(No Model.)

E. ANTHONY & J. E. HARVEY.

FOLDING APPARATUS.

No. 263,749. Patented Sept. 5, 1882.

Fig. 1.

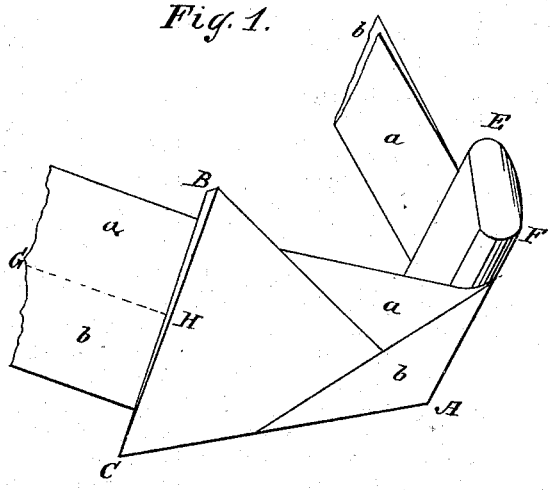


Fig. 2.

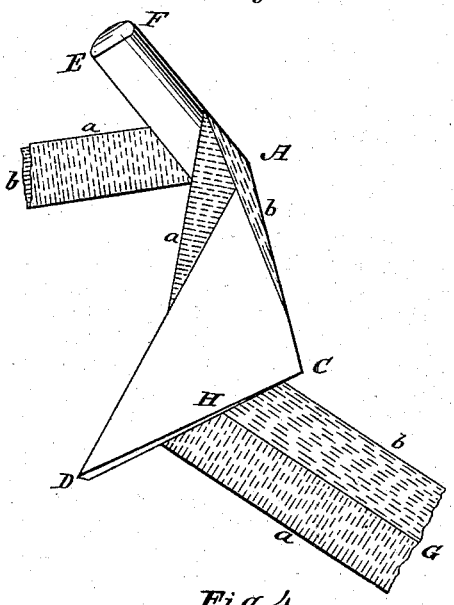
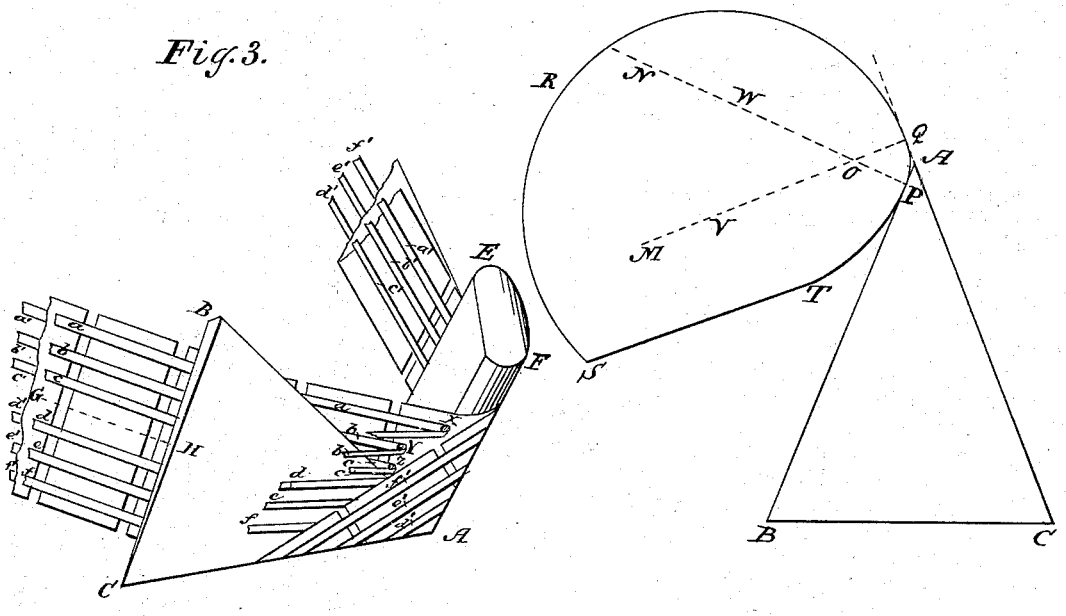


Fig. 4.

Fig. 3.



Witnesses:
J. L. Butterly
S. T. Gifford.

Inventor:
Edwin Anthony
Jacob Edwards Harvey

UNITED STATES PATENT OFFICE.

EDWYN ANTHONY AND JACOB E. HARVEY, OF NEW YORK, N. Y.

FOLDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 263,749, dated September 5, 1882.

Application filed May 16, 1882. (No model.)

To all whom it may concern:

Be it known that we, EDWYN ANTHONY and JACOB EDWARD HARVEY, subjects of the Queen of Great Britain, residing at the city of New York, in the county and State of New York, have invented a new and useful Improvement in Folding Apparatus, of which the following is a specification.

Our invention consists of an apparatus, as hereinafter specified and claimed, for folding longitudinally, without stopping the motion thereof, a traveling web or sheets in tapes.

Figs. 1 and 2 illustrate the folding of an uncut web; Fig. 3, of sheets carried between tapes, while Fig. 4 more particularly describes the shape and position of the segmental cylinder E F A.

Referring to Figs. 1 and 3, A B C is a triangular plane, made of any suitable material and of any convenient thickness. The lower edges of its sides A B, A C, over which the web slides, must be slightly rounded. The sides A B, A C are equal in length, and the angle at A may be any convenient angle; but we prefer one not greater than sixty degrees—say forty-five degrees.

E F A is a segmental cylinder with its axis perpendicular to the triangular piece A B C. It is placed close to the side B A of the latter, but with just sufficient space to allow the web (and tapes when they are used) to travel freely between them, and so that a tangent plane can be drawn to it, which will pass through the side A C of the triangular piece A B C. The triangular piece must be placed so that its side B C is parallel to the axis of the roller (not shown in the figures) which conducts the web to the apparatus, and so that the lower surface, A B C, would, if produced, touch the said roller. Its position must also be such that the longitudinal line of the web—say G H—along which the fold is to be made passes over the middle point, H, of the side B C. If the fold is to be down the middle of the web, the line G H will of course be the central line of the web.

It is not absolutely necessary, in order that the apparatus may operate to some extent, for the peculiarly-shaped cylinder E F A to be perpendicular to the triangular piece A B C. It may be inclined at another angle thereto, provided it is placed so as to nearly touch along one of its generating-lines the plane through A H, perpendicular to the triangular piece A B C; but the perpendicular position of the cylinder is the best, and any very considerable deviation therefrom would obstruct the proper working of the apparatus. The web slides under A B C, and that portion of it which is to the left of G H passes round the side B A, and thence round the cylinder E F A, and that portion which is to the right of G H passes round C A, and thence round the cylinder E F A. Thus the two portions of the web come together along the line A F, and the fold is complete. The web may now be conducted directly away from the cylinder in the tangent plane which touches it along the line A F; or it may be wrapped round a portion of the cylinder, as shown in Figs. 1 and 3. In either case it may afterward be immediately conveyed to mechanism for delivery or for further folding, as the case may be; or it may be first taken over any suitable turning surface, so as to cause the lines drawn perpendicularly across it to be parallel to lines similarly drawn on the web before it entered the apparatus.

The edge B C of the triangular piece A B C may be slightly rounded and may take any other position, such as D C, Fig. 2. By this means the relative positions of the web before entering and after leaving the apparatus may be varied, while the angle at A, &c., remains the same. The web must pass over D C, so that G H (the line of the fold) passes over H, (H being such that H A bisects the angle A,) and that H G and H A are equally inclined to D C.

Fig. 4 is a section of the segmental cylinder and triangular piece, and exhibits the precise shape and position of the former.

S R Q is the arc of a circle which touches A C, produced in Q, and whose center is at V.

T P is the arc of an equal circle which touches A B in P, and whose center is at W.

P Q is the arc of a circle which touches A B in P, and whose center is at O, the point of intersection of V Q and W P. The points P and Q should be taken equally distant from and near to the point A, (nearer, in fact, than is shown in the figure,) so that the diameter of the circle of which P Q is an arc be not greater than about one-quarter of an inch.

V Q—*i. e.*, the radius of the cylinder—may be any convenient length, and the arc Q R S may extend farther than or not extend so far as it does in the figure, provided only that it extends beyond where the folded web leaves the cylinder, and the arc P T and the straight portion S T may be greater or less than shown in the figure. In fact, the shape of the portion S T P is immaterial, provided that the surface has a common tangent plane at P with P Q, and that it slopes well away from A B, as indicated by the figure. The segmental cylinder having been constructed as just described, it must be placed as before directed—*i.e.*, with its axis perpendicular to the triangular piece A B C—its tangent plane at Q passing through A C, and with just sufficient space between it and the edge A B for the web (or sheets and tapes, as the case may be) to pass freely between at the point P.

The taping of the apparatus is similar to the ordinary ways of conducting sheets in tapes. Since, however, the ends of the tapes will not in general come out so as to be opposite to their previous positions, skew-pulleys or other suitable devices must be employed for bringing their ends together. For example, Fig. 3 shows the sheets running between tapes. *a b c d e f* indicate tapes passing on one side of the sheets as they enter the apparatus; *a′ b′ c′ d′ e′ f′*, the corresponding tapes, which pass on the other side of the sheets. *a b c* and *a′ b′ c′* lie to the left of the line G H of the fold, and *d e f d′ e′ f′* to the right of the said line. The tapes *a′ b′ c′ d′ e′ f′* pass entirely through the apparatus, and pass therefrom with the folded sheets, the three *a′ b′ c′* being on one side of them and the three *d′ e′ f′* on the other, as shown in the figure. They pass on (their future course being determined by considerations independent of the devices herein described) and they must be ultimately returned by skew-pulleys or other suitable devices, their respective ends being joined to one another. The tapes *a b c d e f* on the other side of the web do not follow the sheets throughout the whole of their course. They pass over the edges of the triangular piece, (*a b c* going round B A and *d e f* round C A,) and they continue the same course as the tapes on the other side of the web until they approach the line A F. As near this line as conveniently can be skew-pulleys or other suitable devices are placed, over which the tapes are returned, and ultimately by means of other suitably-placed pulleys brought back to their original positions and their ends joined. X Y Z represent in the figure the pulleys for returning the tapes *a b c;* but they can be placed nearer the line A F than they are in the drawings. The skew-pulleys for returning the corresponding tapes, *d e f*, for the other half of the web are hidden by the web.

We do not claim the use of a triangular-shaped piece for holding longitudinally a traveling web, because its use is disclosed in the specification of British Letters Patent No. 2,764, year 1862, and in the specification of British Letters Patent No. 3,319, year 1870.

What we do claim as our invention is the following:

The combination of a triangular piece and of a peculiarly-shaped segmental cylinder at right angles to the plane thereof, whereby a traveling web or sheets in tapes are folded longitudinally, and facilities are afforded for wrapping the web or sheets in tapes partially round the said cylinder without stopping the motion of the same, all substantially as described.

EDWYN ANTHONY.
JACOB EDWARD HARVEY.

Witnesses:
J. L. BUTTERLY,
S. T. LIPPINCOTT.