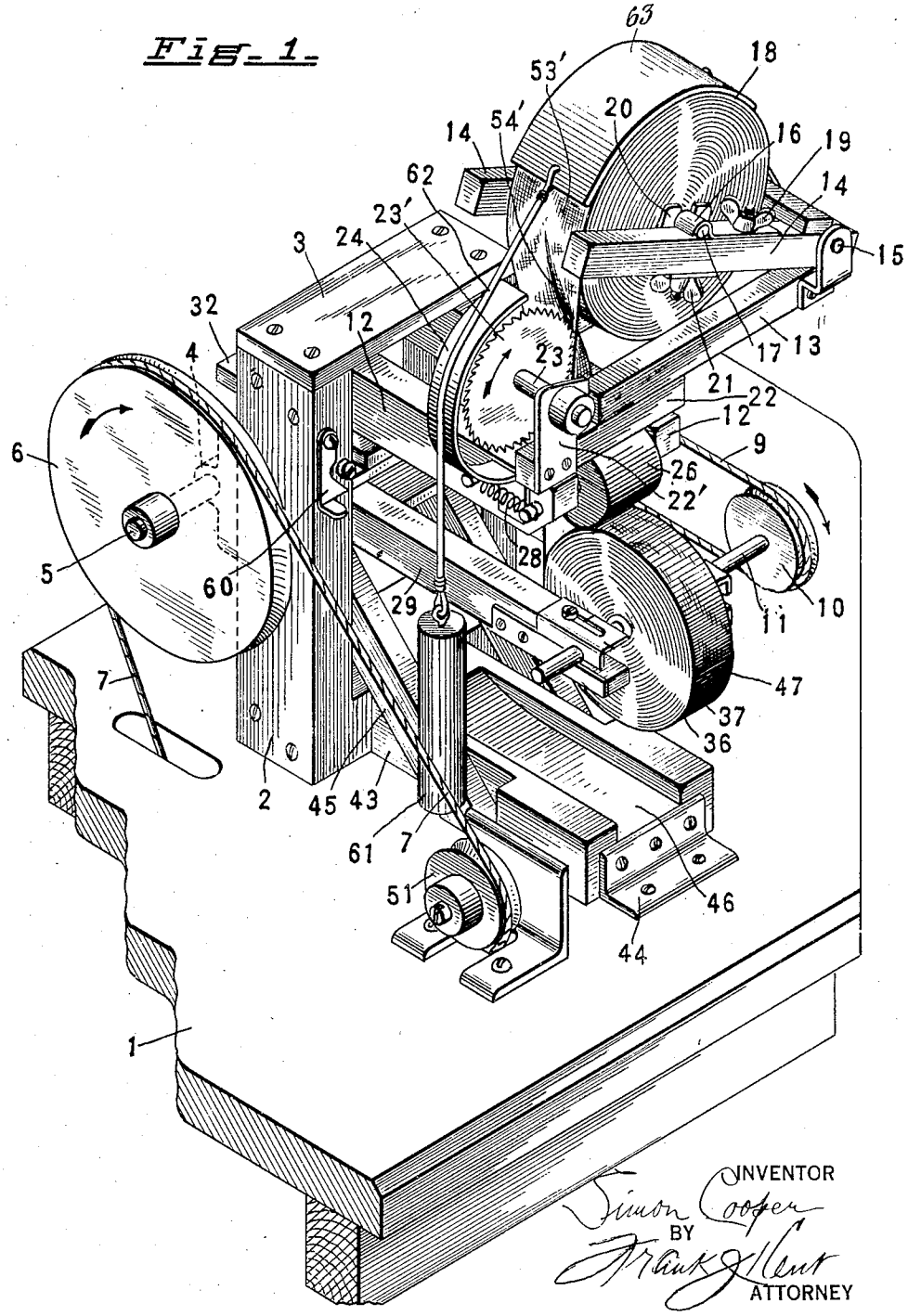
June 10, 1930. S. COOPER 1,762,612

CLOTH FOLDER

Original Filed Aug. 11, 1925 4 Sheets-Sheet 1

Fig. 1.



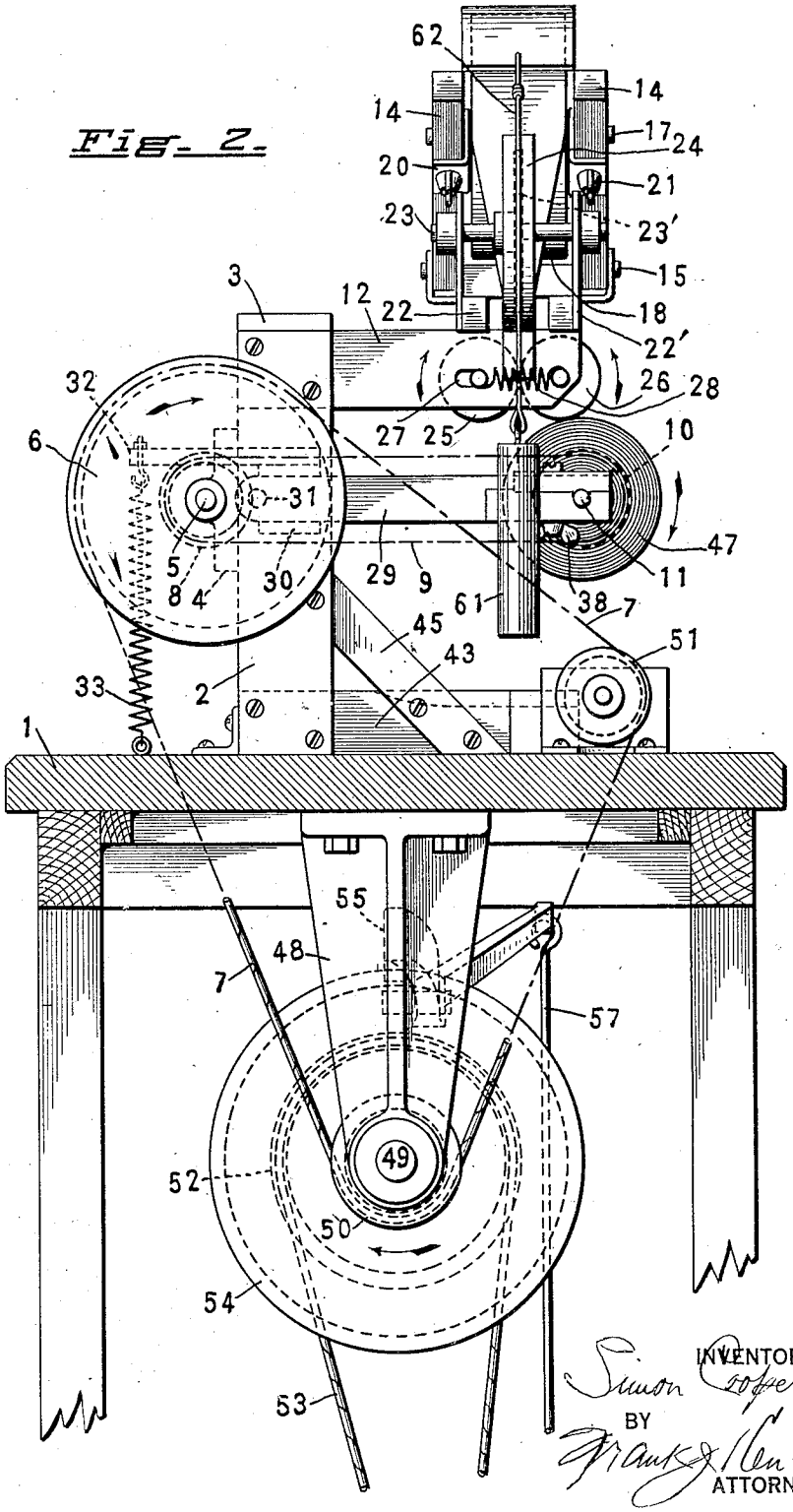
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CLOTH FOLDER

Original Filed Aug. 11, 1925 4 Sheets-Sheet 2

Fig. 2.



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Original Filed Aug. 11, 1925 4 Sheets-Sheet 3

Fig. 3.

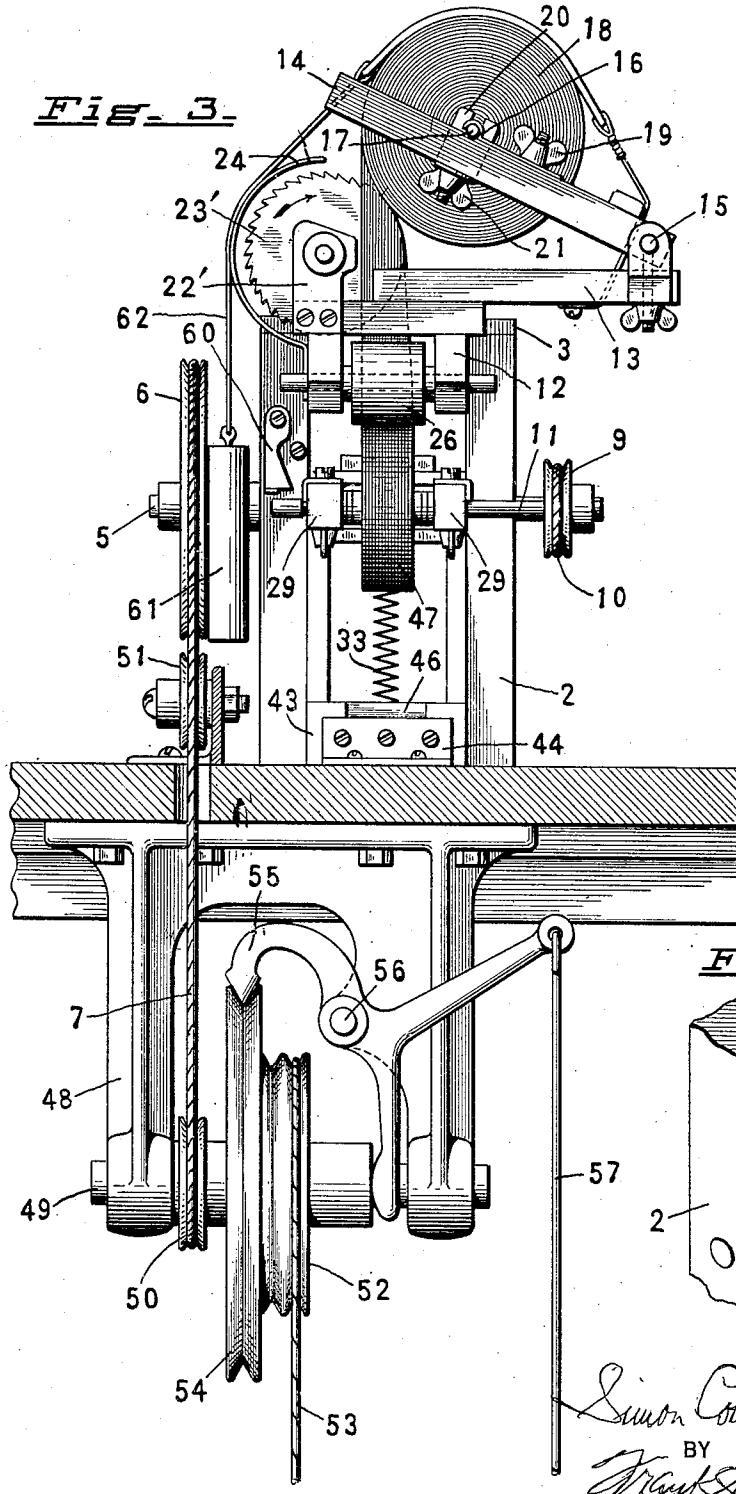
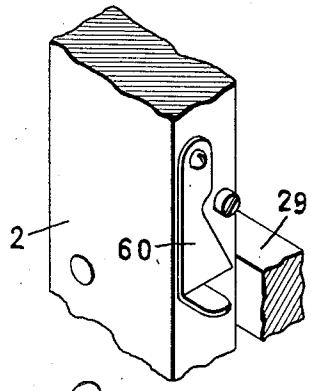


Fig. 4.



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CLOTH FOLDER

Original Filed Aug. 11, 1925 4 Sheets-Sheet 4

Fig. 5.

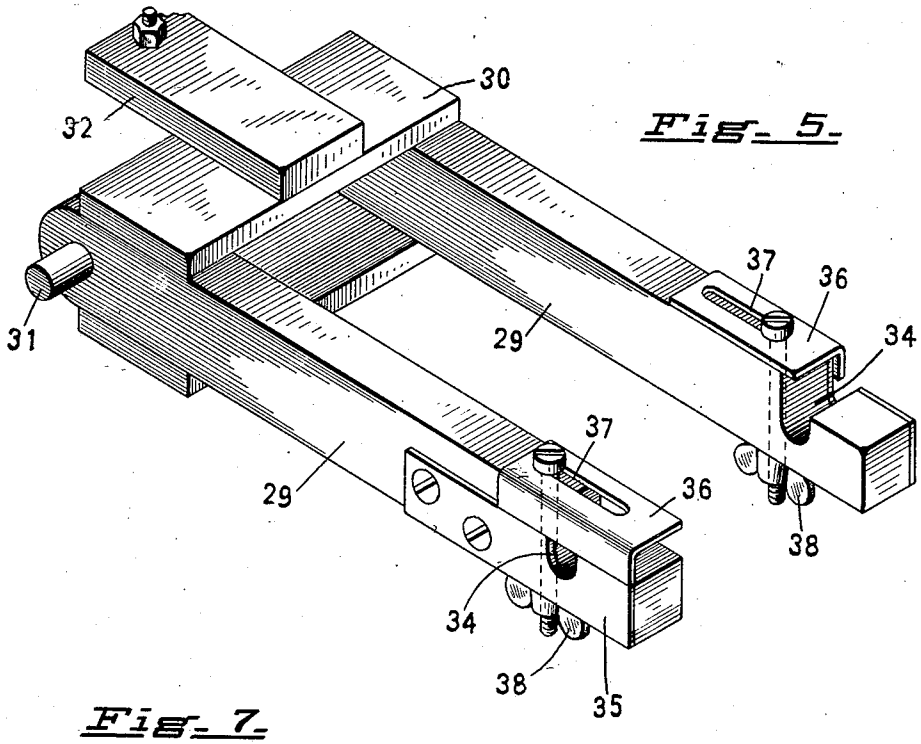


Fig. 7.

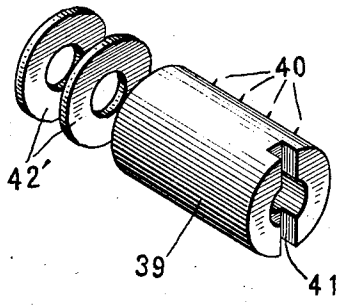
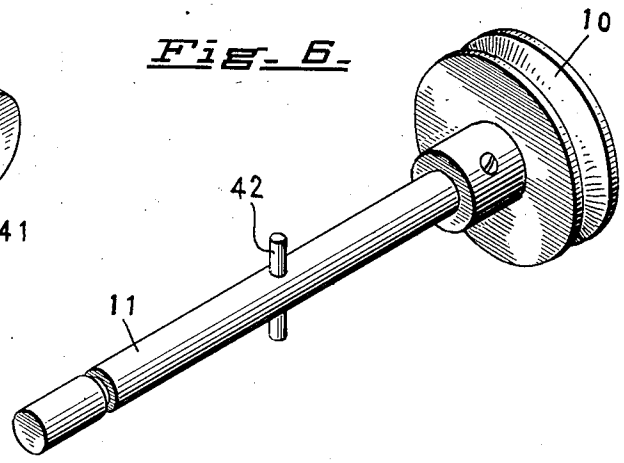


Fig. 6.



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UNITED STATES PATENT OFFICE

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CLOTH FOLDER

Application filed August 11, 1925, Serial No. 49,664. Renewed January 24, 1928.

This invention relates to a machine for holding sheet material and more particularly to a machine for folding loosely woven fabrics as well as a process or method for performing the folding operation.

In the art of folding textile material such as cheese-cloth, hospital gauze, or similar material having a loosely woven texture, the folding devices ordinarily used in folding cloth are not applicable because of the flimsiness and tendency to crumple which is inherent in the loosely woven material. It is a general object of the present invention to provide a folding machine which will operate effectively on loosely woven materials such as have been referred to.

The invention provides for the controlling of the material while in rolled or coiled condition and includes means for initiating the folding or creasing operation before the material has become wholly disengaged from the roll from which it is drawn through the folding means.

The folding means consists of a toothed disk mounted on an axis parallel to the axis of the feed roll and arranged to engage the periphery of the feed roll at a point to produce the desired line of fold in the material which leaves the roll at the point of engagement of the toothed folding disk therewith. A pair of guiding rollers mounted closely adjacent to the toothed disk and at right angles thereto completes the folding action initiated by the toothed disk and folds the strip against the opposite faces of the toothed disk as it is drawn from the roll. A rewinding shaft deceives the folded strip and serves to draw the strip through the folding device.

Other features of the invention will be hereinafter referred to.

In the drawings, in which a preferred embodiment of the invention has been selected for illustration,

Figure 1 is a perspective view of a cloth folding machine embodying the invention.

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

Figure 3 is a view in front elevation of the machine shown in Figures 1 and 2.

Figure 4 is a detail view showing a latch used in the invention.

Figure 5 is a view in perspective of a winding roll supporting yoke forming part of the invention shown in Figure 1.

Figure 6 is a perspective view of a winding mandrel used in the invention.

Figure 7 is a perspective view showing in detail a winding core adapted to cooperate with the winding mandrel shown in Figure 6.

Referring to the drawings for a more detailed description of the invention, at 1 is shown a platform or table adapted to form a support for upright frame members or standards 2 which are bridged at their upper ends by a plate 3 to provide a supporting framework for the various parts of the machine. The upright frame members 2 are provided on their rear faces with bearing members 4 in which a horizontally extending shaft 5 is journaled for rotation. The shaft 5 carries at one end a drive pulley 6 over which a belt 7 passes to transmit power to the shaft 5 and thereby drive the working parts of the machine.

The other end of the drive shaft 5 is provided with a small pulley 8 around which a belt 9 passes and extends to a pulley 10 on a winding shaft 11 hereafter referred to. In the upper part of the framework provided by the upright members 2 there is mounted a pair of supporting bars 12 which extend forward from the uprights 2 to provide a support for a pair of laterally extending bars 13 and connected by suitable cross pieces to form a supporting framework for a pair of roll supporting arms 14 having a pivoted connection at 15 with the outer ends of the bars 13. The arms 14 are provided with bearing members 16 which can be lifted from their positions in order to pass the shaft 17 of a feed roll 18 thereunder. Wing nuts 19 are provided for holding the bearing members 16 in place. Notched bearing members 20 are also provided for assisting the bearing members 16 in holding the shaft 17 in position. Wing nuts 21 are provided for holding the bearing members 20 in position.

A pair of cross bars 22 carried by the outer ends of the frame members 12, and to which the inner ends of the transverse bar 13 are attached, provide also a support for a pair of bracket members 22′ which provide bearing supports for a shaft 23 carrying a toothed rotary folding disk 23′. A guard member 24 attached to one of the supporting bars 12 is spaced from and follows the edge of the toothed folding member 23′ to obviate contact of the hands of the operator with the folding disk.

Journaled in the forward ends of the supporting bars 12 is a pair of cylinders 25 and 26 formed of rubber or similar material, the roller 25 being journaled in slots 27 in the bars 12 to provide for a limited movement of the roller 25 with relation to the roller 26 in order to accommodate different thicknesses of material therebetween. A spring 28 attached to the ends of the shafts on which the rollers 25 and 26 are carried tends to pull the roller 25 into engagement with the roller 26 to thereby compress the material passing between the roller.

The rewinding shaft 11, which has been previously referred to, is removably mounted in the ends of the arms 29 of a yoke member 30 pivoted at 31 on the uprights 2. The yoke 30 is provided with a rearwardly extending bar 32 between the outer end of which and the table 1 is stretched a spring 33 for normally elevating the ends of the bars 29 which carry the rewinding shaft 11.

The outer ends of the bars 29 are provided with bearing notches 34 and are reinforced by plates 35 attached to the outer faces of the bars. Sliding latch members 36 have a pin and slot connection 37 with the upper surfaces of the bars 29 and can be moved into and out of position to lock the rewinding shaft 11 therein. Wing nuts 38 provide means for locking the latch members 36 in position to hold the shaft in place in the notches 34.

The rewinding shaft 11 is arranged to receive a core member 39 provided with pin points 40 to engage and hold the end of a strip of material which it is desired to wind upon the core. The core member is provided at one end with a diametrically extending slot 41 adapted to engage with a transversely extending pin 42 in the rewinding shaft 11 to thereby cause the core member to rotate with the shaft. Suitable washers 42′ may be interposed between the ends of the core member 39 and the inner faces of the supporting yoke bars 29 to center the core member and cause it to run steadily in operation.

A base member 43 is attached at one end to the table member 1 by means of the angle piece 44 and at the other end to the base portions of the uprights 2. Diagonally extending brace members 45 assist in the insuring of rigidity to the supporting parts. A groove 46 in the top of the base member 43 serves to receive a rewinding roll 47 on the core member 39 and to permit the downward movement of the yoke bars 29 in the winding of the roll 47.

Attached to the under surface of the table 1 is a hanger or bearing support 48 in which a shaft 49 carrying a drive pulley 50 is journaled. The belt 7 already referred to passes about the pulley 50 and turns over an idle pulley 51 to the drive pulley 5 already referred to. A pulley 52 on the shaft 49 receives power through a belt 53 from any suitable source and a brake pulley 54 is arranged to be engaged by a brake member 55 pivoted at 56 on the bracket 48 and manually controlled through a rod 57 leading to a treadle or other device mounted for convenient manipulation by the operator.

In the operation of the device described, a roll of material 18 is placed on the shaft 17, the roll being centered with relation to the toothed disk 23′ through the adjustable bearing members 16 and 20. The end of the strip of material is then passed downwardly along the edge of the toothed disk 23′ and is folded against the sides of the disk and passed between the guide rollers 25 and 26 in its folded condition. The folded strip is then attached to the points 40 on the core member 39 which is supported by the rewinding shaft 11.

It will be noted that the rewinding shaft 11 is mounted in position in the outer ends of the yoke bars 29, a latch member 60 being moved into engagement with the upper surface of one of the bars to hold the core member from moving upward into engagement with the guide roller 26 under the pull of the spring 33. A brake member 63 of leather or canvas is held in contact with the roll 18 by a weight 61 attached to the brake member by a flexible element 62. The brake puts the strip of fabric under slight tension and prevents overrunning of roll 18.

When the strip has thus been threaded through the parts the machine is set into operation whereupon the rewinding shaft 11 is rotated to draw the strip through the machine, the toothed disk 23′ operating to initiate the fold as at 54′ at the point where the strip 53′ leaves the feed roll 18. It will be seen that the strip is fully controlled throughout the folding operation and at no time is there an uncontrolled stretch of material out of contact with either a roll or the toothed disk itself. The control thus exercised is fully effective for the purpose and the initial folding crease 54′ invariably follows the desired line after the roll 18 has been adjusted with relation to the

toothed disk 23′ against which the periphery of the roll 18 rests in operation.

It will be obvious that the rewinding roll 47 will increase in size at a greater rate than the feed roll 18 diminishes in size so that when the rewinding roll has reached its maximum size the operator stops the operation of the machine and removes the rewound roll 47 and severs the strip for reattachment to a substitute core member 39 which is slipped into place on the rewinding shaft 11.

While I have shown the folded strip passing directly to the rewinding roll 47, I contemplate also the feeding of the folded strip directly to a sewing machine for stitching the free edges together to produce a tubular fabric preparatory to the making of the ultimate articles, such as tea bags, therefrom. In thus feeding the folded strip directly to the sewing machine, I preferably locate the folding mechanism closely adjacent to the sewing machine in order that the feeding mechanism of the sewing machine may actuate the folding mechanism by drawing the strip of material therethrough.

In practice it has been found that the method of folding a strip of fabric by maintaining the fed roll in peripheral contact with the rotatable toothed or serrated disk and in leading the cloth partly around the periphery of the disk, the plies of the folded strip will pass out of engagement with the folding disk and engage each other without the formation of objectionable creases or secondary folds therein.

I claim:—

1. That method of folding sheet material which consists in unwinding the material from a roll while the roll of material is in peripheral contact with the edge of a fold-initiating rotatable disk whereby a fold is initiated without creasing the material.

2. In a device for folding sheet material, a rotatable disk, means for supporting a roll of sheet material in peripheral contact with the edge of the disk, and means for drawing the material from the roll to cause it to fold across the edge of the disk.

3. In a device for folding sheet material, a rotatable disk having a serrated edge, means for supporting a roll of material in peripheral contact with the edge of the disk, a pair of parallel guide rollers having their axes at right angles to the axis of rotation of the disk and arranged to draw the material along a portion of the edge of the disk to thereby fold the same.

4. In a device for folding sheet material, a rotatable disk having a serrated edge, means for supporting a roll of material in peripheral contact with the edge of the disk, a pair of parallel surfaces located substantially in the plane of the disk and between which the material is led to fold the same across the edge of the disk, and means for rewinding the folded material, said means serving to draw the material through the folding device.

5. In a device for folding loosely woven fabric, a rotatable disk having a serrated edge, means for supporting a roll of fabric in peripheral engagement with the edge of the disk to thereby establish the line of fold as the strip is unwound from the roll.

6. In a device for folding cloth, a rotatable disk having a serrated edge, means for supporting a roll of fabric in peripheral engagement with the edge of the disk, means for drawing the strip from the roll at the point of contact of the disk therewith to thereby initiate a fold in the strip, and a pair of parallel surfaces between which the strip is drawn to complete the folding thereof.

7. In a device for folding cloth, a rotatable disk, means for supporting a roll of cloth in peripheral engagement with the edge of the disk, friction means for drawing the strip from the roll by exerting a steady pull thereon, said means acting to draw the strip from the roll at the point of contact of the disk therewith to thereby initiate a fold in the strip, and a pair of parallel surfaces between which the strip is drawn to complete the folding thereof.

8. In a device for folding cloth, a rotatable disk, means for supporting a roll of cloth in peripheral engagement with the edge of the disk, means for adjusting the roll axially to thereby vary the point of contact between the roll and the disk, friction means for exerting a steady pull on the strip to thereby draw the strip from the roll, said means acting to draw the strip from the roll at the point of contact of the disk therewith to thereby initiate a fold in the strip, and a pair of parallel surfaces between which the strip is drawn to complete the folding thereof.

9. In a device for folding sheet material, a rotatable disk having a serrated edge, means for supporting a roll of material with its axis parallel to the axis of the disk and in peripheral engagement with the edge of the disk, and means for drawing the material from the roll and partly around the periphery of the disk, whereby the strip will be folded and the plies of the fold will engage each other.

10. In a device for folding sheet material, a rotatable disk having a serrated edge, means for supporting a roll of material with its axis parallel to the axis of the disk and in peripheral engagement with the edge of the disk, means for drawing the strip partly around the periphery of the disk, and parallel surfaces mounted closely adjacent each other and between which the strip is drawn to consolidate the plies of the fold.

11. In a device for folding sheet material, a rotatable disk having a serrated edge, means for supporting a roll of material with its axis parallel to the axis of the disk and in peripheral engagement with the edge of the disk, means for drawing the strip partly around the edge of the disk to initiate a fold therein, parallel surfaces substantially parallel to the plane of the disk and between which the folded strip is passed from the disk, said surfaces exerting pressure upon the interposed material.

12. In a device for folding sheet material, a rotatable disk having a serrated edge, means for supporting a roll of material with its axis parallel to the axis of the disk and in peripheral engagement with the edge of the disk, parallel surfaces substantially coincident with the plane of the disk and between which the folded strip is passed from the disk, means for causing the parallel surfaces to exert pressure on the interposed strip, and means for drawing the material through the device from the roll.

13. In a device for folding sheet material, a rotatable disk having a serrated edge, means for supporting a roll of material with its axis parallel to the axis of the disk and in peripheral engagement with the edge of the disk, parallel surfaces substantially coincident with the plane of the disk and between which the folded strip is passed from the disk, means for causing the parallel surfaces to exert pressure on the interposed folded strip, and means for drawing the material through the device from the roll, said drawing means acting to rewind the folded material.

14. That method of folding cloth which consists in causing the periphery of a roll of cloth to engage a moving element providing a line along which to bend the cloth, and in so positioning the moving element with relation to the face of the roll as to permit the cloth to fold at opposite sides of said element without the production of wrinkles in the parts folded on each other.

15. That method of folding cloth which consists in unwinding the material from a roll, and in conducting the material along an element having a predetermined position on the periphery of the roll to fold the material thereon without creasing the folded surfaces.

16. That method of folding sheet material which consists in unwinding the material from a roll in peripheral contact with a movable element for determining the line of fold, in causing the folds so produced to move into mutual engagement, and in maintaining a uniform tension in the material during the folding.

17. That method of folding cloth which consists in unwinding the material from a roll, in conducting the material along a rotating element engaging the periphery of the roll to fold the material without creasing along the line of contact with the element, and in adjusting the roll and element during operation.

18. In a device for folding sheet material, a rotatable disk, means for supporting a roll of material in peripheral engagement with the edge of the disk, means for drawing a strip of material from a point between the roll and disk along a section of the periphery of the disk, and means for bending the strip across the edge of the disk and folding the strip against the opposite faces of the disk.

19. In a device for folding sheet material, a freely rotatable disk having a toothed edge, means for supporting a roll of material in peripheral engagement with the edge of the disk, means for drawing a strip of material from a point between the roll and the disk along a section of the periphery of the disk, and parallel rollers arranged to fold the strip against the opposite faces of the disk, the rotation of the disk acting to smooth the plies of the folded strip as the surfaces of the disk are withdrawn from between the plies.

20. That method of folding sheet material which consists in unwinding the material from a roll while the roll of material is in peripheral contact with the edge of a rotating fold-initiating member whereby the fold is initiated without creasing.

21. That method of folding sheet material which consists in unwinding the material from a roll and passing the material through folding members which initiate the fold without creasing the material before the material has left the said roll.

In testimony whereof I affix my signature.

SIMON COOPER.