

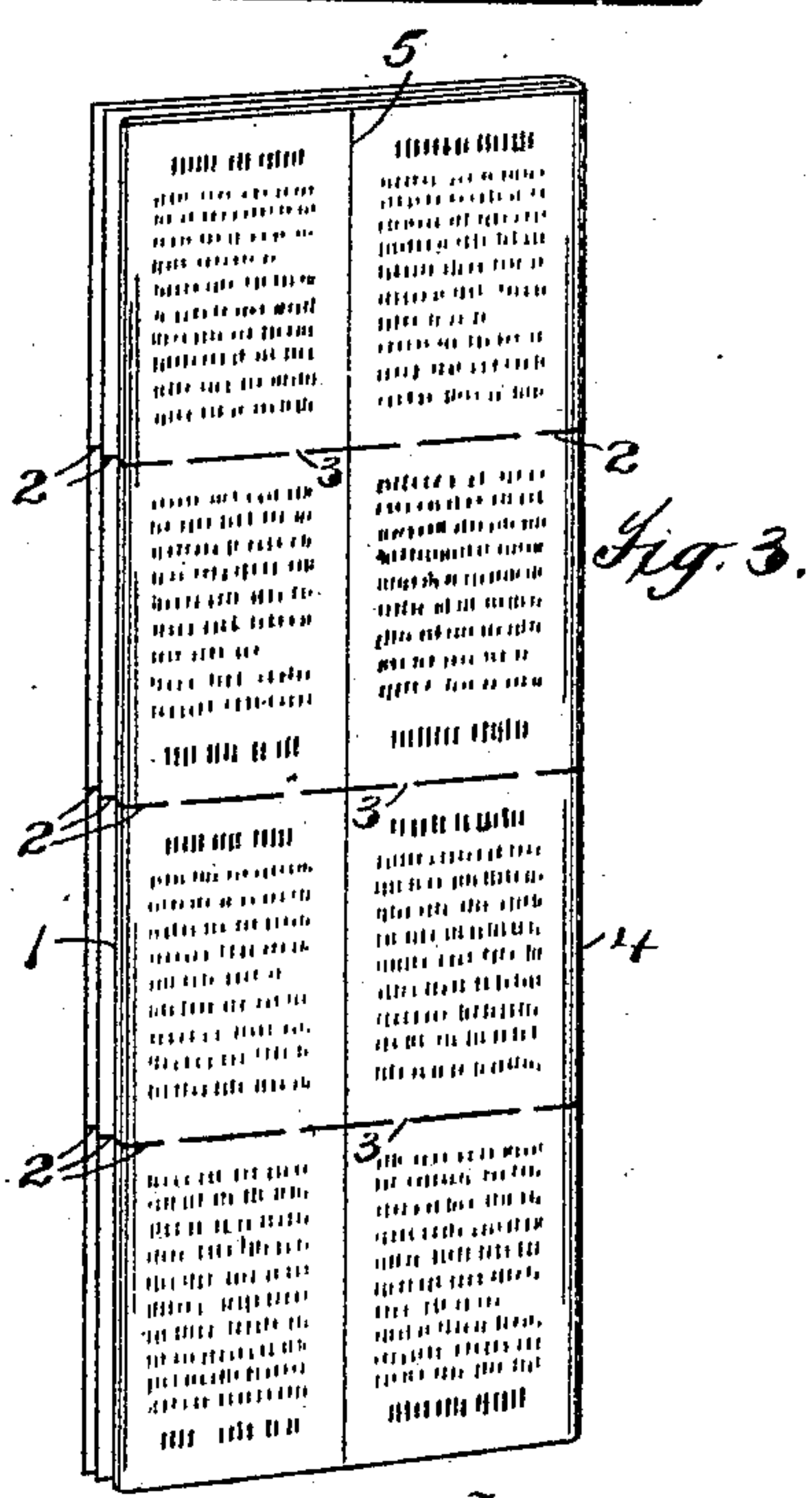
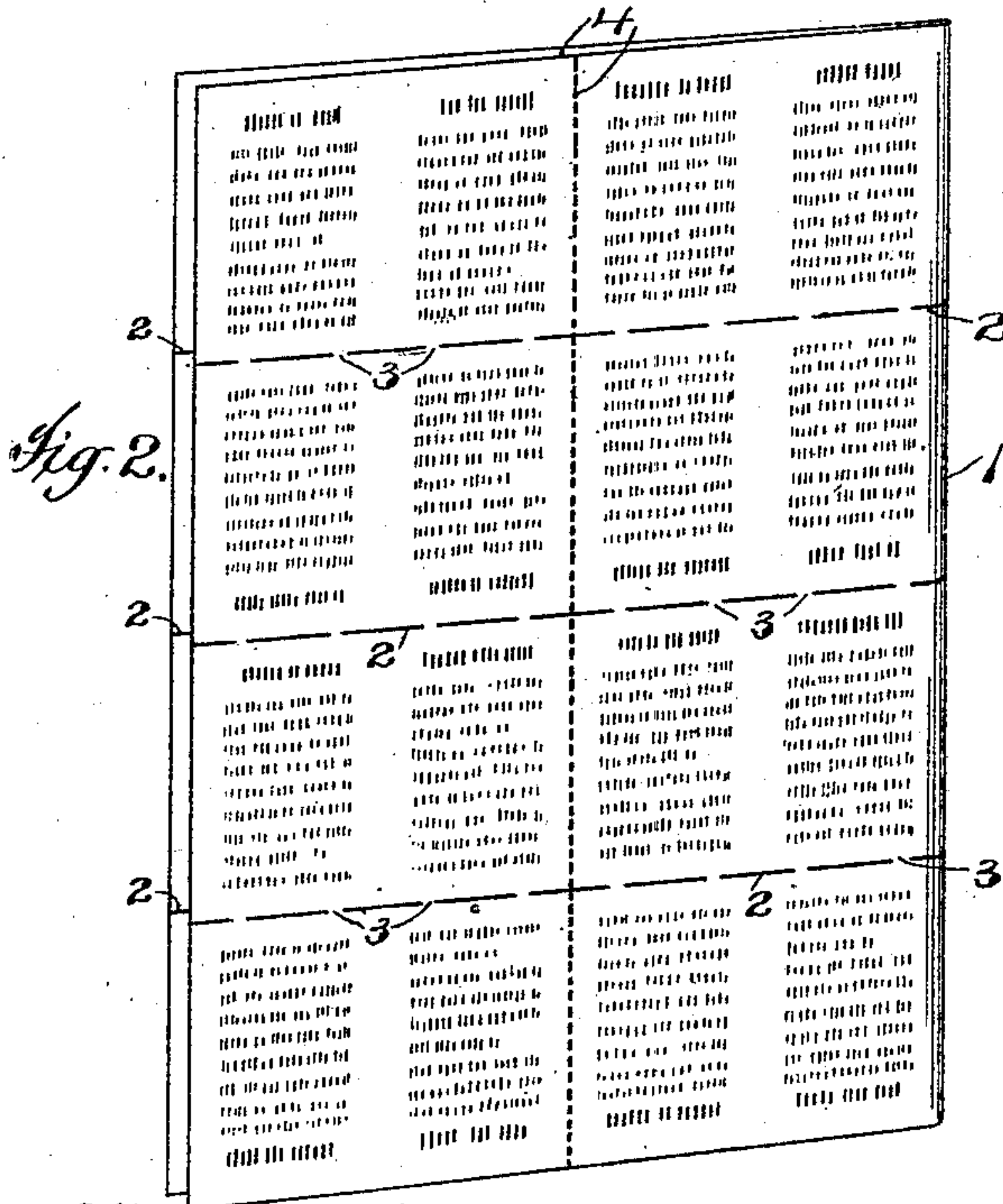
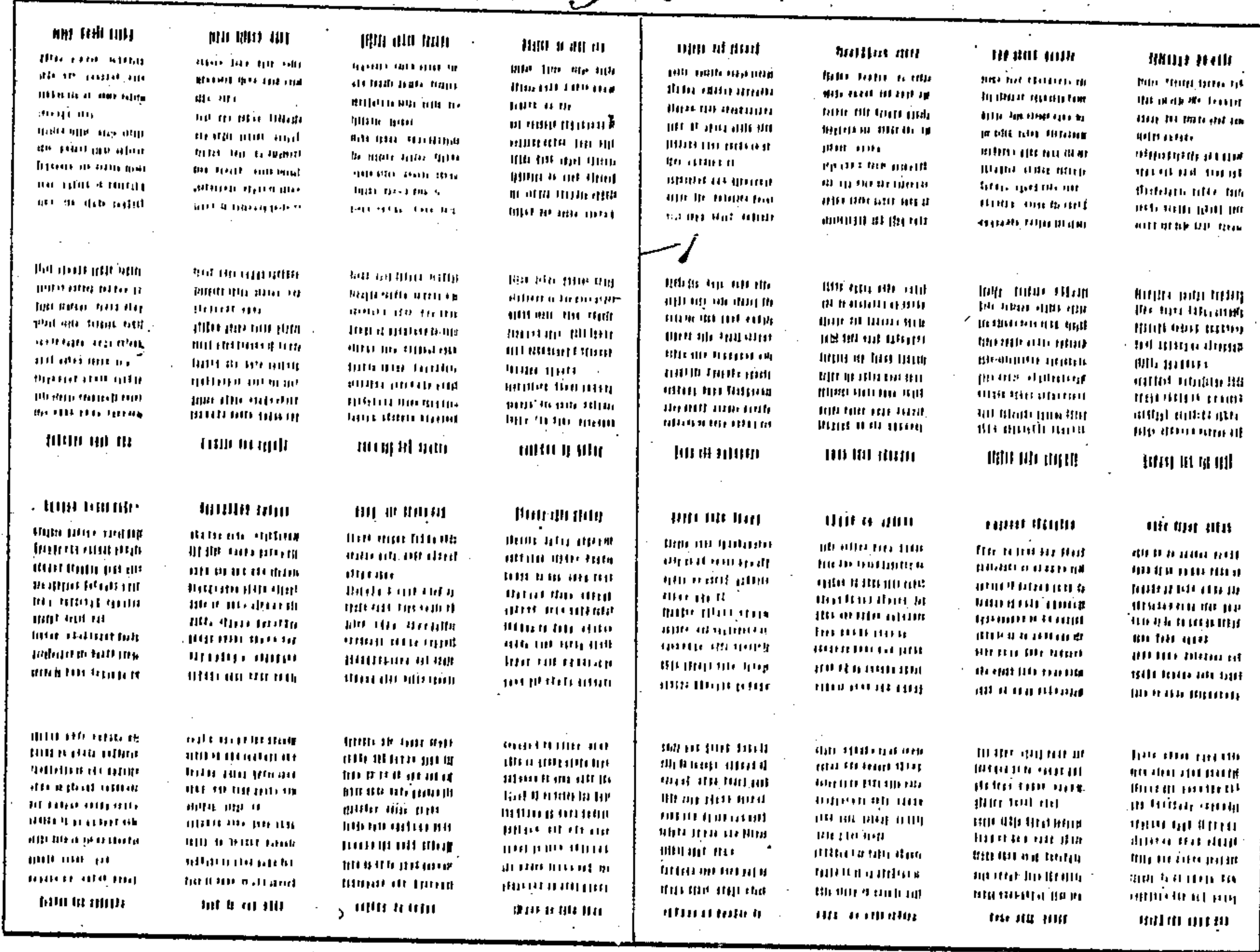
C. A. STURTEVANT.
METHOD OF FORMING SIGNATURES.
APPLICATION FILED MAY 10, 1906.

908,516.

Patented Jan. 5, 1909.

Fig. 1.

2 SHEETS—SHEET 1.



Witnesses
Augusta White
Galvani.

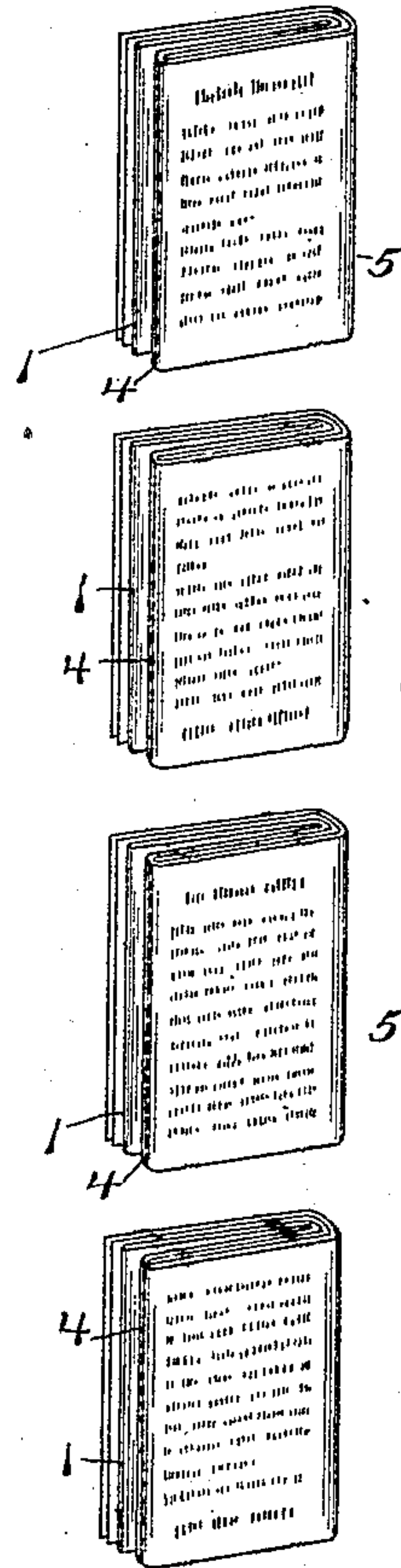
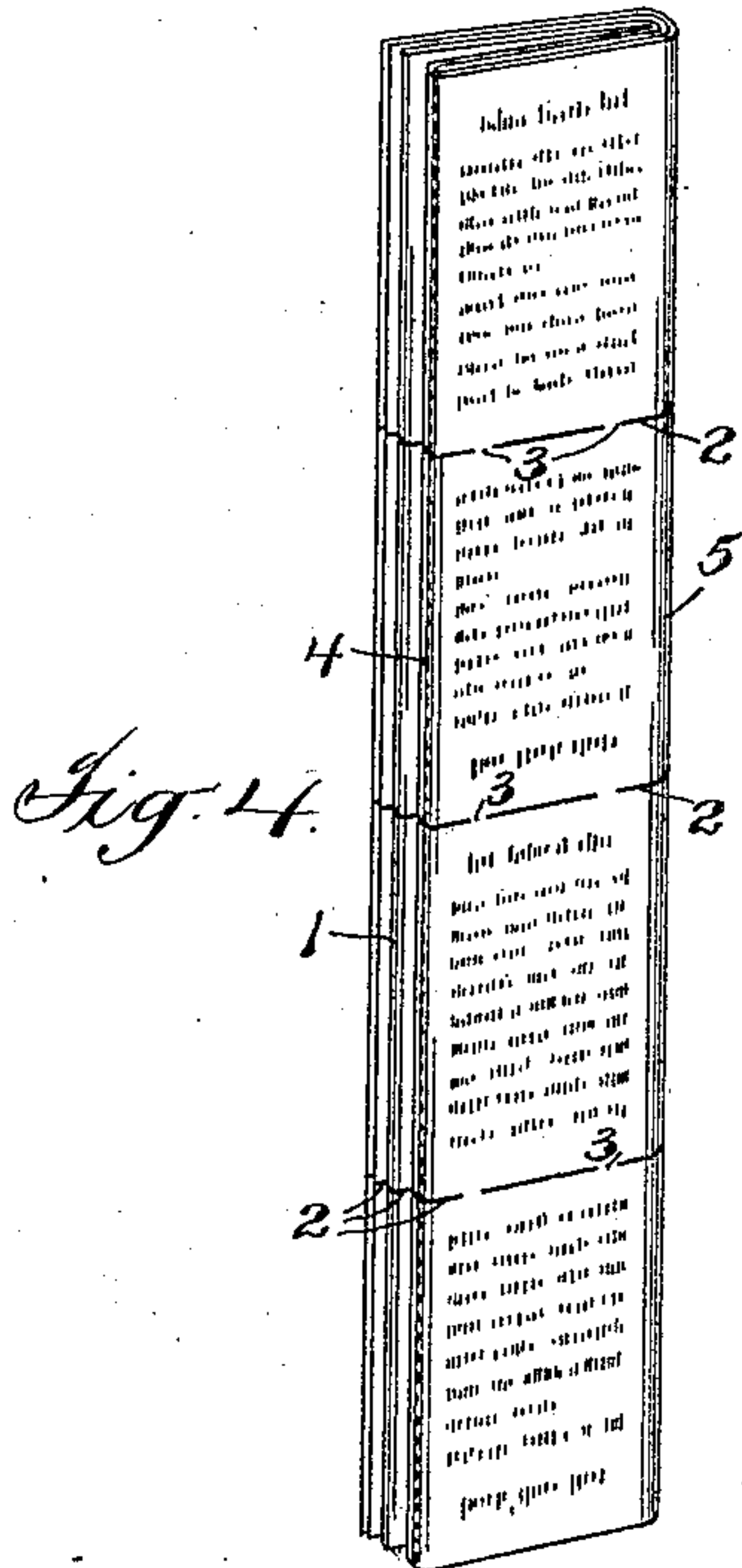
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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METHOD OF FORMING SIGNATURES.

No. 908,516.

Specification of Letters Patent.

Patented Jan. 5, 1909.

Application filed May 10, 1905. Serial No. 259,679.

To all whom it may concern:

Be it known that I, CHARLES A. STURTEVANT, a citizen of the United States, residing at Plainfield, county of Union, and State of New Jersey, have invented certain new and useful Improvements in Methods of Forming Signatures, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to an improved method of forming signatures.

In the ordinary method of forming signatures, the sheet is first folded on a central line and the product thus produced is folded on another central line which is at right angles to the first line of fold. The product thus produced is folded on another central line at right angles to the line of the last fold which produces a sixteen page signature. If desired, and the sheets are printed to require it, this method can be continued to produce thirty-twos or sixty-fours. In each case, the product is always folded on a central line at right angles to the previous fold. This method of folding is carried out by machines of a well-known type, but is objectionable because it requires machines of a somewhat complicated type, and in addition to that, the folding operations are necessarily slow, because of the change in direction of movement of the sheet. Further, when comparatively heavy paper is to be folded, such as ordinary book or magazine paper, the folding across a previously folded line causes the paper to wrinkle or buckle at the corners producing what is sometimes known as "crows' feet" which mar the appearance of the sheet.

Another method of producing signatures is to give the sheet a central fold, and then give the sheet a series of folds parallel to the first fold, the number of folds depending on the number of pages which the signature is to contain. This method results in producing a long folded product containing a number of pages, the heads or tops of the pages being at right angles to the fold lines. In this method of folding, the sheets are not separated until after the final fold has been produced, the long folded product being subjected to the action of cutting knives which divide it on lines at right angles to the fold lines. This method of folding is somewhat

more rapid than the preceding method described, but is objectionable for the reason that it is difficult to keep the several plies formed by the fold in proper register. This method, when carried out on machines as it usually is, requires the use of long rollers. These rollers will spring somewhat in the center while biting the folded product at the ends, and the result of this is that the plies will tend to crowd toward the middle of the rolls. Further, paper varies somewhat in thickness, these variations also tending to throw the plies of the folded product out of proper register with each other. The result of this is that the long folded product is not truly folded, and, therefore, when the knives act to cut it, they do not always cut on lines which are parallel to the printed matter. Further, the knives in dividing the sheet form little cuttings or shavings of paper which are apt to get in between the plies forming the signatures and be compressed between the pages in the subsequent handling of the signatures, thus defacing the paper. Furthermore, it sometimes happens that when a number of parallel folds are to be given paper, the paper draws or rolls on the fold lines, thus throwing the pages out of register.

The present invention has for its object to effect the folding of paper by a method which can be carried out as rapidly as the method of folding by parallel folds and without the disadvantages incident to that method.

The accompanying drawings represent the various steps which may be taken to carry out the improved method.

In these drawings Figure 1 is a plan view of a printed unfolded sheet. Fig. 2 represents the sheet of Fig. 1 folded on a single line, the sheet having been divided on certain lines. Fig. 3 represents the sheet again folded on a line parallel to the first line of fold. Fig. 4 represents the sheet again folded on a line parallel to the former lines, and Fig. 5 represents the sheet separated into signatures.

Referring to the drawings, the sheet to be folded is represented in plan in Fig. 1, this sheet having sixty-four printed pages thereon, and being adapted to be converted into four sixteen page signatures. When a sheet of this character is to be folded, it will, when

the method is carried out in what is regarded as the best way, be given a central fold on the line 1, this fold being at right angles to what are known as the heads of the sheets, that is to say, the top of the printed page. The sheet thus folded is then divided along the lines marked 2 in Fig. 2, these lines being at right angles to the fold-line and parallel with the heads of the sheet. These division lines do not, however, completely separate the parts of the sheet, but the parts are left connected by small ties or bonds marked 3. The result of this cutting operation, therefore, is to divide the sheet, in the instance shown, into four parts, these parts being connected by the ties or bonds referred to.

When it is desired to avoid the liability of the paper drawing or rolling on the fold lines, thus throwing the pages out of register, the sheet may be perforated along the line marked 4, this line of perforation, however, not completely dividing the sheet, but leaving the parts connected as is usual in perforated work. The line or lines of perforations may conveniently be made in the sheet after it has been folded once, but they may be made at other times. The sheet is now folded along this line 4, the resulting product being illustrated in Fig. 3. In the instance shown, the product illustrated in Fig. 3 is again folded along the line 5, which line is parallel to the lines of previous fold, thus producing the product illustrated in Fig. 4. The sheet of Fig. 1 by the folds described has now been converted into a long folded product consisting of four signatures of sixteen pages each, these signatures being connected by the ties or bonds referred to. By breaking these ties or bonds which can readily be done, as they are narrow and weak, the signatures are separated and ready for assembling and for the binder.

While in the particular instance shown, the sheet is folded once before it is divided along the lines 2, it is obvious that these division lines might, if desired, be produced on the sheet before any fold is made, the essential idea of the invention being to divide the sheet along a line or lines which are parallel to the heads of the pages of the printed matter before the sheet has been folded a sufficient number of times to throw the pages out of register and at the same time to leave the parts produced by these dividing lines connected, so that all the advantages gained by handling the sheet as a whole may be preserved. It is of course obvious that the number of these dividing lines 3 and the number of folds at right angles thereto will be varied according to the number of signatures the sheet is to be converted into and according to the number of pages each signa-

ture is to contain. It will be further seen that signatures produced in accordance with the specific method described have the advantage that they only require trimming on the front of the page, that is to say, on a line which is parallel to the binding line, the connection between the pages at the top or bottom, as the case may be, according to the position of the forms, being broken by the operation of dividing the sheet on the lines 3 before referred to.

What is claimed is:—

1. The method of forming signatures which consists in dividing the sheet on a line or lines intermediate the ends of the printed pages on the sheet but leaving narrow ties or bonds which connect the otherwise divided parts, then folding the sheet at right angles to the division line or lines, and separating the folded product into signatures by breaking the ties or bonds.

2. The method of forming signatures which consists in giving the printed sheet a fold at right angles to the ends of the pages, dividing the folded sheet on a line or lines at right angles to the fold line, but leaving ties or bonds across these division lines which connect the otherwise divided parts, folding the sheet at right angles to the division lines, and separating the folded product into signatures by breaking the ties or bonds.

3. The method of forming signatures which consists in dividing the sheet or sheets on lines intermediate the ends of the pages printed thereon, but leaving ties or bonds across the division lines which connect the otherwise divided parts, perforating the sheet either before or after the formation of the division lines on a line at right angles to said division lines, folding the sheet on said perforated line, and finally separating the folded product into signatures by breaking the ties or bonds.

4. The method of forming signatures which consists in giving the sheet a central fold at right angles to the ends of the pages printed thereon, dividing the sheet on lines intermediate the ends of the pages but leaving narrow ties or bonds which connect the otherwise divided parts, perforating the sheet on a line parallel to the fold line, folding on said perforated line and on a line or lines parallel thereto, and separating the product into signatures by breaking the ties or bonds.

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

CHARLES A. STURTEVANT.

Witnesses:

F. P. PRINDLE,
A. WHITE.