with a notch 6, adapted to be engaged by the spring-pawl 7, carried by the clutch member U.

8 represents a lever pivoted at 9 and provided with a lug 8', adapted to lie normally in the path of the lug 9' on the pawl, so as to retract the pawl and prevent it from engaging with the notch in the clutch member V.

10 represents a cam on shaft p, controlling the movements of the lever 8, so as to retract it at appropriate intervals from the path of the pawl to permit the pawl to engage and turn the rolls I J and to return the lever 8 again to normal position after the rolls I J have made one revolution. The cam 10 is revolved by means of a gear 11, splined to the outer end of the shaft F' and adapted to slide laterally thereon.

12 represents a bifurcated lever pivoted on the shaft F' and carrying between its divided arms a gear 13, which by sliding the lever and gears 11 13 along the shaft F' is adapted to engage any one of a cone of gears 14 on the shaft p, thereby imparting a rela-

tively faster or slower movement to the cam 10, which causes the clutch to be tripped and the rolls I J to be revolved at shorter or longer intervals to cut the bands into longer or shorter sections according to the length of shook required, the dies of the rolls I J being preferably arranged to cut the band between two adjacent teeth of the band, as indicated in Fig. 2. The handle end of the lever 12 is adapted to be locked by means of a pin 15 to a bracket 16 to hold the gears in engagement. The lever 12 is a bent lever, which has its bifurcated end pivoted on the shaft F' on opposite sides of the gear 11. At the bend of the lever is a small shaft on which is journaled the gear 13, while the lower free end of the lever is adapted to be locked to the arm 16, so as to hold the gear 13 in mesh with one of the gears 14, as shown in Figs. 1 and 5.

The upper rolls J have an annular recess except at the point where the dies are located to permit the passage of the teeth B'. The size of rolls K is such that the forward end of the band-sections come in contact with the slats before the rear end of the band-sections are severed, thereby insuring a steady and regular feed of the band-sections. The guides 17, which are preferably strips of non-magnetic material on opposite sides of the projecting teeth B' of the band-sections, serve to guide the bands from the rolls F G to the rolls I J, and the guides L', as shown in Fig. 14, conduct them to the rolls K and hold them in contact therewith and against lateral displacement.

In Fig. 4 I have shown in detail the magnets L, which serve to hold the band-sections upon the rolls K. They are preferably permanent magnets, as shown in the upper portion of Fig. 4, and are provided with non-magnetic sleeves 21. If desired, however, electromagnets such as shown in the lower portion of Fig. 4 may be employed.

22 23 represent gears for driving the rolls I J in unison.

In Figs. 11, 12, 13 I have illustrated one form of dies and the manner of severing the band into sections. As shown in Fig. 11, the projection 37 of the male die 39 enters a recess 36 in the opposite die 35, thereby forming the tooth C. The slightly-raised face 38 of the male die enters a corresponding recess 40 in the face of the opposite die to sever the band and trim off the corners, as indicated in Fig. 2. 41 represents the edge for cutting the tongue C, which is flush with the face of the roll J, and 42 represents a recess in the raised face 38 to receive the same. Other forms of dies may be used, depending on the style of cut desired.

The several punching, severing, and feeding rolls and clenching-bars are adapted to be adjusted laterally upon their shafts to form boxes of different sizes.

If desired, the tooth C may be omitted from the end of the band and the severed ends of the band concaved, as shown in Fig. 10, or

otherwise trimmed, so as to present no sharp points or rough edges, the end teeth B' in that case serving to hold the end of the band-section in close contact with the slats.

5 By arranging the band-severing rolls so as to sever the bands into sections before applying the bands to the slats I am enabled to cut the bands shorter than the slat portion of the
10 shooks and to prepare the ends of the bands so as to securely attach them to the end slats, and thereby avoid the projection of any sharp corners or rough edges which might injure the workmen in handling the shooks or boxes.

Having described my invention, what I
15 claim is—

1. In a box-forming machine, band-feeding rolls adapted to feed the bands onto the slats, and to insert the teeth of the bands through
20 the slats; clenching-bars bearing on the opposite side of the slats in the path of the teeth; and rolls at the side of the clenching-bars adapted to coact with the band-feeding rolls in feeding the slats forward over the
25 clenching-bars.

2. In a box-forming machine, a slat-feeding chain; band-feeding rolls; means for supporting the bands upon said rolls; clenching-bars bearing on the slats on the opposite side from
30 the band-feeding rolls; and rolls located at the side of the clenching-bars adapted to support the slats and feed them forward.

3. In a box-forming machine, a slat-feeding chain; band-feeding rolls; clenching-bars bearing on the opposite sides of the slats from
35 the band-feeding rolls, and supporting and feeding rolls at the sides of the clenching-bars.

4. In a box-forming machine, in combination with band-feeding rolls, clenching-bars,
40 and slat supporting and feeding rolls; an intermittently-operated mechanism adapted to sever the bands into sections of proper length to form the shooks previous to applying the bands to the slats.

5. In a box-forming machine, rolls adapted to form teeth at regular intervals upon the metal bands; a slat-feeding chain; band-feeding rolls, and an intermittently-operated
45 mechanism located between the band-feeding rolls and the teeth-forming rolls to sever the bands into sections of appropriate lengths to form the shooks before applying the bands to the slats.

6. In a box-forming machine, rolls adapted
55 to form teeth at regular intervals upon the bands; and an intermittently-operated mechanism adapted to receive the bands direct from the teeth-forming rolls, and to sever them into sections of appropriate length to

form the shooks before applying the bands to
60 the slats.

7. In a box-forming machine, an intermittently-operated mechanism adapted to sever the bands into sections of appropriate lengths to form the shooks, and to trim and turn in
65 the severed ends of the bands before applying the bands to the slats.

8. In a box-forming machine, an intermittently-operated mechanism adapted to sever the bands into sections of appropriate lengths
70 to form the shooks before the bands are applied to the slats; and means for changing the interval of movement of said severing mechanism in order to sever the bands into sections of varying lengths as required for
75 boxes of different sizes.

9. In a box-forming machine, in combination with band-feeding rolls, clenching-bars, and slat supporting and feeding rolls; an intermittently-operated mechanism adapted to
80 sever the bands into sections, and to trim and turn in the severed ends of the band-sections previous to applying the bands to the slats.

10. In a box-forming machine, in combination with a slat-feeding chain and means for
85 clenching the teeth of the bands; band-feeding rolls provided with magnets adapted to hold the bands upon the periphery of the band-feeding rolls.

11. In a box-forming machine, in combination
90 with a severing device adapted to sever the bands into sections of proper length to form the shooks; band-feeding rolls provided with magnets adapted to hold the severed band-sections on the rolls while they are being
95 fed in contact with the slats to form the shooks.

12. In a box-forming machine, rolls adapted to form teeth at intervals upon the bands; mechanism for severing the bands into sections
100 of the proper length to form the shooks before applying them to the slats; rolls adapted to feed the severed band-sections in contact with the slats to form the shooks; and means for holding the severed band-sections
105 in contact with said band-feeding rolls.

13. In a box-forming machine, band-feeding rolls provided with magnets adapted to hold the band-sections upon the rolls while being
110 fed in contact with the slats; clenching-bars upon the opposite side of the slats from the bands, and slat supporting and feeding rolls.

In testimony whereof I have affixed my signature in presence of two witnesses.

CASPER W. MILES.

Witnesses:

JOS. J. SCHORR,
HARRY MORETON.