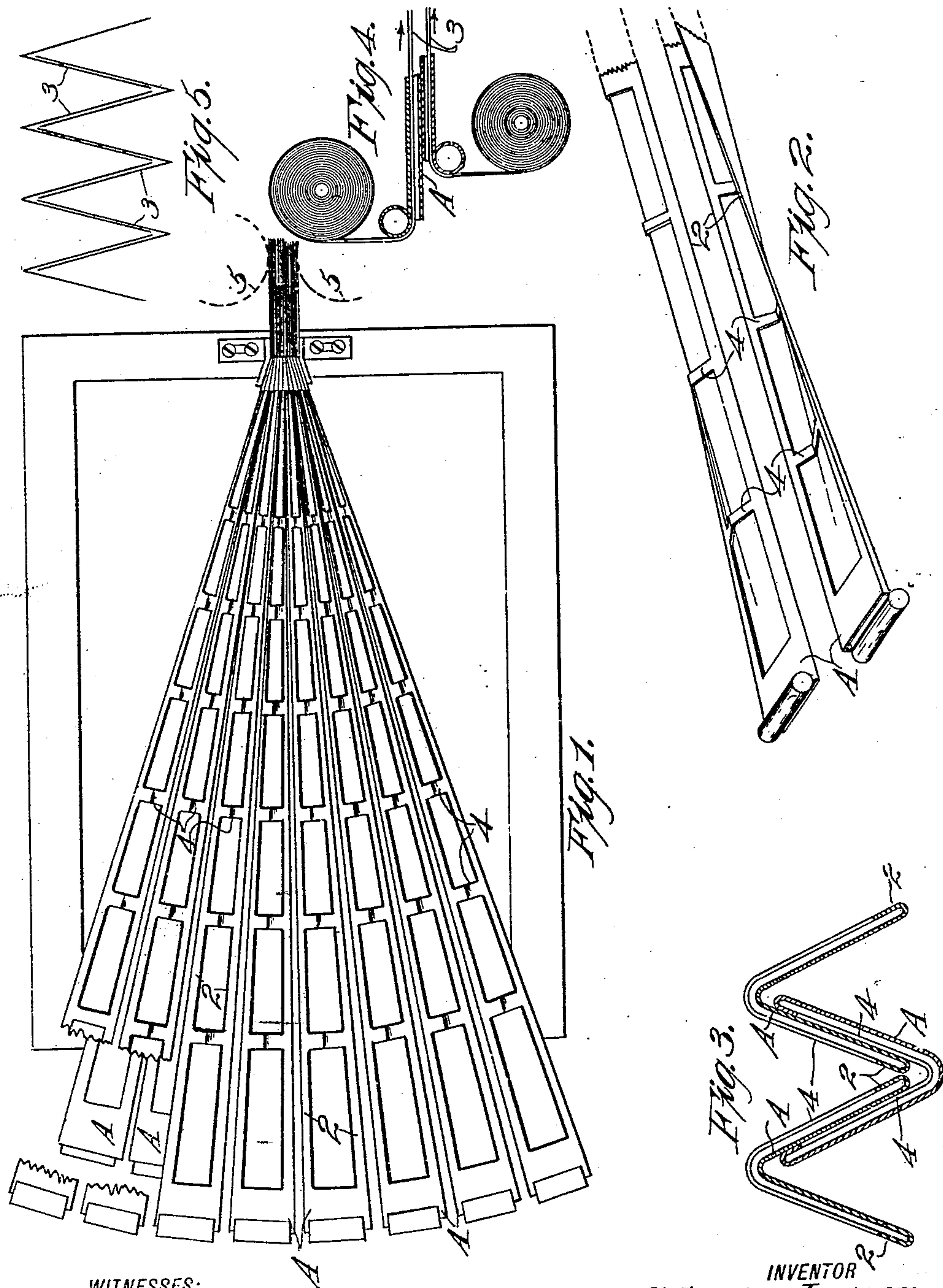


No. 843,219.

PATENTED FEB. 5. 1907.

S. LAZAR.  
PAPER FOLDING MACHINE.  
APPLICATION FILED AUG. 25, 1906.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

SOLOMON LAZAR, OF SAN FRANCISCO, CALIFORNIA.

## PAPER-FOLDING MACHINE.

No. 843,219.

Specification of Letters Patent.

Patented Feb. 5, 1907.

Application filed August 25, 1906. Serial No. 332,004.

*To all whom it may concern:*

Be it known that I, SOLOMON LAZAR, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented new and useful Improvements in Paper-Folding Machines, of which the following is a specification.

My invention relates to a machine for folding and interleaving a plurality of paper webs prior to their being cut into lengths suitable for use.

My object is to provide a simple practical machine which shall be cheap to manufacture, easy to operate, and which shall be adapted to fold and interlock a multitude of ribbons or webs of paper simultaneously, which shall be especially adapted to handle cigarette, toilet, and like tissue papers, which are notoriously flimsy and are so liable to tear, but which machine is so constituted that if any single web or any number of webs break the torn or broken web can be quickly gotten at and the repair made no matter at what point this tear or break may take place in the machine.

The invention consists of the parts and the construction and combination of parts, as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a plan view of the machine. Fig. 2 shows folding-dies in relative position. Fig. 3 is a section through the dies. Fig. 4 is a section of the feed end, and Fig. 5 is a diagrammatical representation of the interleaved papers.

In the practice of my invention I employ a die member, as A, which is made of a strip of suitable sheet metal or heavy Manila paper or like stiff bendable material. This strip is bent over along both edges to form the lateral flanges 2, which inclose suitable troughs or guide-channels for the strip of paper 3. These guide-flanges are connected at suitable intervals by the cross-straps 4. These cross-straps may be one inch, more or less, in width. At each end of the die, where the paper enters and leaves the mold, the connecting-strap may be two or three inches, more or less, in width.

The strip A is flat at the feed end and is bent centrally and longitudinally toward the delivering end, so as to bring the flanges 2 op-

posite each other until the sides of the bent strip adjacent the delivery end stand nearly parallel, the die being substantially V-shaped or A-shaped in cross-section along its bent portions and the V or A narrowing as the discharge end of the die is approached. The cross-strips are uniformly parallel with that portion of the strip A which they are directly opposite to. The result of this construction is that when a strip of paper or web is drawn through the die from the flattened end to the folded end of the die the web is folded lengthwise and centrally the edges of the paper running in the grooves formed by the turned-over flanges and the paper being held in place by the cross-straps 4. By thus making an open-work die of tubular form friction on the tissue web is very greatly reduced. If a closed die of tubular form is used, the friction is often so great that the delicate web or paper is being broken continually, and it is a source of great annoyance and inconvenience to get the web started again. By constructing the die in the form here shown and placing the cross-straps 4 at such intervals as will just keep the paper straight and properly guided it is an extremely simple matter to get at the broken web and mend it or else draw it through, so that the creasing operations may continue.

In the actual machine as constructed by me I use a lower series of die members A, arranged with their edges in upturned position and with the narrower ends of the dies all pointing in one direction. On top of this series of upturned or V-shape dies and overlapping the same in break-joint fashion I place loosely a second series of molds, the bent sides of this upper series pointing downward and fitting into the corresponding depressions in the other series. There may be any desired number of these dies used in a single machine. Each die is adapted to receive its own web of paper, and all the webs are adapted to be drawn through all the dies at the same time by any suitable means, such as friction-rollers 5.

Any suitable form of support may be provided for the dies, and preferably the latter are mounted loose on the other, so that any one of the upper series of dies may be quickly lifted up in order to effect a repair in a broken



web in case a break or tear occurs. This ready inspection of the web while in the die is an advantage not possessed by any machine of which I have knowledge and is of utmost practical importance. Moreover, by reason of the trifling amount of friction offered tears and breaks in the webs are of less frequent occurrence than would be the case with a die of closed tubular form.

It is readily understood that the upper and lower arrangement of the dies, tapered and intermeshed as they are, results in the several webs of paper being interleaved and interlocked the moment they emerge from the dies. These interfolded webs are then cut into suitable lengths and put up in suitable packages. There may be from fifty to one thousand of these interfolded leaves in one package, and the package would have a convenient central slot through which a top leaf projects. By pulling on this projecting leaf it operates to partly withdraw a second leaf, so that each leaf may be withdrawn singly.

It should be stated that the dies of the two series differ in this respect, that the lowermost dies, or those of V shape in cross-section, having their under sides closed and their upper or reëntrant portions open, while the dies of the upper series, or those of A shape, having their upper exposed convex sides made open-work—that is, the cross-straps of the lower series of dies are V shape or concave and the cross-straps of the upper series are A shape or convex, and the cross-straps in both series are always toward the top. The result is that the webs of paper in the upper series are always in sight throughout the major portion of the length of the dies, and any repair to the upper webs can be made without disturbing the dies. At the same time if a web of any particular lower die becomes broken or torn it only requires the lifting up of one or two of the corresponding upper dies in order to expose the broken part.

It is manifest that I may bend the lower die to have its open-work side downward, just as the upper die is.

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

1. A paper-folding machine comprising upper and lower series of dies, each die in each series comprising a strip of stiff, bendable material having its longer edges bent to form lateral guide-flanges for the web, said flanges connected at intervals by narrow cross-straps and said strip bent longitudinally and centrally with one end of the die formed by said strip and straps substantially flat and the other end with its sides substantially parallel, the bent sides of the dies in one series fitting into the corresponding depressions in the other series.

2. In a paper-folding machine, a die formed from a strip of suitable bendable material, the edges of said strip overturned to form lateral guide-flanges, said flanges connected at intervals by cross pieces or straps, said strip flattened at its feed end and bent centrally and longitudinally toward the other end, said cross-straps being maintained parallel with the adjacent surface of said strip, said bent strip and cross-pieces operating gradually to fold a web of paper centrally and longitudinally when the web is passed therethrough, and a second die corresponding to the first one and having its bent sides fitting into the corresponding depression of said first die, said cross-straps of the dies affording ready access to the web at any point in the lengths of the dies.

3. In a paper-folding machine, the combination of an upper and a lower series of dies, each die in each series comprising a strip of suitable bendable material having lateral guide-flanges, said flanges connected by cross-straps, said die-strip bent longitudinally and centrally to cause its opposite sides gradually to approach each other from the feed toward the delivery end of the die, the dies of the lower series being substantially concaved and the dies of the upper series substantially convexed relative to the dies of said lower series, with the bent sides of the upper series fitting the concavities of the lower series, said cross-straps of both series of dies being uppermost whereby the web in each die is viewable from the top and for a major portion of the length of the die.

4. In a paper-folding machine, the combination of an upper and a lower series of open-work dies of tubular form, the dies of each series being bent lengthwise so as to operate gradually to fold a web of paper centrally and longitudinally when a web is passed therethrough, the dies of the lower series being substantially concaved and the dies of the upper series being substantially convexed in cross-section relative to the dies of said lower series, the sides of the dies of the upper series fitting the concavities of the lower series, and the open-work part of each die being uppermost so that the web in each die is viewable from the top for the major portion of the length of the die.

5. In a paper-folding machine, the combination of an upper and a lower series of open-work dies of tubular form, the dies of each series being bent lengthwise so as to operate gradually to fold a web of paper centrally and longitudinally when the web is passed therethrough, the dies of the lower series being substantially concaved and the dies of the upper series being substantially convexed in cross-section relative to the dies of said lower series, the sides of the dies of the upper



series fitting the concavities of the lower series, and the open-work of each die being uppermost so that the web in each die is viewable from the top for the major portion of the length of the die, said upper series of dies  
5 lying loose on the lower series to permit the ready and separate removal of any die.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

SOLOMON LAZAR.

Witnesses:

S. H. NOURSE,  
F. E. MAYNARD.