W. ROSE.

FOLDING APPARATUS FOR WRAPPING MACHINES.

APPLICATION FILED AUG. 6, 1914.

1,157,585.

Patented Oct. 19, 1915.

5 SHEETS—SHEET 1.

Fig. 1.

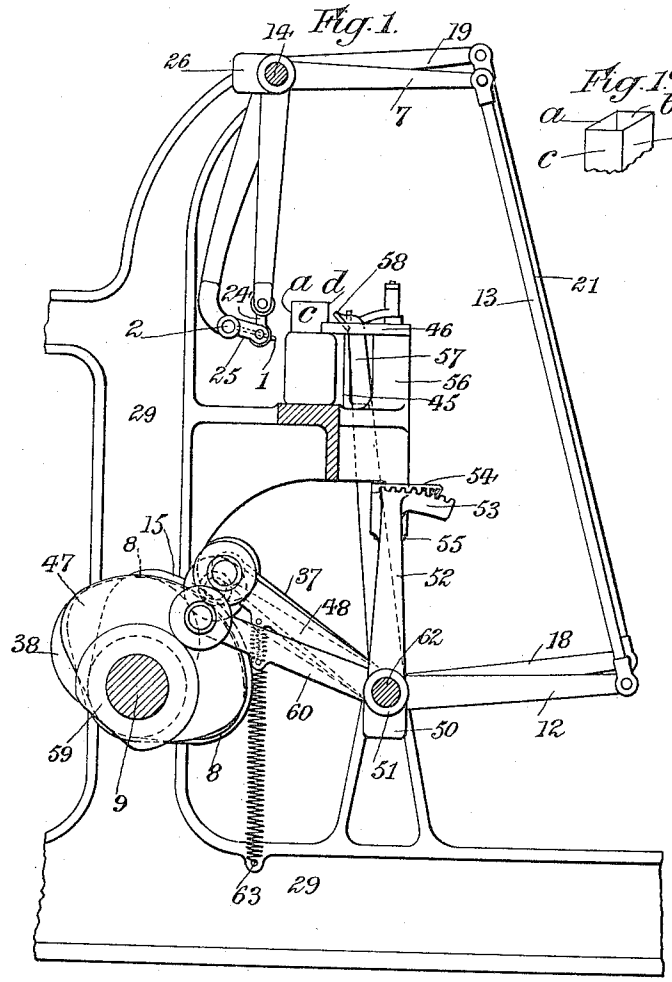


Fig. 1a

WITNESSES

L. A. Grote

W. E. Klein

INVENTOR

WILLIAM ROSE

BY Howson and Howson

ATTORNEYS.

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

W. ROSE.

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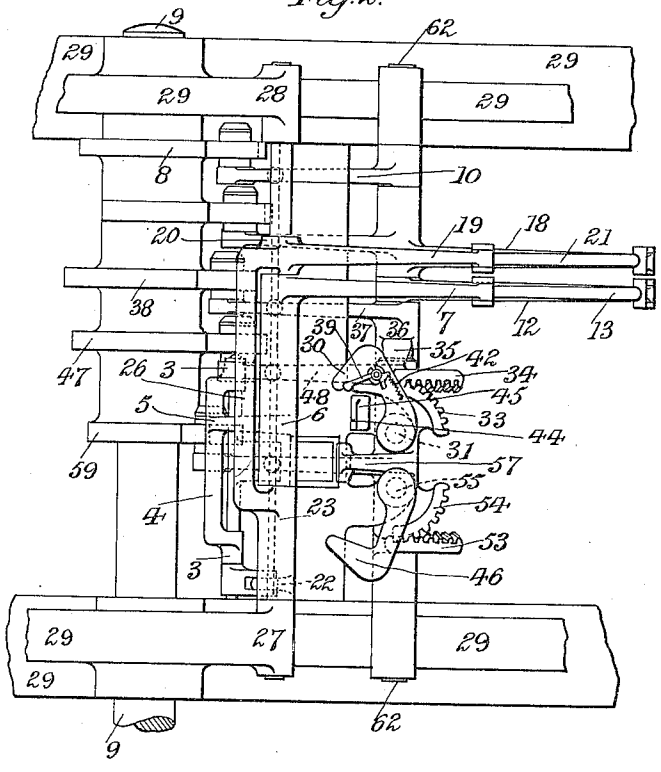
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5 SHEETS—SHEET 2.

Fig. 2.



WITNESSES

L. H. Grote

W. E. Klein

INVENTOR

WILLIAM ROSE

BY Howson and Howson

ATTORNEYS

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

W. ROSE.

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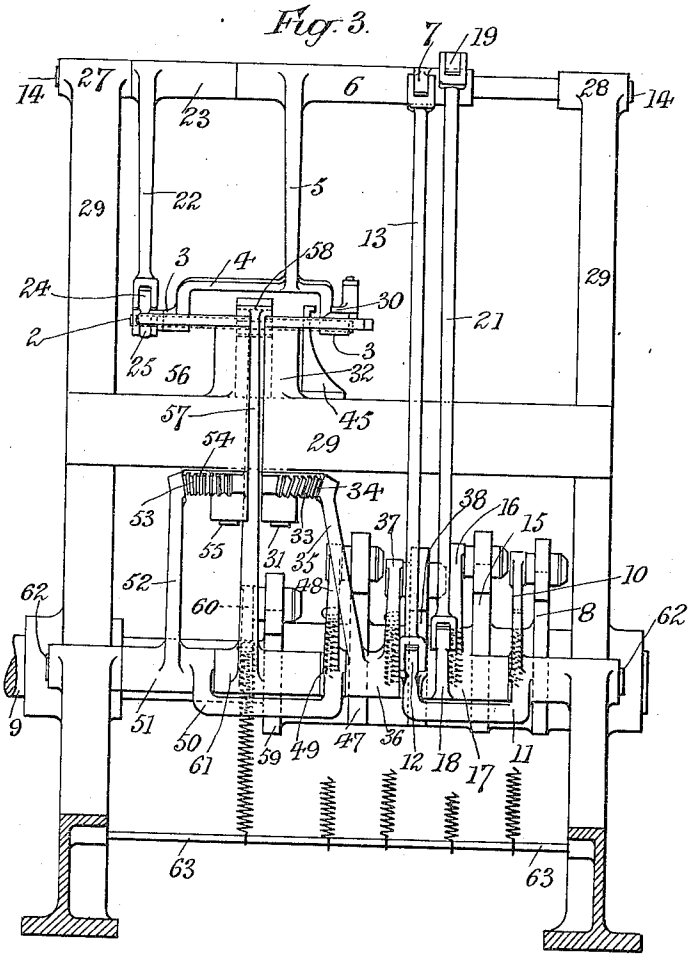
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5 SHEETS—SHEET 3.

Fig. 3.



WITNESSES

L. H. Grote

W. E. Klein

INVENTOR

WILLIAM ROSE

BY Howson and Howson

ATTORNEYS

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

W. ROSE.

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5 SHEETS—SHEET 4.

Fig. 4.

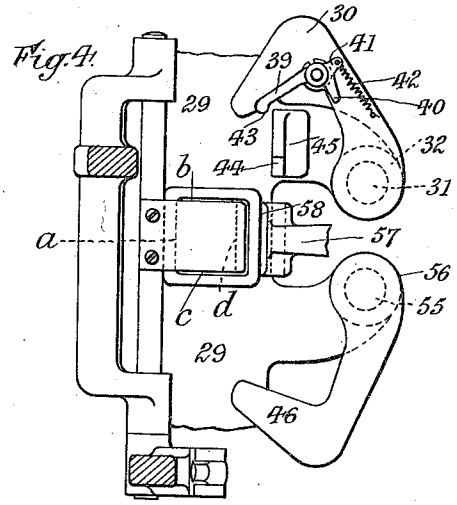
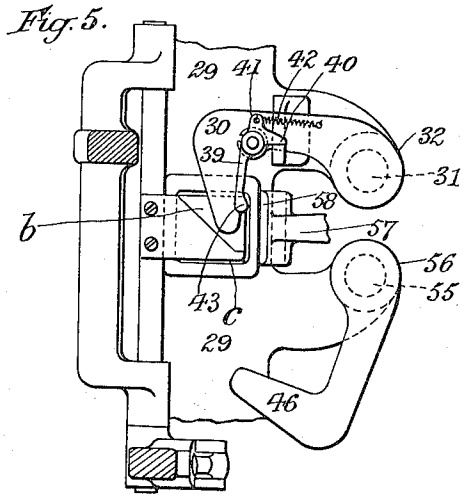


Fig. 5.



WITNESSES

L. H. Grote

W. E. Heuz

INVENTOR

WILLIAM ROSE

BY Howson and Howson

ATTORNEYS

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

W. ROSE.

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5 SHEETS—SHEET 5.

Fig. 6.

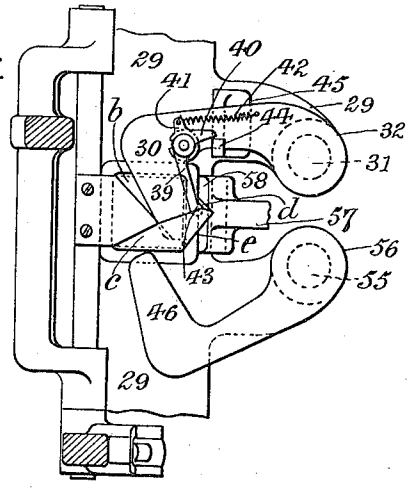
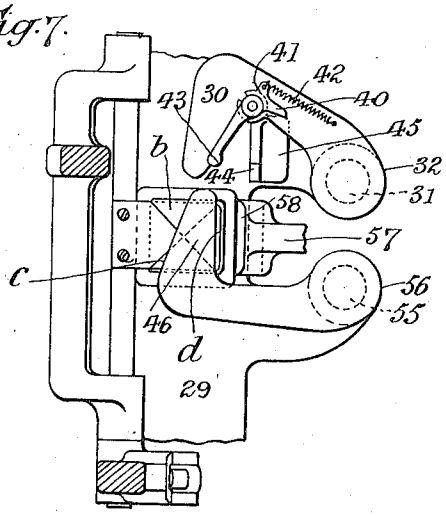


Fig. 7.



WITNESSES

L. H. Grott

W. E. Klein

INVENTOR

WILLIAM ROSE

BY Howson and Howson

ATTORNEYS

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

WILLIAM ROSE, OF GAINSBOROUGH, ENGLAND.

FOLDING APPARATUS FOR WRAPPING-MACHINES.

1,157,585. Specification of Letters Patent. Patented Oct. 19, 1915.

Application filed August 6, 1914. Serial No. 855,487.

To all whom it may concern:

Be it known that I, WILLIAM ROSE, a subject of the King of Great Britain, residing at Albion Works, Gainsborough, in the county of Lincoln, England, have invented new and useful Improvements in Folding Apparatus for Wrapping-Machines, of which the following is a specification.

This invention relates to apparatus for folding the ends of bags, tubes, or like receptacles, (hereinafter for brevity referred to as bags), and is more particularly intended for use in that class of apparatus in which either tubes of paper, cardboard, or the like, are supported on mandrels, or formers, in order to allow of the formation of flat bottomed bags, or in which the ends of bags into which material, such as tea, tobacco, or the like has been charged are folded down upon the contents and the object of this invention is to provide improved means for folding the ends of the bags, which means are very simple and efficient and will effect the folding so as to produce very neatly shaped bag-ends. It is of course understood that, in order to enable the folding to be effected a portion of the tubes from which the bags are formed, must project beyond the mandrel or former, or beyond the boxes in which the bags are carried, while being charged.

I employ a number of suitably shaped blades, or folders, (hereinafter referred to as folders) pivotally mounted, or otherwise supported, on a suitable frame-work and in close proximity to the projecting end of the bag, the number of folders employed depending on the particular style, or shape, of the bag-ends and one, or more than one, of the folders may be of a compound character consisting for example of a main folder, provided with a supplementary, or auxiliary, folder pivotally mounted, or otherwise supported, on the main folder so that it can be operated at the proper time to assist in the folding as hereinafter explained. The auxiliary folder is preferably pivoted on the main folder which is partly rotated so as to fold one side of the bag and when this is being effected, the auxiliary folder is prevented from operating, but after the said side of the bag has been folded the auxiliary folder is caused to act so as to effect a breaking, or backward bending, of one of the remaining sides of the bag, so as to materially assist in the operation of the folder, or folders, which effect the further folding and give the folded ends a very neat and uniform appearance.

I will describe, with reference to the accompanying drawings, a construction of apparatus in accordance with this invention, but I do not limit myself to the precise details hereinafter described and illustrated in the said drawings.

Figures 1, 2 and 3 are respectively a side elevation partly in section, a plan, and a front elevation of the apparatus, and Fig. 1ª is a perspective view of the upper end of a bag, showing the order in which the sides of the bag are lettered. Figs. 4 to 7 (both inclusive) are plans, also drawn to a larger scale, illustrating the action of the auxiliary folder as hereinafter explained.

For convenience in describing the invention, I have marked, and will refer to, the sides of the upper part of a bag, *a*, *b*, *c* and *d* in Fig. 1ª, the sides being lettered in the order in which they are to be folded.

The side *a* of the bag is folded by a blade 1, secured to the spindle 2 and capable of turning therewith the spindle being carried in bosses 3, connected by a bridge-piece 4, carried by an arm 5, projecting from a sleeve 6 (see Fig. 3) having another arm 7, which is operated by means of the cam 8, on the main shaft 9, through the lever-arm 10, bridge-piece 11, lever-arm 12 and rod 13. In addition to the movement of the blade 1 about the center of the spindle 2, the said blade can, by the arm 5, be swung on the cross-shaft 14 which is supported in bearings 27, and 28 carried by the frame 29, the said shaft carrying the sleeve 6. The swinging movement of the blade 1 is effected by the cam 8 and the connections 10, 11, 12, 13 and 7, the movement of partial rotation of the blade being effected by the cam 15 on the main shaft 9. This cam 15 acts on the lever-arm 16 projecting from a sleeve 17, which is provided with another lever-arm 18, connected by a rod 21, to an arm 19, projecting from a boss 20. An arm 22 projecting from a sleeve 23 is connected, at its lower end, by links 24, 25 one end of which link 25 is mounted on and capable of turning with the spindle 2, the arm 22 and links 24—25 being operated from the boss 20 through the bridge-piece 26 connected with the sleeve 23.

The mechanism used in folding the side *b*

of the bag, comprises a horizontally arranged blade 30 secured to, and capable of turning with, a vertical shaft 31 supported in a bearing 32 on the frame 29 of the machine, the motion being derived from the main shaft 9 by the means hereinafter described.

On the lower end of the shaft 31 is secured a segmental toothed wheel 33 gearing with a rack 34 formed on the end of a lever-arm 35 which projects from a sleeve 36 having an arm 37 operated by a cam 38 so as to give oscillatory movement to the blade 30.

The blade 30 is shown as being provided with an auxiliary folder which is pivotally mounted on the upper side of the blade 30. This auxiliary folder consists of a bell-crank lever having arms 39 and 40, and a projection 41 to which is secured one end of a spring 42 the other end of which is secured to the blade 30. The end of the arm 39 is rounded, as at 43, so as to prevent the said arm from injuring the part, or parts, of the bag upon which it acts. This auxiliary folder is actuated by a projection 44 on a bracket 45, which is arranged in a continuation of the path of oscillation of the blade 30, so that when the said blade acts to fold the side *b* of the bag, the arm 40 of the auxiliary folder comes in contact with the projection 44 immediately before the blade 30 has completed its forward oscillation, and by the time the blade 30 has completed such oscillation, the auxiliary folder, has been caused by the arm 40 coming against the projection 44, to turn into the position shown in Fig. 6, thereby causing the side *d* of the bag to be creased along a diagonal line as at *e*. The return movement of the blade 30 is followed by the forward movement of the blade 46 which then folds the side *c* of the bag in a manner similar to that described with regard to the folding of the side *b*, this folding being much facilitated by the creasing which has been effected by the auxiliary folder 39. The operation of the blade 46, is effected by the cam 47, acting on the arm 48, on the boss 49, connected by a bridge-piece 50, with a sleeve 51, having a lever-arm 52 at the upper end of which is a rack 53, similar to the rack 34, which rack 53, engages with a segmental toothed wheel 54 secured to the lower end of a vertical shaft 55, mounted in a bearing 56. The folding blade 46, is secured on the upper end of the shaft 55, and is constructed and operated in the same way as the blade 30, but is not provided with an auxiliary folder. When the side *c* of the bag is folded a lever-arm 57, provided at its upper end with a blade 58, acts on the side *d* to fold it. The movement of the arm 57, is effected by a cam 59 which acts on a lever-arm 60, projecting from a sleeve 61, this sleeve also carrying the arm 57. The sleeves 17, 36, 61 and 51 and the boss 49 are mounted on a shaft 62, common to all and the rollers on the arms 10, 16, 37, 48 and 60, are maintained in contact with their respective cams by means of springs which are secured at one of their ends to the respective arms and at the other of their ends to the frame or, as shown, to a cross-bar 63.

The operation of the folding mechanism is as follows:—The blade 1 swings toward the side *a* of the bag and at the same time it is partially rotated so as to bring the blade into an inclined position, the blade 1 being then turned with the spindle 2 so as to fold down the side *a* of the bag, and the blade 1 being retained in position on top of the side *a* during the subsequent folding operation. After the side *a* is folded, the blade 30 is caused to swing toward the side *b* of the bag so that this side is folded down on top of the blade 1, and, at, or about, the completion of the folding of the side *b* the auxiliary folder is operated to break, or bend, the side *d*, backward so as to form the aforesaid crease at *e*. Fig. 5 shows the side *b* partly folded and Fig. 6 shows the side *b* completely folded and the crease *e* formed. On the completion of the creasing at *e* and as the blade 30, is retracted the movement of the said blade is followed up by the blade 46 which then acts to fold the side *c* of the bag, and when this folding is completed, the arm 57, shown in Figs. 1, 2 and 3 is operated so as to fold down the side *d* of the bag, or, if desired, the bag may be moved against a fixed folder to effect the final folding of the side *d*.

The various blades used in folding the bag-ends are constructed and arranged so that, when operated, each blade effectively presses those portions of the bag-end with which they engage right down into their respective corners and thus very definite, or uniform, form is given to the folded ends of the bags.

It is preferable, though not essential, that the first folding blade, shall remain in the position it has assumed after it has operated, until, one, or more than one, of the subsequent foldings has taken place.

I claim—

1. A folding device comprising oppositely situated folding elements, said elements being arranged to move in opposite directions and in parallel planes, a creasing blade superimposed on one of said elements and means to project the creasing blade in advance of its supporting element so as to define subsequent lines of folding.

2. A folding device comprising a fold-forming element, a creasing blade superimposed thereon, said fold-forming element and creasing blade being arranged to move in parallel planes, means to move said fold-

forming element and creasing blade in unison and means to cause relative movement there-between.

3. A folding device comprising a fold-forming element, a creasing blade superimposed thereon, said fold-forming element and creasing blade being arranged to move in parallel planes, means to oscillate said fold-forming element and creasing blade about a common axis to exteriorly engage the end of a wrapper and means to cause relative movement between said fold-forming element and the creasing blade.

4. A folding device comprising a fold-forming element, a crease-forming element mounted thereon, both said fold and crease-forming elements being arranged in parallel planes, and stationary means adapted to engage the said creasing blade in its forward movement so as to cause relative movement between the fold-forming element and the creasing blade.

5. A folding device comprising folding elements, a creasing blade superimposed on one of said elements, said elements being arranged to move in parallel planes, means to project the creasing blade in advance of its supporting element and a further folder adapted to be turned in two directions, movement in one direction causing the said folder to come up to one side of the end of a bag, and movement in the other direction causing the folder to exteriorly engage the said side of the bag and turn it downward.

6. A folding device comprising a plurality of folding elements, a creasing blade superimposed on one of said elements, and a further folder having depending radius-arms on which it is supported, said folder being adapted to be turned in two directions to exteriorly engage and turn down one side of a bag.

7. A folding device for the purpose set forth consisting of an auxiliary folding element, superimposed on, and arranged to move parallel to, a main folding element and means to project said auxiliary folding element in advance of the main folding element.

8. In a machine of the character described, the combination of a folder having an auxiliary folder mounted thereon, means for moving said two folders together and afterward the auxiliary folder alone and a further folder consisting of a blade having as its support depending radius-arms of different lengths and pivotally mounted on a common shaft so as to be capable of being turned in two directions upon these centers, movement in one direction causing the blade to come up to one side of the end of the bag, or the like, and movement in the other direction causing the said blade to turn downward and fold the said side, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WILLIAM ROSE.

Witnesses:
M. SHIRMAN,
WILLIAM BATTY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."