A. & H. G. MUTSCHLER.

SHEET FOLDING MACHINE.

APPLICATION FILED JUNE 10, 1908.

966,760.

Patented Aug. 9, 1910.

4 SHEETS—SHEET 1.

Fig. 1.

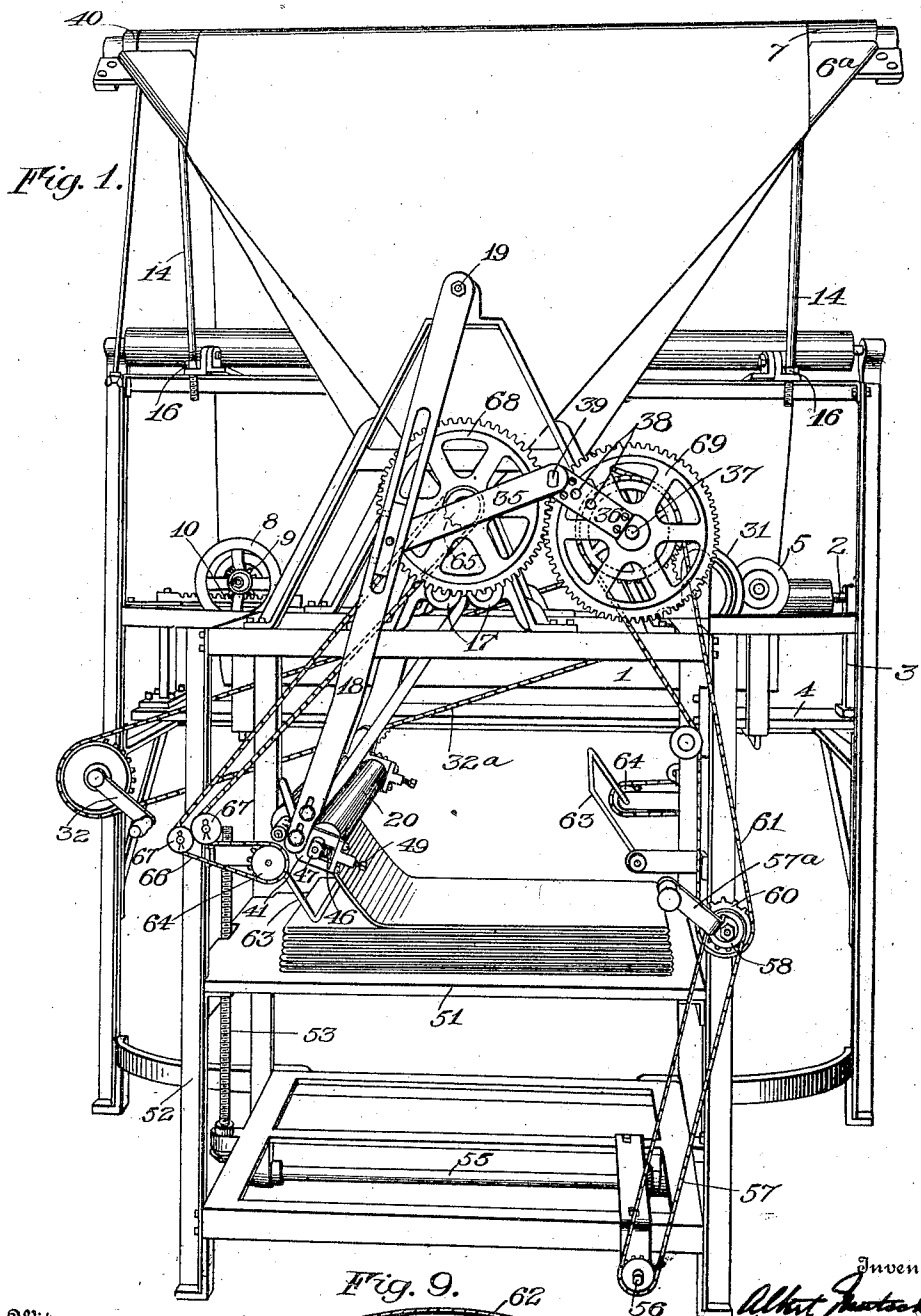

Fig. 9.

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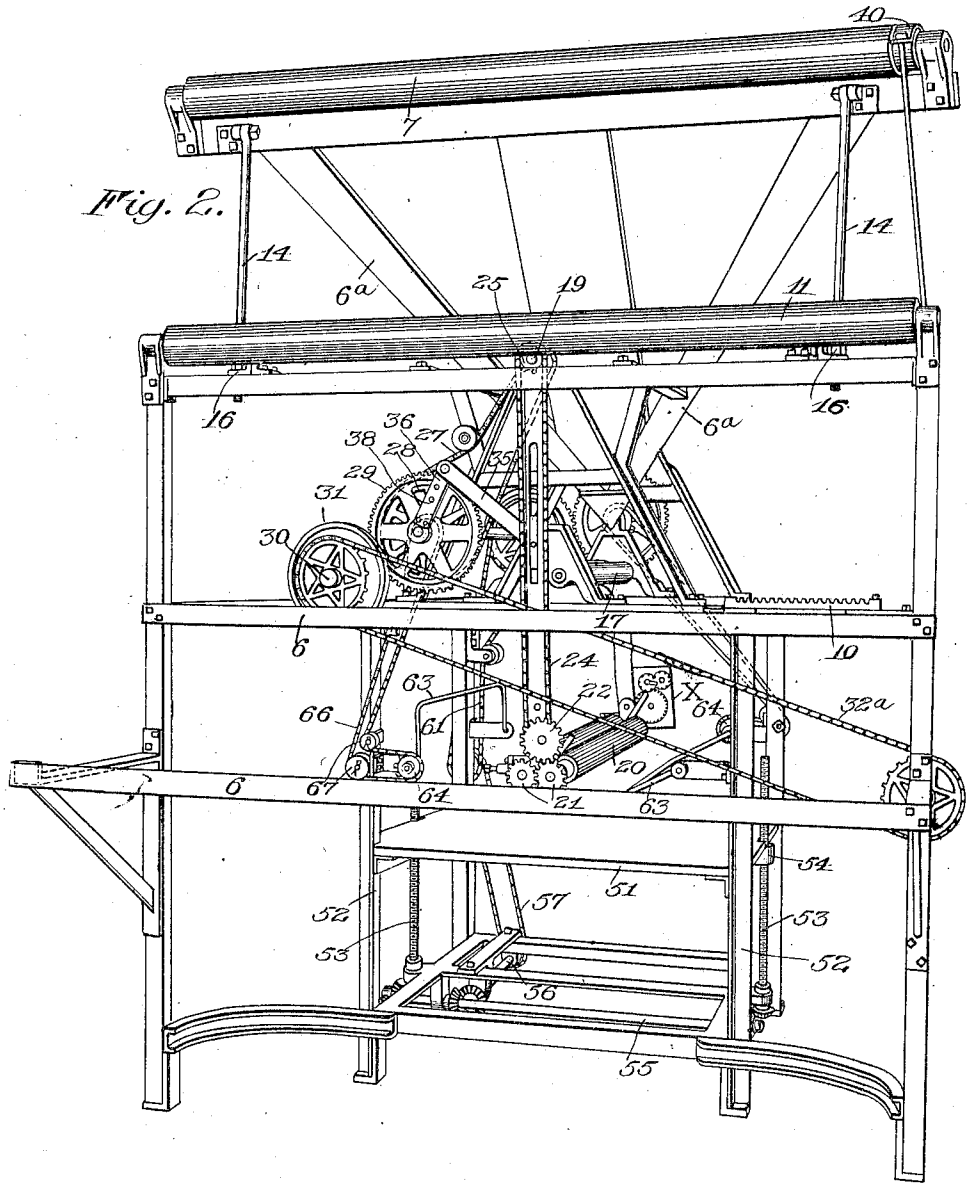
4 SHEETS—SHEET 2.

Fig. 2.



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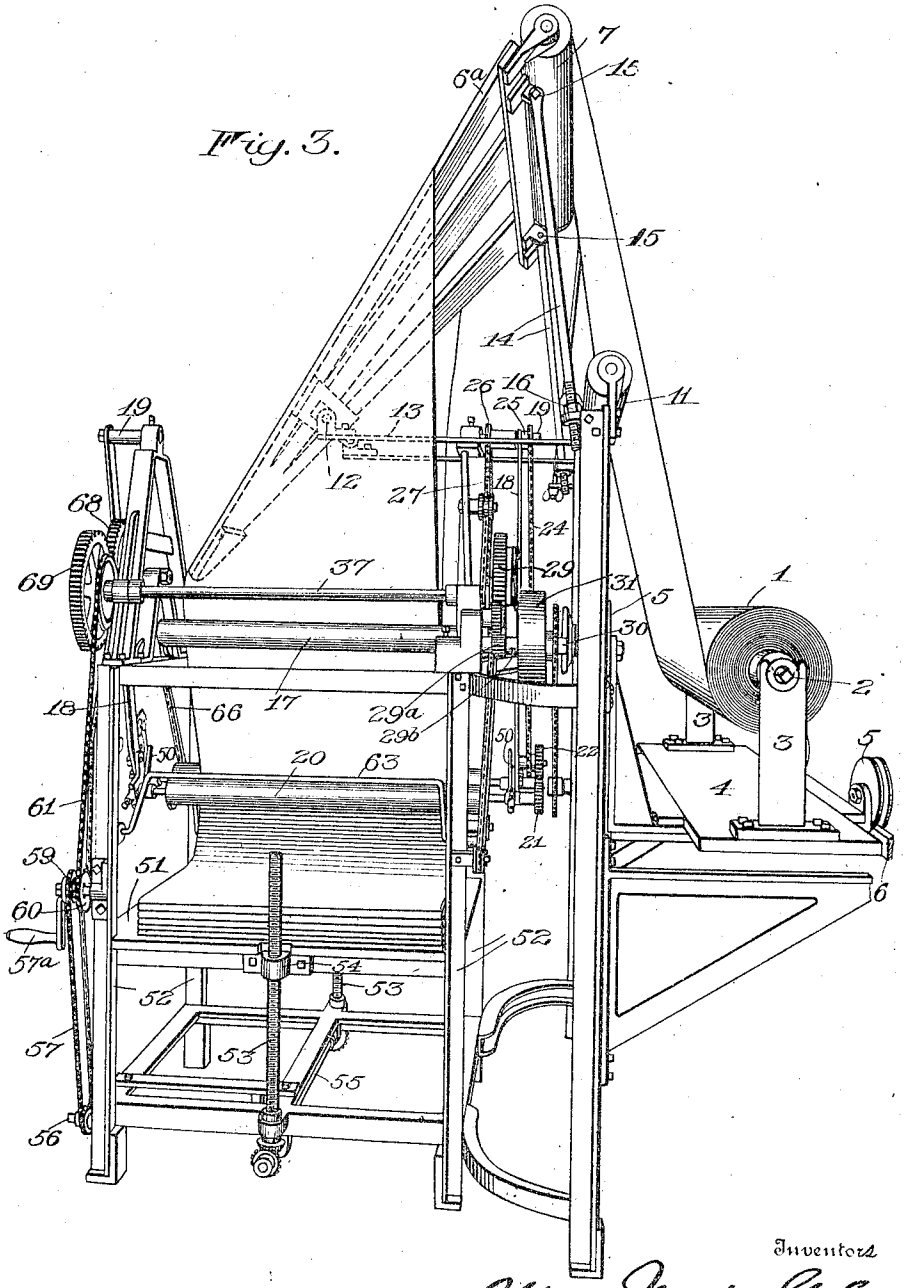
4 SHEETS—SHEET 3.

Fig. 3.



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4 SHEETS—SHEET 4.

Fig. 4.

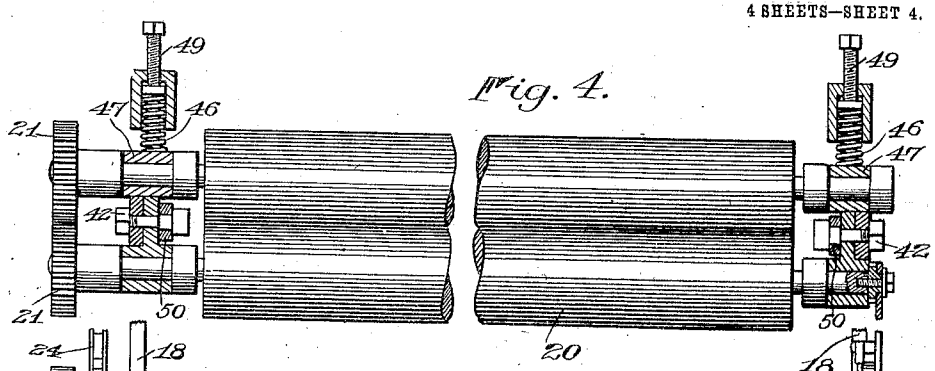


Fig. 5.

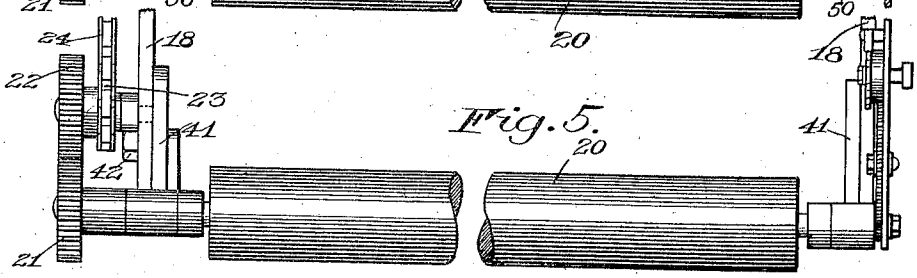


Fig. 6.

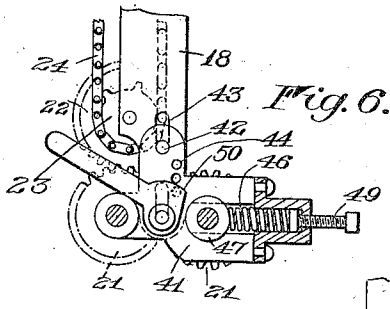


Fig. 7.

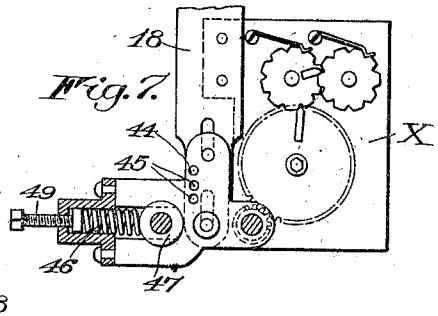
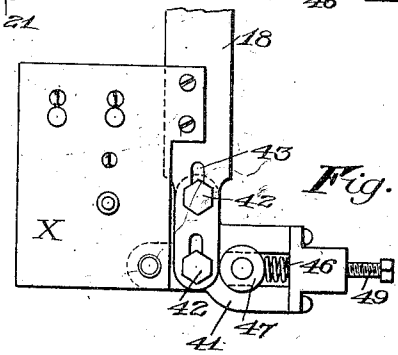


Fig. 8.



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UNITED STATES PATENT OFFICE.

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SHEET-FOLDING MACHINE.

966,760. Specification of Letters Patent. Patented Aug. 9, 1910.

Application filed June 10, 1908. Serial No. 437,657.

To all whom it may concern:

Be it known that we, ALBERT MUTSCHLER and HENRY G. MUTSCHLER, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Sheet-Folding Machines; and we do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the reference-numerals marked thereon.

The present invention relates to sheet folding machines and it has for an object to provide a construction which will fold a sheet longitudinally and then transversely.

To this and other ends the invention consists in certain improvements and combinations of parts all as will be hereinafter more fully described, the novel features being pointed out in the claims at the end of the specification.

In the drawings: Figure 1 is a front perspective view of a machine for folding cloth constructed in accordance with this invention; Figs. 2 and 3 are respectively a rear and a side perspective view of the same machine; Figs. 4 to 8 are detail views of a pair of guide and feed rollers which reciprocate to carry the material back and forth over a support which receives the transversely folded material; and Fig. 9 is a detail view of the support above mentioned.

The invention is herein embodied in a cloth folding machine as all large tailoring establishments and cloth manufacturers desire that cloth which comes from the mill in a roll be first folded longitudinally and then transversely alternately in opposite directions in order that it may be easily handled.

The roll of cloth 1 is usually provided with a spindle 2 and this spindle is supported preferably on brackets 3 having open bearings to receive the projecting ends. The brackets may be mounted on a carriage 4 movable in a direction of the axis of the spindle transverse to the length of the cloth, and the carriage may be provided with wheels 5 which travel on tracks or guides 6 formed on the frame of the machine. The movement of the carriage in this instance is effected by a hand wheel 8 which is journaled on the carriage and operates a pinion 9 that gears with the rack 10 on the main frame.

From the roll carriage the cloth passes to the longitudinal folding mechanism. This mechanism is in this instance arranged above the roll and preferably comprises a frame arranged at an inclination and having converging guides 6^a on opposite sides and an anti-friction roller 7 at the upper end of the guides, the sheet passing upwardly from the roll 1 over a roller 11 if desired to roller 7 and thence downwardly on the guide frame which owing to its gradually decreasing width causes the cloth to drop on opposite sides thereof and produce a longitudinal fold, the extreme end of the frame being pointed to produce a bend in the cloth. Should the cloth drop on one side more than the other the carriage 4 is shifted to move the roll 4 the required distance axially in order to produce an even fold.

The folder frame is preferably mounted so that it may have its inclination changed in order to increase or decrease the friction on the sheet as it passes over the folder. In this instance, it is pivotally supported near its lower end at 12 on arms 13 while its upper end has upright rods 14 pivoted thereto at 15 and adjustably secured at 16 to the main frame of the machine, a band brake 40 or other retarding device being employed if desired to act on roller 7 to prevent the latter rotating too freely.

The longitudinal folding mechanism preferably delivers the cloth to a pair of rollers 17 arranged on the main frame in a horizontal position so that they extend transversely of the cloth, these rollers serving to crease the cloth at the longitudinal fold and to hold the two sections together in order that they may be folded transversely. The cloth preferably is now folded transversely alternately in opposite directions so that a bundle is formed, arranged in layers. This arrangement permits the tailor to rest the bundle on a table and to take from the top as he needs it without disturbing the whole bundle. A preferred method of effecting this transverse fold is to provide a reciprocatory mechanism or distributer, movable transversely of the path of the cloth beneath rollers 17 and in this instance comprising a swinging frame embodying a pair of links or arms 18 having their pivots 19 alined and arranged on opposite sides of the lower end of the longitudinal folder. The links or arms 18 are connected at their

lower ends by a guide preferably in the form of a pair of rollers 20 which hold the cloth against unfolding longitudinally.

One of the rollers 20 is movable away from the other, but is normally held toward the latter by springs 46 which bear on laterally movable sleeves 47 in which the shaft of the roller turns, the tension on the springs 48 being adjusted by screws 49. This arrangement permits the rollers to separate without injury to the cloth or the rollers whenever a hard substance passes between them. They may also be separated by manually operable devices which may consist of cams 50, pivoted at each end of the movable roller 20 and adapted to coöperate therewith to move the same.

If desired, these guide rollers may be suitably driven in order to positively feed the cloth, this driving being effected in this instance by providing the rollers at one end with intermeshing pinions 21 with one of which meshes a gear 22 turning with a sprocket 23 that is journaled on one of the links or arms 18 (see Figs. 4 to 8). The sprocket 23 is connected by a chain 24 to a sprocket 25 that is journaled on stub shaft or pivot 19 of one of the arms 18 (see Fig. 2). This sprocket 25 turns with a sprocket 26 which, by a chain 27, is connected to a sprocket 28 that turns with a gear 29 driven from a pinion 29^a on a sleeve 29^b that surrounds spindle 30, the sleeve being driven in any suitable manner as by a pulley 31, or by a crank arm 32 connected by sprocket chain 32^a with sleeve 29^b to manually operate the machine.

The reciprocation or oscillation of the transverse folder may be effected in any suitable manner. In this instance, a pair of links or pitmen 35 are each pivoted at one end to an arm 18 and at the other end to a crank arm 36. Both crank arms 36 are connected to a shaft 37 on which gear 29 and sprocket 28 are secured, thus connecting this mechanism with pulley 31.

A suitable means may be provided for changing the lengths of the reciprocations of the transverse folder, and this may be easily accomplished, in this instance, by adjusting the links 35 on their crank arms 36 toward and from the axis of the latter, the crank arm having for this purpose a series of openings 38 in any one of which the pivot pins 39 are adapted to be fitted. With the changing of the throw of the oscillatory frame the speed of the guide rollers 20 must be changed and this may be effected (see Figs. 6 to 8) by providing adjustable roller carriers 41 at the lower ends of the swinging links or arms 18, in order that the pinions 21 may be moved toward and from the gear 22 which is removable to permit gears of other sizes to be used. The adjustable connection between the carriers and the arms 18, may be in the form of bolts 42 on the carriers working in slots 43 on the arms, projections or pins 44 on the arms being insertible in openings 45 on the carriers to hold the latter in adjusted position.

The cloth is delivered to a support 51 which preferably moves gradually away from the folder as the folding operation progresses or as the size of the bundle increases. In this instance, the support moves on vertical guides 52 on the frame and is driven by a mechanism comprising preferably a pair of vertical screws 53 turning in nuts 54 on the support and rotated simultaneously by a horizontal shaft 55 which is driven by a shaft 56 disposed transversely to the same. The shaft 56 is connected by a sprocket chain 57 with a sprocket 58 which has a clutch connection 59 with a sprocket 60 that is connected by a chain 61 to the shaft 37 in order that the support may be moved with the folder. A crank arm 57^a may be connected to sprocket 57 in order to operate the support independently of the folding mechanism when the clutch is moved to one position.

The length of the cloth may be measured by gearing to the rollers 20 a counting mechanism X of any suitable construction. This counting mechanism registers one yard after a certain number of revolutions of the rollers.

The support may have an elevated portion such as an arch 62 on which the cloth is deposited in order to cause the tops of the bundle to be flat, it being apparent that if this were not provided there would be a central depression caused by the greater thickness at the ends of the bundle or the folds. This arch may be removably held beneath guides 62^a on the support in order to permit it to be removed with the bundle. Means may also be provided for creasing the cloth at the transverse folds. The creasers are in this instance in the form of wipers rotatably mounted on the frame of the machine above the ends of the bundle and preferably comprising U shaped members 63 journaled at their ends on the main frame and each having a sprocket 64 at one end. The sprockets are located on opposite sides of the main frame and are connected to sprockets 65 by chains 66 which between the sprockets pass over idlers 67 to deflect the chains out of the path of the transverse folder. One of the sprockets 65 turns with the gear 29 while the other turns with a gear 68 that meshes with gear 69 on shaft 37.

The operation will be understood from the foregoing description and it will be necessary only to give a general statement of this point. Cloth from roll 1 is carried upward to the longitudinal folder and then passes downwardly through creasing rolls 17 to the oscillatory frame which carries the cloth

back and forth causing it to alternately fold in opposite directions on the support 51 which moves away from the oscillatory frame as the size of the bundle increases. The wipers 63 alternately act on opposite ends of the bundle immediately in advance of the approach of the guide rollers.

A machine constructed in accordance with this invention will economically fold cloth in a condition which will make handling of the cloth easy. It is simple in operation and inexpensive to manufacture and it permits the cloth to be inspected while traveling over the inclined longitudinal folder.

What we claim is:

1. In a folding mechanism, the combination with a swinging frame, of a suitably driven sprocket turning about an axis coincident with the turning axis of the swinging frame, a sprocket mounted near the free end of the swinging frame, a sprocket chain connecting the sprockets, a detachable gear driven by the second named sprocket wheel, adjustable carriers on the swinging frame, a pair of rollers on the latter, and intermeshing gears on the rollers one of which meshes with the removable gear.

2. The combination with a support, of a swinging frame, adjustable roller carriers on the frame, rollers on said carriers delivering a sheet to the support, intermeshing pinions on the rollers, and mechanism for operating the rollers embodying a removable gear adapted to mesh with one of the pinions.

3. In a mechanism for folding sheet material alternately in opposite directions, the combination with a reciprocatory frame, of a pair of rollers carried thereby, one of which is movable toward and from the other, resilient means moving said roller toward the other, and manually operable means for moving said roller away from the other.

4. The combination with a support, of mechanism for folding sheet material alternately in opposite directions on the support, and a pair of devices rotatable in opposite directions in complete circles to engage the folds at opposite ends of the bundle thus formed.

5. The combination with a support, of mechanism for folding sheet material alternately in opposite directions on the support, and a pair of U shaped members rotatable in opposite directions in complete circles and alternately engaging the material at the folds at opposite ends of the bundle.

6. The combination with a frame and a support guided vertically on the frame, of mechanism for folding sheet material alternately in opposite directions, mechanism for moving the support away from the folding mechanism as the folded bundle increases in size, and wipers carried by the frame, rotatable in opposite directions in complete circles and alternately engaging the material at the folds at opposite ends of the bundle.

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