

(No Model.)

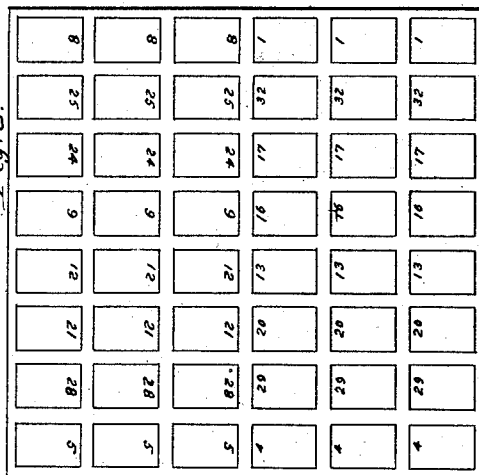
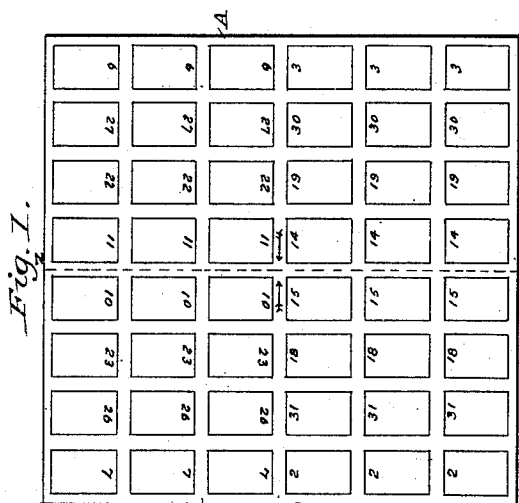
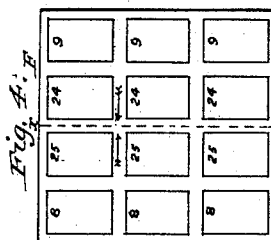
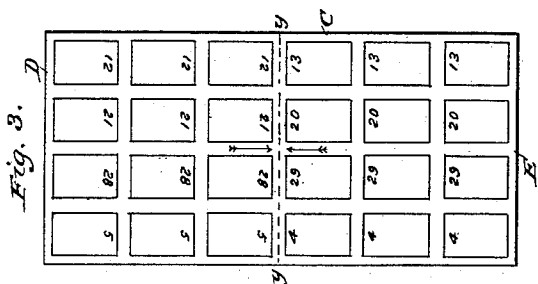
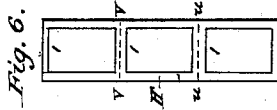
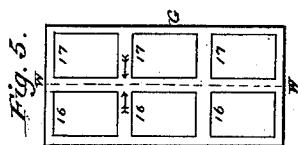
4 Sheets—Sheet 1.

D. S. CLARK.

MANUFACTURE OF BOOKS AND PAMPHLETS.

No. 375,125.

Patented Dec. 20, 1887.



Witnesses.

D. S. Clark.
H. H. Whittemore.

Inventor
Dwight S. Clark
By J. W. Osborn

Attorney.

(No Model.)

4 Sheets—Sheet 2.

D. S. CLARK.

MANUFACTURE OF BOOKS AND PAMPHLETS.

No. 375,125.

Patented Dec. 20, 1887.

Fig. 9.

32	7	16	17	24	9	8	25
32	7	16	17	24	9	8	25
32	7	16	17	24	9	8	25
32	7	16	17	24	9	8	25
32	7	16	17	24	9	8	25
32	7	16	17	24	9	8	25

Fig. 7.

30	3	14	19	22	11	6	27	26	7	10	23	18	15	2	31
30	3	14	19	22	11	6	27	26	7	10	23	18	15	2	31
30	3	14	19	22	11	6	27	26	7	10	23	18	15	2	31
30	3	14	19	22	11	6	27	26	7	10	23	18	15	2	31
30	3	14	19	22	11	6	27	26	7	10	23	18	15	2	31
30	3	14	19	22	11	6	27	26	7	10	23	18	15	2	31

Fig. 8.

32	1	16	17	24	10	8	25	28	5	12	21	20	13	4	29
32	1	16	17	24	10	8	25	28	5	12	21	20	13	4	29

Fig. 13.

2	31	18	15	10	23	26	7	6	27	22	11	14	19	30	3
2	31	18	15	10	23	26	7	6	27	22	11	14	19	30	3

Fig. 14.

4	29	20	13	12	21	28	5	8	25	24	9	16	17	32	1
4	29	20	13	12	21	28	5	8	25	24	9	16	17	32	1

Fig. 11.

32	7	16	17	24	9	8	25
32	7	16	17	24	9	8	25
32	7	16	17	24	9	8	25
32	7	16	17	24	9	8	25
32	7	16	17	24	9	8	25
32	7	16	17	24	9	8	25

Fig. 10.

29	24	24	24	24	24	24	24
29	24	24	24	24	24	24	24
29	24	24	24	24	24	24	24
29	24	24	24	24	24	24	24
29	24	24	24	24	24	24	24
29	24	24	24	24	24	24	24

Witnesses.

D. S. Clark.
H. H. H. H. H.

Inventor

Dwight S. Clark
By J. W. Osborn

Attorney.

(No Model.)

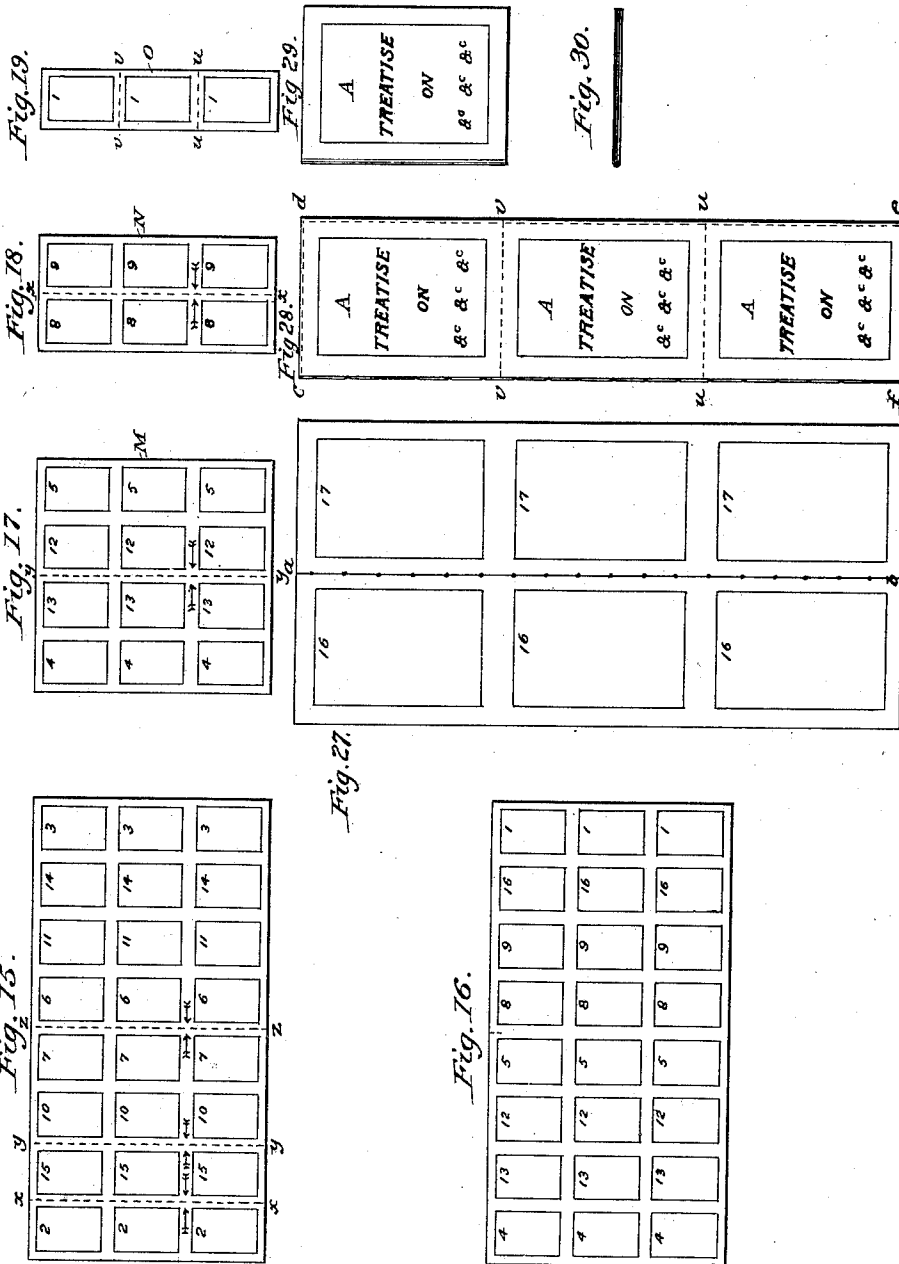
4 Sheets—Sheet 3.

D. S. CLARK.

MANUFACTURE OF BOOKS AND PAMPHLETS.

No. 375,125.

Patented Dec. 20, 1887.



Witnesses.

J. S. Clark.
A. H. Huntman

Inventor
Dwight S. Clark
By *J. W. Osborn*
Attorney.

(No Model.)

4 Sheets—Sheet 4.

D. S. CLARK.

MANUFACTURE OF BOOKS AND PAMPHLETS.

No. 375,125.

Patented Dec. 20, 1887.

Fig. 21.

45	8	52	64	53	25	1	49
45	8	52	64	53	25	1	49
56	9	24	41	48	17	76	49
56	9	24	41	48	17	76	49
55	21	12	44	54	02	81	25
55	21	12	44	54	02	81	25
40	5	28	37	36	29	4	61
40	5	28	37	36	29	4	61

Fig. 20.

89	2	16	45	62	92	7	85
89	2	16	45	62	92	7	85
50	15	18	47	42	23	10	55
50	15	18	47	42	23	10	55
15	41	61	94	84	22	11	45
15	41	61	94	84	22	11	45
62	3	30	35	38	27	6	59
62	3	30	35	38	27	6	59

Fig. 23.

64	91	91	84	33	33
64	91	91	84	33	33
64	91	91	84	33	33
64	91	91	84	33	33

Fig. 22.

64	91	91	84	14	42	6	95
64	91	91	84	14	42	6	95
64	91	91	84	14	42	6	95
64	91	91	84	14	42	6	95

Fig. 25.

64	91	91	84	14	42	6	95
64	91	91	84	14	42	6	95
64	91	91	84	14	42	6	95
64	91	91	84	14	42	6	95

Fig. 24.

64	91	91	84	14	42	6	95
64	91	91	84	14	42	6	95
64	91	91	84	14	42	6	95
64	91	91	84	14	42	6	95

Fig. 26.

64	91	91	84	14	42	6	95
64	91	91	84	14	42	6	95
64	91	91	84	14	42	6	95
64	91	91	84	14	42	6	95

Witnesses.

D. S. Clark.
H. H. Huesterman

Inventor
Doughty & Clark
By J. W. Osborn
Attorney.

UNITED STATES PATENT OFFICE.

DWIGHT S. CLARK, OF CAMBRIDGEPORT, ASSIGNOR TO WILLIAM H. FORBES,
OF BOSTON, MASSACHUSETTS.

MANUFACTURE OF BOOKS AND PAMPHLETS.

SPECIFICATION forming part of Letters Patent No. 375,125, dated December 20, 1887.

Application filed October 26, 1886. Serial No. 217,240. (No model.)

To all whom it may concern:

Be it known that I, DWIGHT S. CLARK, a citizen of the United States, residing at Cambridgeport, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in the Manufacture of Books and Pamphlets; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention has reference to the process of book-making, its object being to accomplish the necessary operations in an economic way, saving both labor and material and time as well.

In the drawings forming part of this specification, Figures 1 to 26, inclusive, illustrate the manner in which the imposing and folding are done in practically carrying out my invention. Fig. 27 shows on a larger scale the binding of three connected and folded books by means of sewing. Fig. 28 represents the same covered before trimming. Fig. 29 is a single book or pamphlet cut apart after trimming. Fig. 30 is an end elevation of the same.

In producing a book, pamphlet, or signature according to the method I have invented I begin by imposing the pages of matter by using in the form at least two, and more frequently several, repetitions of each page of composition.

The sheets may be printed as "whole" sheets, and therefore from two different forms, one for each side, and then folded; or they may be printed from one large form, turned over, printed on the back, and then cut into two "half" sheets, in the well-known way, and each half folded in the manner to be hereinafter described. In the whole sheet and in each of the half-sheets, however, at least two each of all of the pages which are required to complete the book or pamphlet must be included, as has been already explained.

The imposition of the pages of composition is accomplished in such accordance with the way in which the sheet is to be subsequently folded that when that step in the process has been completed each book, though joined to the others, forming a "group," can be separated from them by a single cut.

The folding of a sheet, however many repetitions of each page may be upon it, is adapted to the relative positions of the folios in the form, but has no reference to the number of those repetitions; nor does it increase the number of folds above that required to fold a sheet printed on both sides for a single book, pamphlet, or signature in the ordinary way—that is, the entire sheet containing a series of books is treated as a single "signature" or pamphlet, the separation of the books or signatures from each other being the last step in the process. Consequently, although the lines of foldage may be longer, there will be, as a rule, no more folds in a sheet which forms two, three, four, or eight, or other number of completed pamphlets than in a single pamphlet printed from a single form imposed for the same number of pages.

In Fig. 1 a diagram is given representing the "inside" face of a printed sheet arranged for the production of three pamphlets of thirty-two pages each. Fig. 2 shows the outside of the same sheet. In both these figures the numerals indicate the positions of the pages, and it will be found that three of every folio appear upon the two sides taken together, the object being to produce three books. Assuming Fig. 1 to lie flat upon the table, the first fold is made upon the dotted line *z z*—that is, between the "fronts" of the pages to the right and left of it and not at the "foot," as is usual where four folds are required. In doing this the edge of the sheet marked *A* is lifted and brought down upon the edge *B*, and the folded edge *C* creased down, as represented in Fig. 3. The second fold is on the dotted line *y y*, the edge *D* being lifted and made to coincide with *E*, giving the result shown in Fig. 4, *F* being the creased edge. Then on the dotted line *x x* the third fold is made, giving Fig. 5 with the folded edge at *G*, and finally the last fold on *w w* gives the three books connected together, as in Fig. 6, with the folded edge at *H*, together forming a group.

In the foregoing figures—namely, Figs. 1, 3, 4, and 5—little arrows are introduced to indicate the way in which the paper is folded on the dotted lines. In the case cited they con-

- verge for every fold, showing that the dotted lines are, as it were, depressed, and that the bending of the paper, as regarded from above, is concave—that is, the two sides of the paper are turned toward the observer or forward. This is not always the case, as will be seen hereinafter. It will also be observed in this case that the order in which the four folds follow each other is first between the fronts, then between the “heads,” then between the fronts again, and lastly through the “backs,” differing in this respect, essentially, from the well-known order followed by printers in folding single signatures.
- In Fig. 27 the next step in my process is illustrated for the same book of thirty-two pages, three on a sheet. This consists in binding all three books at once by running a row of sewing down the three backs, as shown at *a b*. This line of stitching or staples is a straight line through the sheets, which may run from the inside through the backs, as shown, or from side to side after the last fold has been made in the well-known way. It is always on the line of the last fold, and may be made with any of the usual sewing or stapling machines. As the line of fastenings is continuous through all the books, it follows that the number of handlings in feeding to the machine is reduced in the same proportion that the number of books on the sheet is increased. If a cover is desired on the book or pamphlet, it may be sewed at the same time, in which case the thread or wire will appear on the back, as in Fig. 28; or a suitable cover may be pasted on over the thread, so as to hide it, as in Fig. 29, giving a neater appearance to the pamphlet at a somewhat increased cost. In any case, after the book has been closed, having then the appearance shown in Fig. 28, the top, side, and bottom edges are to be trimmed by a paper-cutter, the dotted lines *c* to *d*, to *e*, and to *f* indicating the paper which is to be removed. Lastly, the three books are cut asunder by two cuts, one on the dotted line *v v* and one on *u u*, each one of the three then presenting the appearance delineated in Figs. 29 and 30. The successive steps in the production of a thirty-two page pamphlet, such as has been just described, may be modified without departing from the principle involved. It is, for instance, possible to change the order and the direction in which the folds are made, and when that is done it immediately becomes necessary to change the arrangement of the pages as well, so as to be in harmony therewith, and give as the final result a number of connected books, in each of which the folios follow in regular sequence.
- Figs. 7 to 14, inclusive, will serve to illustrate the way in which modifications may be made. Fig. 7 represents the inside face of a sheet the form for which was imposed so as to produce six thirty-two-page books as the result of the printing, folding, &c., of every perfected sheet. Fig. 8 shows part of the outside of the same sheet from which the arrangement of pages can be deduced. In this case the lines on which the folds are made are all parallel to each other. They are indicated by the dotted lines marked with the four last letters of the alphabet, as in the preceding case, and appear upon Figs. 9, 10, and 11, said figures representing the successive steps in the process of folding. The arrows, as before, indicate the direction in which the sheet is turned, the first, third, and fourth being forward and the second backward, assuming that the sheet lies all the time upon the folding-table with its face up, which of course need not be the case. Figs. 13 and 14 show still another modification of this same form, in which the imposition is so modified as to admit of all the folds being parallel and at the same time in the same direction—namely, inward—as indicated by the dotted lines and arrows which appear in Fig. 13, the former being marked, as before, with the same letters, *z* being the first fold, *y* the second, and so on backward. In Figs. 9, 10, 11, and 12 the capital letters I, J, K, and L indicate, after each fold, the creased edge of the paper. The final separation of the six pamphlets is effected by single cuts upon the dotted lines *v*, *u*, *s*, *t*, and *r* of Fig. 12, the work being of course first trimmed on the three sides, as before described, after sewing or otherwise binding, as shown and explained in connection with Figs. 27 to 30, inclusive.
- Figs. 15 and 16 show the two sides of a sheet arranged to furnish three pamphlets of sixteen pages each. As in the previous case, the dotted lines and arrows indicate the way of folding, the same letters being used, and the folded edges are represented by M, N, and O, respectively.
- Figs. 20 and 21 represent the two sides of a sheet printed from forms imposed for the simultaneous production of two copies of a sixty-four-page book. As in the preceding cases, the dotted lines and arrows indicate the manner of folding, and the letters P, Q, R, S, and T mark the creased edges in Figs. 22, 23, 24, 25, and 26. The two books are separated by cutting the dotted line *v v*.
- From the foregoing it will be seen that when it is desired to intermix two or more repetitions of each page of a book or pamphlet embracing any of the usual numbers of pages it is always possible to so adapt the imposing of the form to the particular manner and sequence of the folds that the result shall be the production of a certain number of perfectly-arranged books, the folio-numbers of which follow in regular succession, joined together at the ends, so as to be separable from each other by a single cut. I have found, so far as my experiments have extended, that a sheet of paper upon which any multiple of eight pages of matter are to follow each other, forming eight-page books, can be folded in two legitimate ways only, which require a different imposition of the forms arranged to cover both sides of the paper with the desired number of

multiples of said eight pages. For sixteen pages of matter the number of changes under like conditions will, I believe, prove to be four; for thirty-two, the number will be eight, and for sixty-four, sixteen, &c.

The advantages which accrue from my method are obvious when pointed out. They may be briefly cited as follows:

First. The economic use of large forms, for which many presses are now fitted.

Second. The folder, dealing with large sheets, makes only the same number of movements he has to make in folding a single book.

Third. In trimming, material and labor are both saved. If we compare the loss of paper in trimming a single book with the loss incurred upon the six books shown in Figs. 7 to 12, inclusive, it will be seen that to trim the six books in the ordinary way requires eighteen cuts, while when my method is followed eight are sufficient. In the former case, too, paper is lost on three sides, whereas I waste on each book paper from two and one-sixth sides only; or, to put it differently, in trimming the six books I save a strip of paper as long as the length of the sheet and at least one and one-fourth inch wide.

Fifth. In stitching or otherwise binding the books and attaching the covers the number of movements is greatly diminished and convenience in handling increased.

I am aware that it is a common thing to print simultaneously two or more impositions

of the same series of pages required for a book or pamphlet in the same press and at the same time, each series to be cut asunder while flat and folded separately; and I do not claim, broadly, any such proceeding.

What I do claim, and desire to secure by Letters Patent, is—

1. The improvement in the art of making books, which consists, first, in imposing a plurality of all the pages required to make a single book, then printing a sheet from said imposed pages, then folding the sheet into a group of books, then binding the group along a single line, then trimming the group as a whole along its unbound margins, and finally separating the books forming the group by a number of cuts less by one than the whole number of books, substantially as and for the purpose described.

2. The step in the method of book-making hereinbefore described, which consists in folding a printed sheet which contains a group of suitably-imposed books upon a line coincident with the back fold common to all books of the group, then securing the leaves of the whole group together along the common back fold, and then severing the books from each other.

In testimony whereof I have hereunto affixed my signature in the presence of two witnesses.

DWIGHT S. CLARK.

Witnesses:

SELWYN Z. BOWMAN,
CHARLES S. ENSIGN.