H. SHAPIRO.

FOLDING MACHINE.

APPLICATION FILED FEB. 23, 1918.

1,305,748.

Patented June 3, 1919.

2 SHEETS—SHEET 1.

Fig. 1.

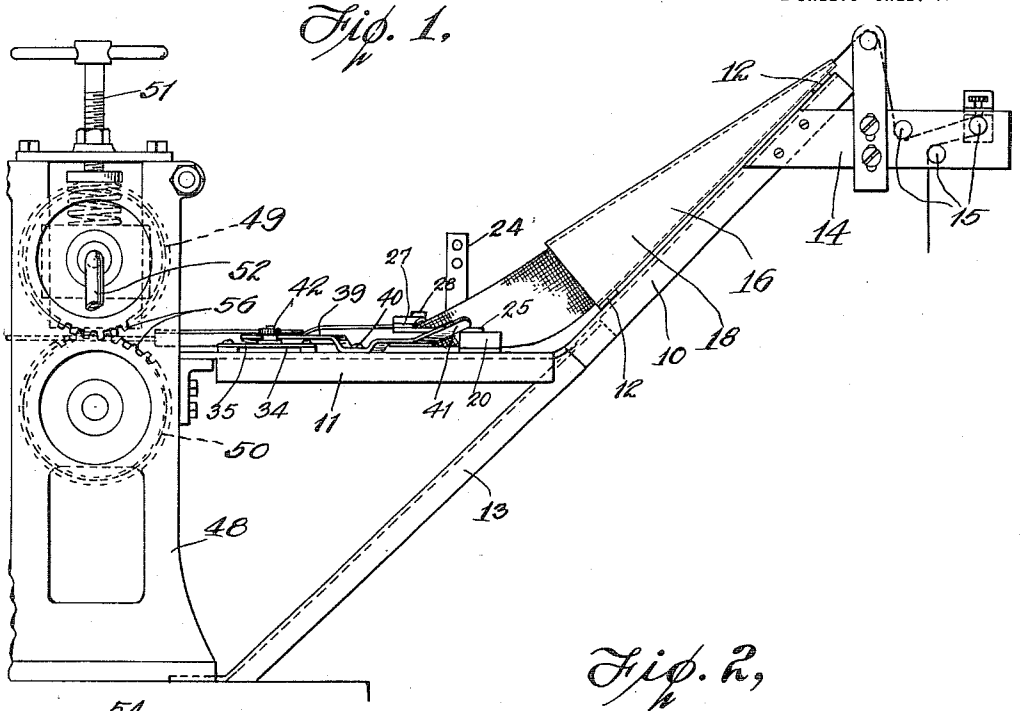
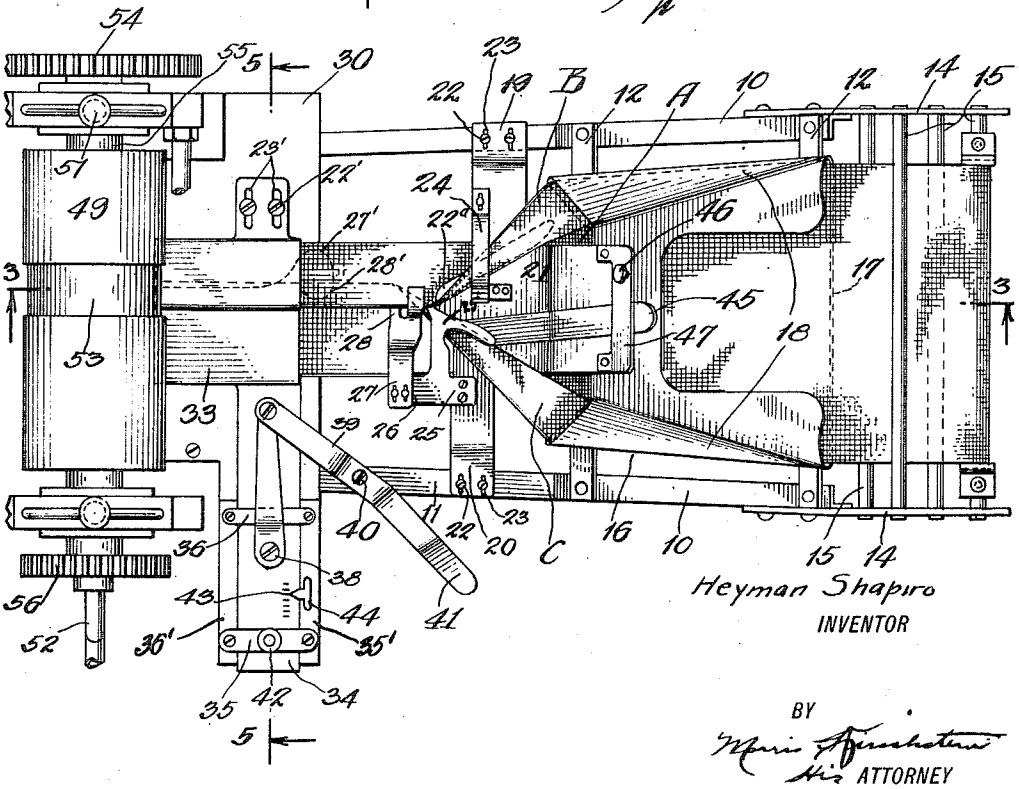


Fig. 2.



Heyman Shapiro

INVENTOR

BY

His ATTORNEY

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2 SHEETS—SHEET 2.

Fig. 3,

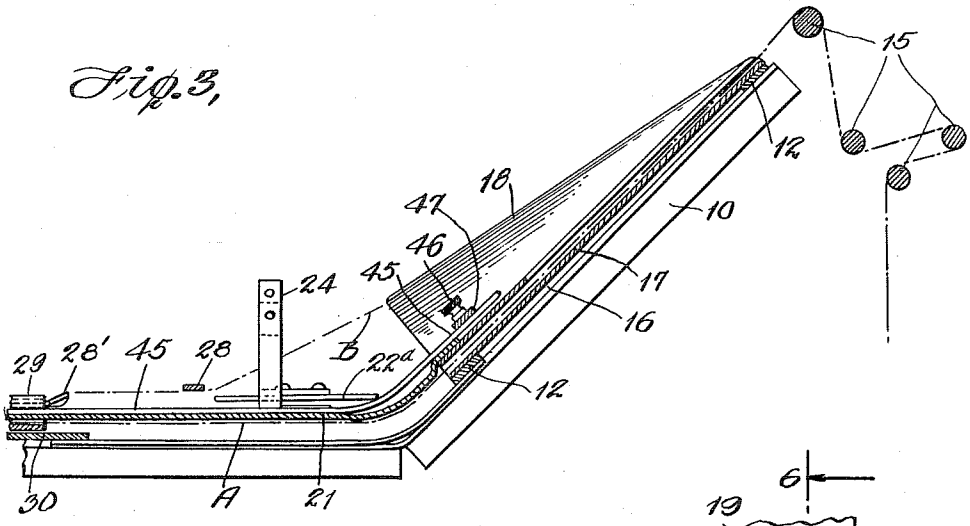


Fig. 4,

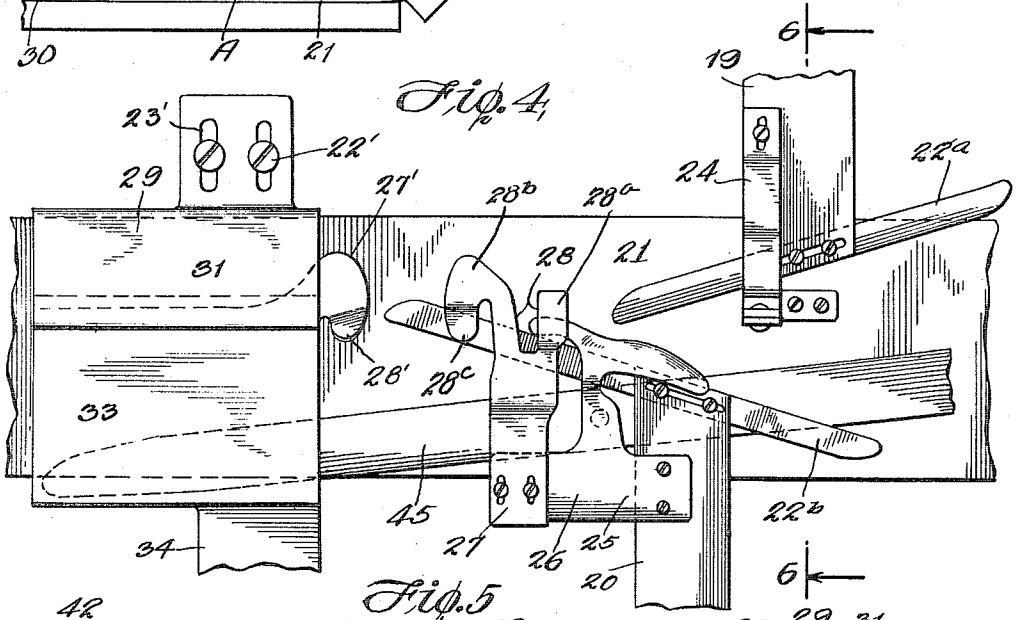


Fig. 5

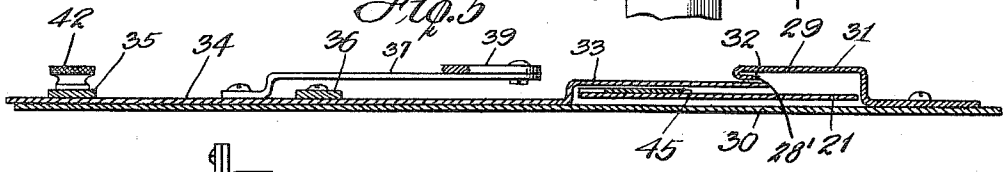
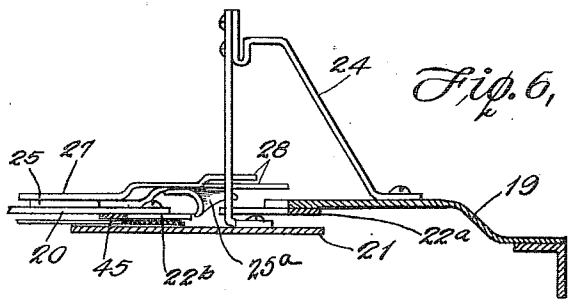


Fig. 6,



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UNITED STATES PATENT OFFICE.

HEYMAN SHAPIRO, OF BROOKLYN, NEW YORK.

FOLDING-MACHINE.

1,305,748. Specification of Letters Patent. Patented June 3, 1919.

Application filed February 23, 1918. Serial No. 218,695.

To all whom it may concern:

Be it known that I, HEYMAN SHAPIRO, a citizen of the United States, and resident of the borough of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Folding-Machines, of which the following is a specification.

This invention relates to folding machines and is directed particularly to a machine for folding material such as cloth into bands of desired width having overlapping sides.

One object of my invention is to provide a machine of the character described which shall be adapted to continuously fold material paid out from a roll into a band of desired width.

Another object is to provide a machine of this character which shall be adapted also to fold the cloth with the sides overlapping to any desired amount.

A further object of this invention is to provide a machine of this character which shall be adapted to fold the cloth in the desired manner and also to press it after folding so that it may retain the shape given it, the means for pressing the band serving at the same time to draw the material through the machine.

A still further object of this invention is to provide a machine of the character described which may be power-driven so that its output and efficiency may be increased.

A still further object of this invention is to provide a machine of the character described with means for automatically folding the cloth as it is paid out from the roll.

A further object is to provide a machine of the character described with means for adjusting the width of the cloth or the amount of overlapping of the sides.

A still further object of this invention is to provide a machine of the character described which is simple in construction and efficient in its operation.

Further objects and advantages of this invention will appear from the detailed description, and the features of novelty will be particularly pointed out in the claims.

In the drawings forming a material part of this specification,

Figure 1 is a side elevation of the machine with the material passing into the machine;

Fig. 2 is a plan view;

Fig. 3 is a section taken along line 3—3 of Fig. 2;

Fig. 4 is an enlarged detailed plan view of part of the folding apparatus;

Fig. 5 is a section taken along line 5—5 of Fig. 2; and

Fig. 6 is a section taken along line 6—6 of Fig. 4.

Referring in detail to the drawings, the machine embodying my invention there shown is seen to consist of two parts, viz., the folding apparatus and the pressing apparatus. These parts are disposed in coöperative relation to each other and their operations are coördinated to afford a continuously operating machine in which the folding and pressing operations go on uniformly and smoothly.

The folding apparatus consists of a frame comprising the inclined supports 10, the horizontal side pieces 11 and the cross bars 12. The frame is supported by the brace bar 13 as shown. The inclined supports 10 have secured thereto an extension 14 which carries the rollers 15. The folding mechanism proper is seen to consist of an inclined guide member 16 having a flat bottom 17 and vertical side members 18 upstanding therefrom. These side members 18 increase in height from the upper end of the guide, as will be clear from the drawings. The guide is preferably made in one piece out of sheet metal, but may of course be made in separate pieces if desired. Secured at one end to the side pieces 11 are the plates 19 and 20 in staggered relation to each other. It will be noted that these plates are attached to the side members by means of bolts 22 passing through elongated slots 23 so that they may be adjusted laterally. A horizontal guide tongue 21 is secured adjacent the lower end of the folding guide and the material on leaving the folding guide 16 passes underneath this guide tongue to be acted upon by the folding guides 22^a, 22^b disposed as shown obliquely to each other and adjustably secured to the other ends of the horizontal plates 19 and 20. The guide tongue 21 thus serves in the first instance to gage the width of the band and to provide the former over which the material may be folded to provide the overlapping sides thereof. Adjustably mounted on the plate 19 is the bracket 24 which serves as a gateway for one of the upfolded sides of the

band and attached to the plate 20 and the horizontal support 21 is the guide finger 25. The particular function and operation of this guide finger will now be described. As will be clear from the drawing, referring especially to the Figs. 4 and 6, this guide finger is formed with a horizontal supporting member 26 whereby it is secured at one end of the latter to the plate 20. The main guide portion upstands from this horizontal support and comprises an oblique head 25′ curved downward as at 25ª in Fig. 6 and as clearly shown by the shading in Fig. 4. The guide portion of this guide finger thus comprises a curved gateway or passage through which one side of the band passes the wall 25ª serving to keep that side of the band from contact with the other side so that they may not interfere with each other in the folding process, the material being curved down and away from the other side of the band in conformity with the curved wall 25ª. This guide finger 25 is disposed obliquely so that the side of the band guided thereby is forced toward the other side of the band and underneath the same. To the other end of the horizontal support 26 is adjustably secured another guide finger 27 having a head 28 forked as at 28ª and 28ᵇ.

The folding apparatus is further provided with a box member 29 comprising a base 30, one fixed side piece 31 made adjustable by the bolts 22′ and slots 23′, having its end infolded as at 32 and a movable side piece 33 which may be adjusted relative to the side piece 31 to provide for varying widths of the folded band. The adjustment of the side piece 33 of the box member may be accomplished in any suitable manner. In the drawing, the means for this adjustment is shown to consist of a plate 34 secured to or integral with the side piece 33. This plate is made movable laterally underneath two holding pieces 35 and 36 attached to the side guides 35′ and 36′. A link 37 is secured at one end to the plate 34 as by means of the screw 38. At the other end of this link is secured the link 39 which is pivoted to the side piece 11 as at 40, and the lever 41 may thus be manipulated to impart lateral motion to the plate 34.

When the width of the box member has been thus properly adjusted the plate 34 is fixed in position by means of the thumb screw 42. A scale 43 and an indicator 44 may be provided for the various desired adjustments as to width of the band. To further insure that the desired width will be maintained as provided by the latter adjusting means, I provide the knife 45 which may be suitably pivoted on the horizontal guide tongue 21 so that it may be manipulated to bring its lower portion against the wall of the adjustable side of the box member. The knife is then clamped in position by means of the thumb screw 46 mounted on the cross piece 47 to be held therebetween and the plate 21. When the cloth is hemmed, the guide piece 27′ having an enlarged head 28′ serves to guide the band and keep it smooth and even as it enters the box member, said enlarged head resting on the inner side of the flap extending from the hem.

The pressing apparatus consists simply of a vertical frame 48 in which are mounted upper and lower calender rolls 49 and 50. A tensioning device 51 may be provided to regulate the pressure between these rolls. The upper roll 49 is hollow and may be supplied with gas for heating through the pipe 52. The upper roll is further formed at its center with a contracted portion or groove 53 to allow for the extra thickness of the cloth at the overlapping portions of the band or for the hemmed edges. It must be remembered that the pressing is required principally at the edges of the band and the contracted portion of the roll further helps serve this purpose. The power for driving the calender may be applied to the gear 54 mounted on the drive-shaft 55 and the motion may be transmitted to the rolls by means of the mesh gears 56.

The operation of the machine will now be clear. The cloth may be paid out from a roll (not shown) to the rolls 15 from which it passes into the guide member 16. In this guide member the flat piece of cloth is now made to conform to the shape of the guide member so as to have a flat bottom portion and tapering side portions upturned from the bottom. The cloth thus passes with the flat bottom portion A underneath the horizontal guide tongue 21 and under the branch 28ª of the guide piece 27 and over the branch 28ᵇ thereof. The latter, it will be noted, is formed with a hooked portion 28ᶜ for the same purpose as the member 28′. This hooked portion and this member 28′ rest on the inner side of the flap extending from the hem as the band passes into the box member, thus coöperating with each other in guiding the folded band smoothly and evenly into said box member. The other side portion C is acted upon by the other folding guide 22ᵇ and passes underneath the curved portion 25ª of the guide piece 25 being thus kept from interfering with the side portion B as the band is being drawn through the machine in the folding operation. It will be noted that the folding guide 22ᵇ extends almost clear up to the box member and the side portion C is thus being flattened thereby until it is about to enter this member. The folding guide 22ª, however, need not extend so far inasmuch as the side B is properly guided along in the folding operation by the member 27 and the branches 28ª and 28ᵇ thereof. The band

with the sides B and C now completely flattened passes into the box member where the overlap and width thereof are adjusted as desired by the mechanism and the operations hereinbefore described. The complete folded band of desired width and lap now passes between the calender rolls and issues from the machine in pressed form. It will be noted that the friction of the calender rolls is at the same time utilized to draw the material over the rolls 15 through the machine. In this way the machine is constantly fed with the flat material which eventually issues as the pressed folded band with overlapping sides.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A folding machine adapted to fold material into a band comprising a folding guide adapted to fold the cloth upward on each side thereof, means for folding down said upfolding sides and means for preventing said sides from interfering with each other as they emerge from said folding guide, said means comprising a guide finger having an overturned head portion serving to form a spacing member whereinto one of said sides passes and adapted to curve said side away from the other side of the band.

2. A folding machine adapted to fold material into a band with overlapping sides comprising means for folding the cloth upward on each side thereof to provide the overlapping sides of the band means for folding down said sides of the band, means for guiding one side of the band underneath the other side, means for adjusting the width of the band and the degree of overlap and means for preventing the sides of the band from interfering with each other during the folding operation, and guiding means adapted to rest in the flap of the hem of the band to help keep the latter smooth and even in passing through the machine.

3. A folding machine adapted to fold material into a band comprising means for folding the material upward on each side thereof, means for folding down said upfolded sides, means for guiding one of said upfolded sides under the other upfolded side, and means permitting the latter upfolded side to pass over said underfolded side, means for adjusting the degree of overlap of said folded sides, means for drawing the material through the folding machine and simultaneously pressing the sides of the band, and adjustable means coöperating with said first-mentioned overlap adjusting means for maintaining said adjusted overlap prior to the pressing operation.

4. A folding machine adapted to fold material into a band with overlapping sides, comprising a folding guide adapted to fold the cloth upward on each side thereof to provide the overlapping sides of the band, guide fingers adapted to fold these upstanding sides down over each other, a box member into which the folded band may pass, means for adjusting the width of said box member, and means for adjusting the width of said band to correspond to said box width.

5. A folding machine adapted to fold material into a band with overlapping sides, comprising a folding guide adapted to fold the cloth upward on each side thereof to provide the overlapping sides of the band, guide fingers adapted to fold these upstanding sides down over each other, a box member into which the folded band may pass, means for adjusting the width of said box member, means for adjusting the width of said band to correspond to said box width, and means for maintaining the width of said band as adjusted.

6. A folding machine adapted to fold material into a band with overlapping sides comprising a folding guide adapted to fold the cloth upward on each side thereof to provide the overlapping sides of the band, guide fingers adapted to fold these upstanding sides down over each other, a box member into which the folded band may pass, means for adjusting the width of said band to correspond to said box width, and means for pressing the edges of said band in folded position, said means serving also to draw the material through the machine.

7. A folding machine adapted to fold material into a band with overlapping sides, comprising a frame, a folding guide mounted on said frame, said guide having two side pieces adapted to fold the material upward on each side thereof to provide the sides of the band, a horizontal tongue, folding guide pieces disposed obliquely to each other and adapted to fold these upstanding sides down and guide fingers held on the frame adapted to guide one side of the band underneath the other side to form the overlap.

8. A folding machine adapted to fold material into a band with overlapping sides comprising a frame, a folding guide mounted on said frame, said guide having two side pieces adapted to fold the material upward on each side thereof to provide the sides of the band, a horizontal tongue, folding guide pieces adapted to fold these upstanding sides down and guide fingers held on the frame adapted to guide one side of the band underneath the other side to form the overlap, and a gate-way for the other side of the cloth through which it may pass to overlap said first mentioned side.

9. A folding machine adapted to fold material into a band with overlapping sides comprising a frame, a folding guide mounted on said frame, said guide having two side pieces adapted to fold the material upward

on each side thereof to provide the sides of the band, a horizontal tongue, folding guide pieces adapted to fold these upstanding sides down, and guide fingers held on the frame adapted to guide one side of the band underneath the other side to form the overlap, one of said guide fingers having a forked head to guide one side of the material over the other to form the overlap.

10. A folding machine adapted to fold material into a band with overlapping sides, comprising a frame, a folding guide mounted on said frame, said guide having two side pieces adapted to fold the material upward on each side thereof to provide the sides of the band, a horizontal tongue, folding guide pieces adapted to fold these upstanding sides down, an oblique guide finger held on the frame adapted to guide one side of the band underneath the other side to form the overlap, and a gate-way for the other side of the material through which it may pass to overlap said first mentioned side, and a guide finger having a forked head whereby the side of the cloth passing through the gate-way is guided between the branches of the fork while the side of the material passes through the oblique guide finger and is guided thereby and one of said folding guide pieces underneath said first-mentioned side.

11. A folding machine adapted to fold material into a band with overlapping sides comprising a frame, a folding guide mounted on said frame, said guide having two side pieces adapted to fold the material upward on each side thereof to provide the sides of the band, a horizontal tongue, folding guide pieces adapted to fold these upstanding sides down and guide fingers held on the frame adapted to guide one side of the band underneath the other side to form the overlap, and an adjustable box member into which the folded band passes.

12. A folding machine adapted to fold material into a band with overlapping sides comprising a frame, a folding guide mounted on said frame, said guide having two side pieces adapted to fold the material upward on each side thereof to provide the sides of the band, a horizontal tongue, folding guide pieces adapted to fold these up standing sides down and guide fingers held on the frame adapted to guide one side of the band underneath the other side to form the overlap, an adjustable box member into which the folded band passes, and a knife adapted to be manipulated to adjust and keep adjusted the width of the band to correspond to the adjusted width of the box member.

13. A folding machine adapted to fold material into a band with overlapping sides comprising a frame, a folding guide mounted on said frame, said guide having two side pieces adapted to fold the material upward on each side thereof to provide the sides of the band, a horizontal tongue, obliquely disposed folding guide pieces adapted to fold these upstanding sides down, guide fingers held on the frame adapted to guide one side of the band underneath the other side to form the overlap, an adjustable box member into which the folded band passes, and a knife adapted to be manipulated to adjust and keep adjusted the width of the band to correspond to the adjusted width of the box member, and means for pressing the band and drawing it through the machine.

14. A folding machine adapted to fold material into a band with overlapping sides comprising a frame, a folding guide mounted on said frame, said guide having two side pieces adapted to fold the material upward on each side thereof to provide the sides of the band, a horizontal tongue, folding guide pieces adapted to fold these upstanding sides down and guide fingers held on the frame adapted to guide one side of the band underneath the other side to form the overlap, an adjustable box member into which the folded band passes, and a knife pivoted on said tongue and adapted to be manipulated to adjust and keep adjusted the width of the band to correspond to the adjusted width of the box member, and means for pressing the band and drawing the material through the machine to deliver the folded band.

15. In a folding machine of the character described the combination of a folding guide, folding guide pieces and guide fingers, a box member of adjustable width comprising a base, one fixed side piece and an adjustable side piece, and means for moving said side piece relative to the fixed side piece.

16. In a folding machine of the character described the combination of a folding guide, folding guide pieces and guide fingers, a box member of adjustable width comprising a base, one fixed side piece and an adjustable side piece, said adjustable side piece having an extension adapted to be moved laterally and a lever held on said extension to impart said lateral motion.

17. In a folding machine of the character described the combination of a folding guide, folding guide pieces and guide fingers, a box member of adjustable width comprising a base, one fixed side piece and an adjustable side piece, said adjustable side piece having an extension adapted to be moved laterally and a lever held on said extension to impart said lateral motion, and a knife operable within said box member adapted to adjust and keep adjusted the width of the material to correspond to the width of the box member.

18. A folding machine adapted to fold material into a band with overlapping sides

comprising a frame, a folding guide mounted on said frame adapted to fold the material upward on each side thereof to provide the sides of the band, a horizontal tongue adapted to gage the width of the band, folding guide pieces adapted to fold down these upstanding sides, guide fingers held on the frame adapted to guide one side of the band underneath the other to form the overlap, one of said guide pieces having a hooked head, a box member into which the folded band passes and a guide piece in said box member having a hooked head projecting therefrom, the latter and the hooked head of said first-mentioned guide finger adapted to rest in the flap of the hem of the band to cooperate in keeping the latter smooth and even as it passes into said box member.

Signed at New York in the county of Kings and State of New York, this 16th day of February, A. D. 1918.

HEYMAN SHAPIRO.

Witnesses:
A. T. JACOBS,
MAX J. SHAPIRO.