J. BENGOUGH.

BOOK FORMING MECHANISM.

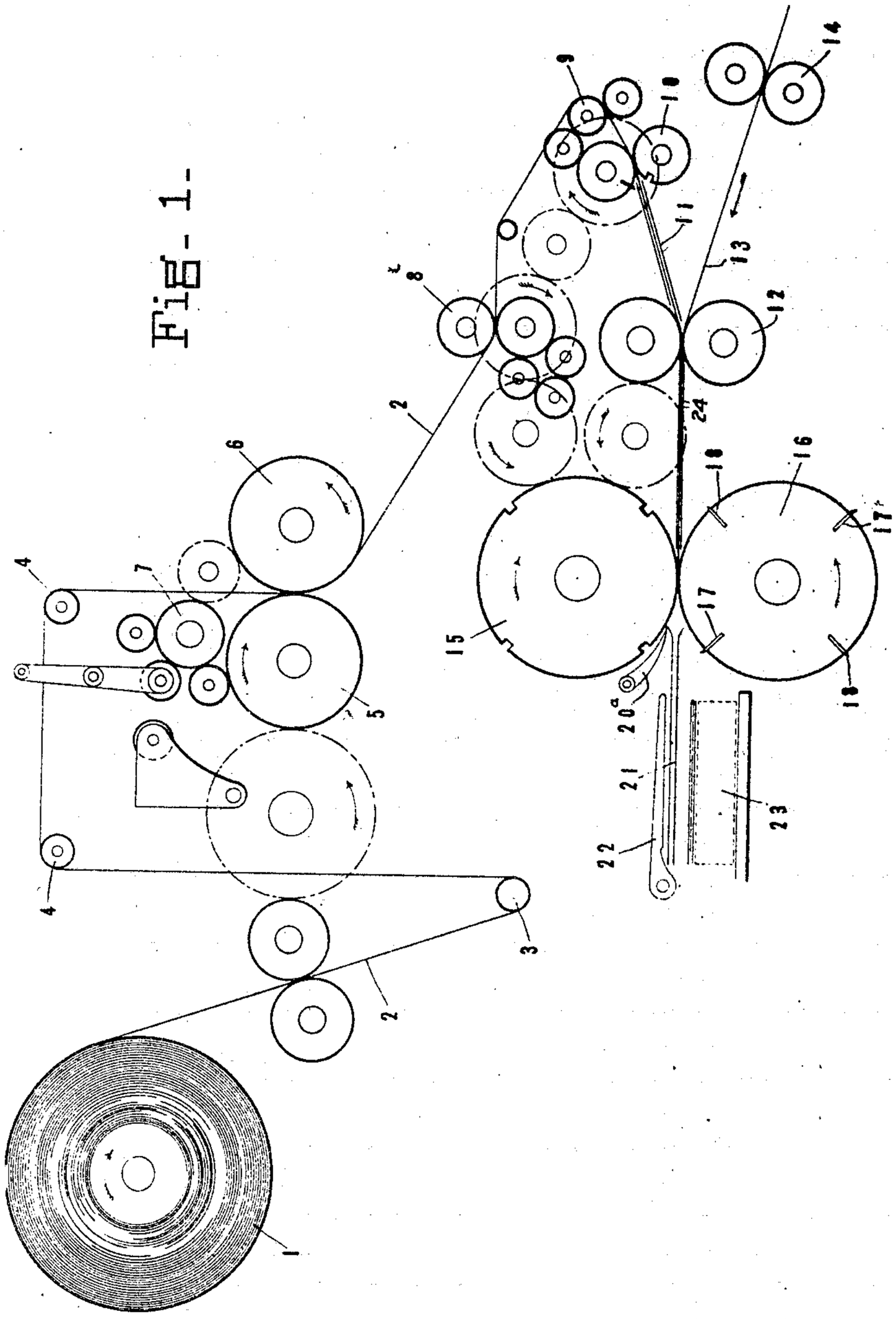
APPLICATION FILED JUNE 12, 1906.

929,652.

Patented Aug. 3, 1909.

2 SHEETS—SHEET 1.

Fig. 1.



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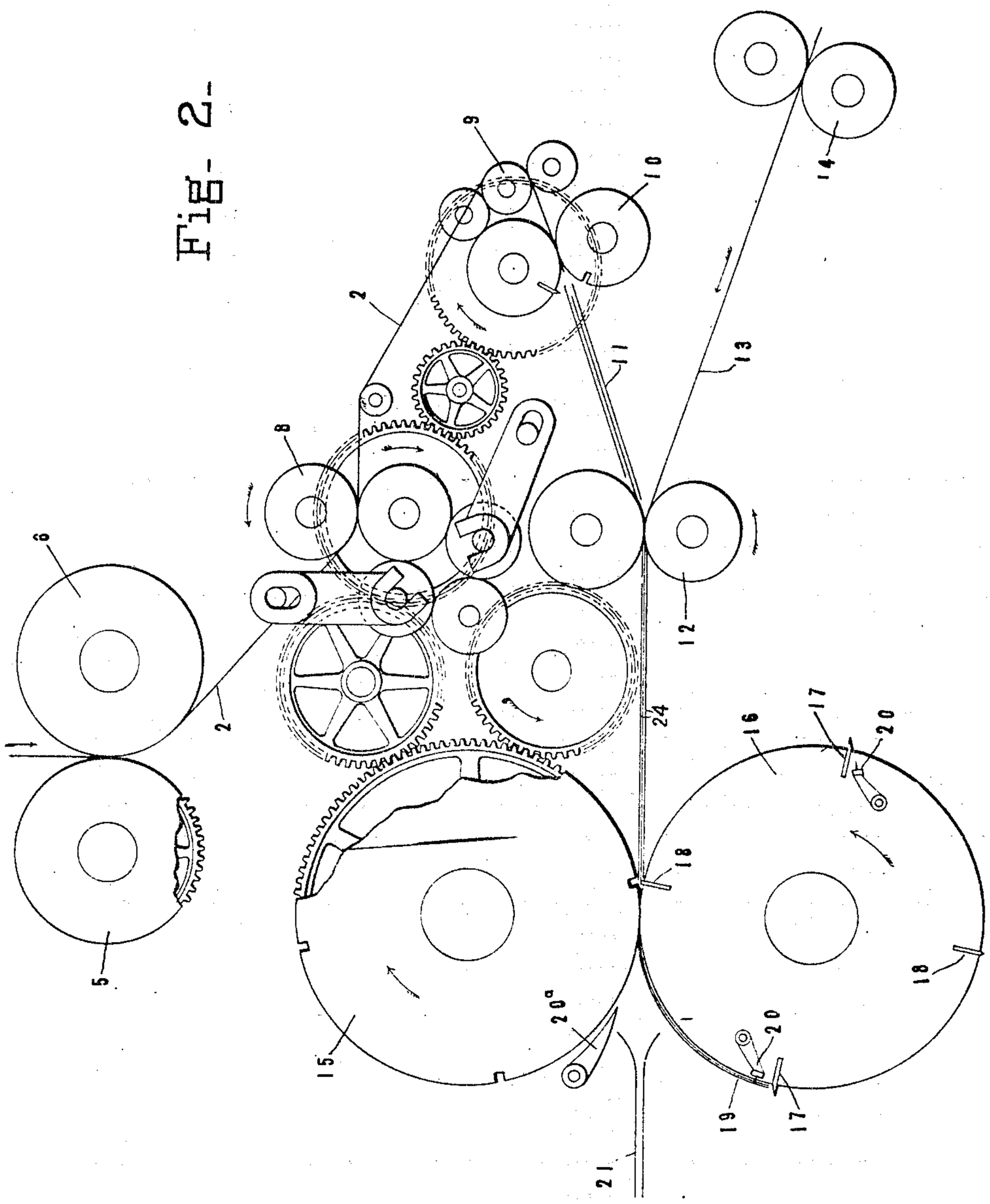
2 SHEETS—SHEET 2.

Fig. 2.



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BOOK-FORMING MECHANISM.

No. 929,652. Specification of Letters Patent. Patented Aug. 3, 1909.

Application filed June 12, 1906. Serial No. 321,342.

To all whom it may concern:

Be it known that I, JAMES BENGOUGH, residing at Niagara Falls, in the county of Niagara and State of New York, have invented certain new and useful Improvements in Book-Forming Mechanism, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to means for forming and handling sheets in the manufacture of sales books and the like. One of the objects thereof is to provide simple and efficient mechanism for forming a set of leaves from a plurality of webs.

A more specific object is to provide mechanism of the above type for preparing and arranging a set of leaves of alternate single and folded form.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, wherein is shown one of various possible embodiments of this invention,—Figure 1 is a diagrammatic elevation thereof. Fig. 2 is a similar view of certain of the parts shown in Fig. 1 upon a larger scale and in more detailed form.

Similar reference characters refer to similar parts throughout both views of the drawings.

Referring now to Fig. 1 of the drawings, there is shown a roll 1 which may be assumed to be of tissue paper, the web 2 from which passes over a tension roller 3 and suitable guide rollers 4 to impression and plate cylinders 5 and 6 respectively. These cylinders are provided with the customary inking rollers 7, and the entire mechanism is connected throughout with gearing which it will not be necessary to describe in detail. From the rollers 5 and 6 the web 2 passes through numbering apparatus 8, which is herein diagrammatically represented and may be of any approved type, the specific construction thereof forming in itself no part of the present invention. From the numbering mechanism the web passes over rollers 9 to cutting cylinders 10, the action of which will hereinafter be described in detail. A sheet path 11 leads from cutting cylinders 10 to feed rolls 12, as shown in the drawings. Also leading to feed rolls 12 is a web 13, which is suitably printed and numbered as by the mechanism 14, each consecutive portion of a length equal to that from the cutting point of the mechanism 10 to the bite of the rolls 12 receiving a number and these numbers being repeated upon such consecutive portions, thus providing a portion bearing the same number twice of a length equal to twice that above set forth. From the rollers 12 the superimposed webs 2 and 13 pass toward the cylinders 15 and 16. It will be noted that inasmuch as at each revolution of the mechanism 10 the web is severed it will be in the form of separate sheets as it passes toward the last-mentioned cylinders, and will preferably rest upon the unsevered web 13, suitable tapes 24 being provided if desired.

The several parts are so proportioned and interconnected by suitable gearing as to feed the web 2 at one-half the rate of peripheral speed of the rollers 12, whereby upon its free edge entering the bite of the latter rollers it will be accelerated and spaced from the main portion of the web from which it is cut.

The cylinders 15 and 16 are provided with cutting and creasing mechanism, which, as it is of a well-known-type, will not be described in detail. It is sufficient to note that upon the cylinder 16 are mounted two cutting blades 17 diametrically disposed upon the circumference thereof, and intermediate these parts are positioned the folding blades 18. Proper coöperating female parts are provided upon the cylinder 15, and it will be seen that the web 13 will be severed at each half revolution of these cylinders. Assuming the latter web with a sheet 19 from web 2 superimposed thereon to enter between these cylinders, it is immediately transfixed by carrying pins 20, the operation of which is well known, and carried partially about the cylinder. At a point substantially coincident with the end of sheet 19, however, the creasing blade 18 engages the web 13 and creases the same, the folded portion being carried toward strippers 20^a, from which it passes into a suitable sheet path 21.

The operation of the above-described em-

bodiment of this invention is substantially as follows:—Assuming a free edge of the web 2 to enter between the rollers 12, it is instantly severed by the mechanism 10 and permitted to travel at the accelerated speed at which the rollers 12 are driven. This sheet having been suitably printed and numbered by the mechanisms 6 and 8 respectively. is thus superimposed upon the web 13 and carried to a position between the cylinders 15 and 16. The parts are so synchronized as to sever the web 13 at a point substantially coincident with the forward free edge of the already severed sheet 19 and to transfix the free edges of both sheets as by the pins 20. These sheets are then carried partially about the roller 16 and the creasing blade 18 brought into play at a point substantially opposite the rear edge of sheet 19. The partially folded web 13 is thence carried about cylinder 15 until stripped therefrom at its folded portion by the parts 20ª, from which it passes into the sheet path 21. The succeeding cutting blade 17 thereupon severs web 13 at such a point as to bring the fold substantially midway between the ends of the severed sheet. There is thus passed into the sheet path 21 a folded sheet from the web 13 and an unfolded sheet 19 from the web 2 of substantially one-half the length thereof, thus providing an element for the completed book or pad comprising a superimposed sheet of tissue paper of a predetermined length and a folded sheet of paper which is preferably of a heavier character and which in folded condition is of substantially the same length. It will also be apparent that the sheets 19 are consecutively numbered and the sheets cut from web 13 are also consecutively numbered but bear this number twice, thus duplicating the same upon each portion of the leaf in its final form. These numbers are alike upon both folded and single sheets, and upon being removed from the sheet path 21 as by a fly 22 there is provided a pile of leaves 23 of a form, disposition and character adapted to be bound into a well-known type of manifolding book.

The entire series of operations above set forth is repeated with each sheet, it being noted that on account of the rate of travel of the rollers 12 being double that of the feed of the web 2 the severed sheet 19 will, upon passing through these rollers, be spaced from the forward free edge of the web from which it is cut by a distance equal to one-half the length of one sheet, thus insuring the arrival of this free edge at the rollers 12 coincident with the arrival at that point of the next succeeding section or portion of the web 13.

It will thus be seen that I have provided an efficient and reliable mechanism well adapted to accomplish the several objects of this invention.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense. It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention, which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new, and desire to secure by Letters Patent is:

1. In apparatus of the class described, in combination, cutting means, feeding means adapted to feed a web toward the same at a predetermined speed, means adapted to feed a second web toward said feeding means at one half of said speed, and means adapted to sever said second web as its forward edge enters said first-named feeding means.

2. In apparatus of the class described, in combination, feeding means, means adapted to feed a web toward the same at a predetermined speed, means adapted to feed a second web toward the same at one half of said speed, means adapted to sever said second web upon entering said feeding means, said second web being so positioned with respect to said first web that the severed portion thereof will be superimposed upon said first web, cutting means in operative relation to said first-mentioned feeding means and adapted to sever said first web, and means adapted to remove the severed sheets of said webs.

3. In apparatus of the class described, in combination, feeding means, means adapted to feed one web toward the same at a predetermined speed, means adapted to feed a second web toward the same at one-half of said speed, means adapted to sever said second web upon entering said feeding means, means adapted to carry said severed sheet and said first web in superimposed relation, cutting and folding means independent of said first feeding means in operative relation to said carrying means and adapted to act upon said unsevered web, and means adapted to remove severed sheets from said first and second web in folded and unfolded condition respectively and superimposed with relation one to another.

4. In apparatus of the class described, in combination, a cylinder provided with alternately disposed cutting and folding blades, a cylinder provided with means adapted to co-act with said blades, means comprising a pair of feed rolls adapted to feed a web into operative relation with said cylinders

said cylinders being adapted to sever and fold said web, means adapted to feed a second web to said feed rolls at one-half the rate of speed of said first web, and means adapted to sever said second web simultaneously with its entrance between said feed rolls.

5. In apparatus of the class described, in combination, a cylinder provided with alternately disposed cutting and folding blades, a cylinder provided with means adapted to co-act with said blades, means comprising a pair of feed rolls adapted to feed a web into operative relation with said cylinders said cylinders being adapted to sever and fold said web, means adapted to feed a second web to said first feed rolls at one-half the rate of speed of said first web, and means adapted to sever said second web simultaneously with its entrance between said feed rolls and into portions equal in length to one-half of the portions into which said first web is severed.

6. In apparatus of the class described, in combination, a cylinder provided with alternately disposed cutting and folding blades, a cylinder provided with means adapted to co-act with said blades, means comprising a pair of feed rolls adapted to feed a web into operative relation to said cylinders whereby the same is severed into sheets, and means adapted intermittently to feed to said feed rolls a series of sheets of one-half the length of those into which said web is severed and in superimposed relation thereto whereby said severed sheet and said web will be fed to said cylinders at the same speed.

7. In apparatus of the class described, in combination, means adapted to number consecutively consecutive portions of each of a pair of webs; and means adapted to superimpose and sever correspondingly numbered portions of said webs, the severed portions of one of said webs being of greater length that the severed portions of the other of said webs.

8. In apparatus of the class described, in combination, means adapted to number consecutively consecutive portions of a web, means adapted to number consecutively consecutive portions of another web, said portions of said second web being of twice the length of those of said first web, means adapted to sever said portions, means adapted to fold the portions of said second web about the correspondingly numbered portions of said first web, and means adapted to remove said portions of said two webs in superimposed relation.

9. In apparatus of the class described, in combination, feeding means, means adapted to feed a web toward the same at a predetermined rate of speed, means adapted to feed a second web toward the same at a greater rate, and means adapted to sever said webs into sheets substantially proportional in relative length to the relative rates at which they are fed, and means adapted consecutively to number the sheets of each web in such manner as to give superimposed sheets corresponding numbers.

10. In apparatus of the class described, in combination, feeding means, means adapted to feed a web toward the same at a predetermined rate of speed, means adapted to feed a second web toward the same at a greater rate, means adapted to sever said webs into sheets substantially proportional in relative length to the relative rates at which they are fed, means adapted to fold the sheet of greater length, means adapted to remove said sheets in superimposed relation, and means adapted consecutively to number the sheets of each web in such manner as to give superimposed sheets corresponding numbers.

11. In apparatus of the class described, in combination, feeding means, means adapted to feed a web toward the same, means adapted to feed a second web toward the same, means adapted to sever said second web upon the same entering said feeding means, means adapted to carry the severed sheet of said second web and said first web in superimposed relation, means adapted to cut said first web, means adapted to remove said webs in superimposed relation, and means adapted consecutively to number the sheets of said web in such manner as to give superimposed sheets corresponding numbers.

In testimony whereof I affix my signature, in the presence of two witnesses.

JAMES BENGOUGH.

Witnesses:
WM. A. PRINGLE,
JOHN R. DICKSON.