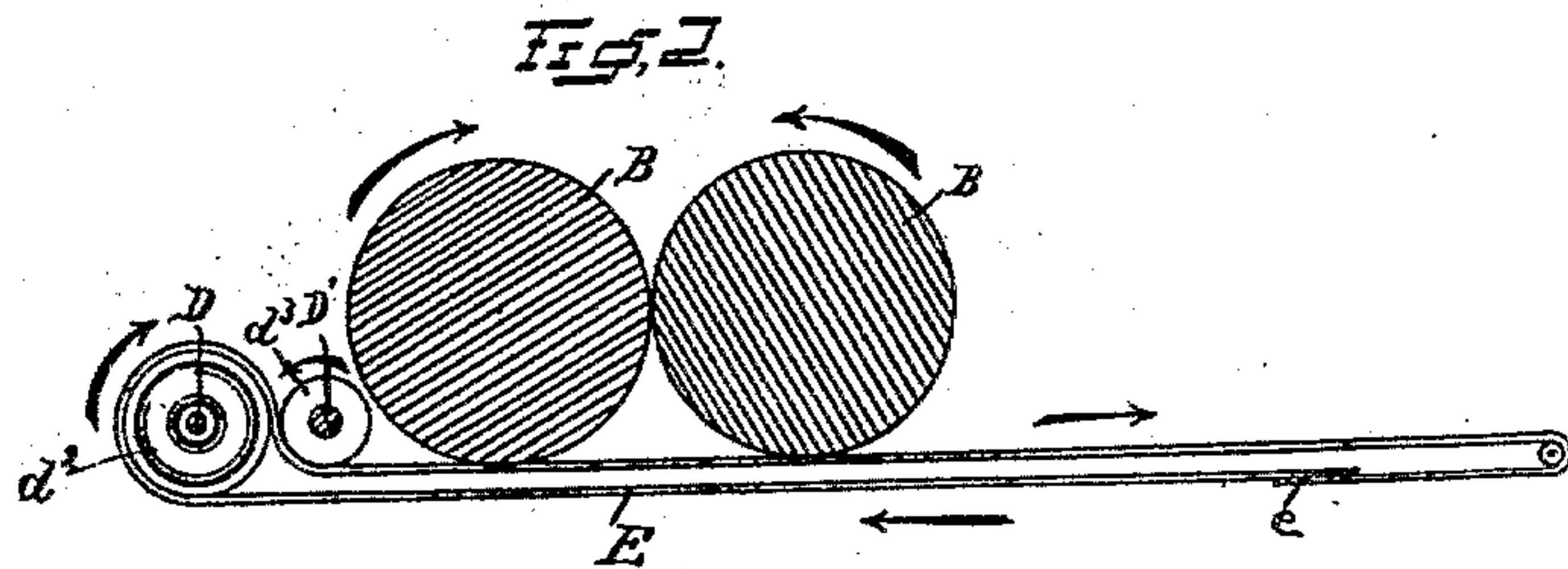
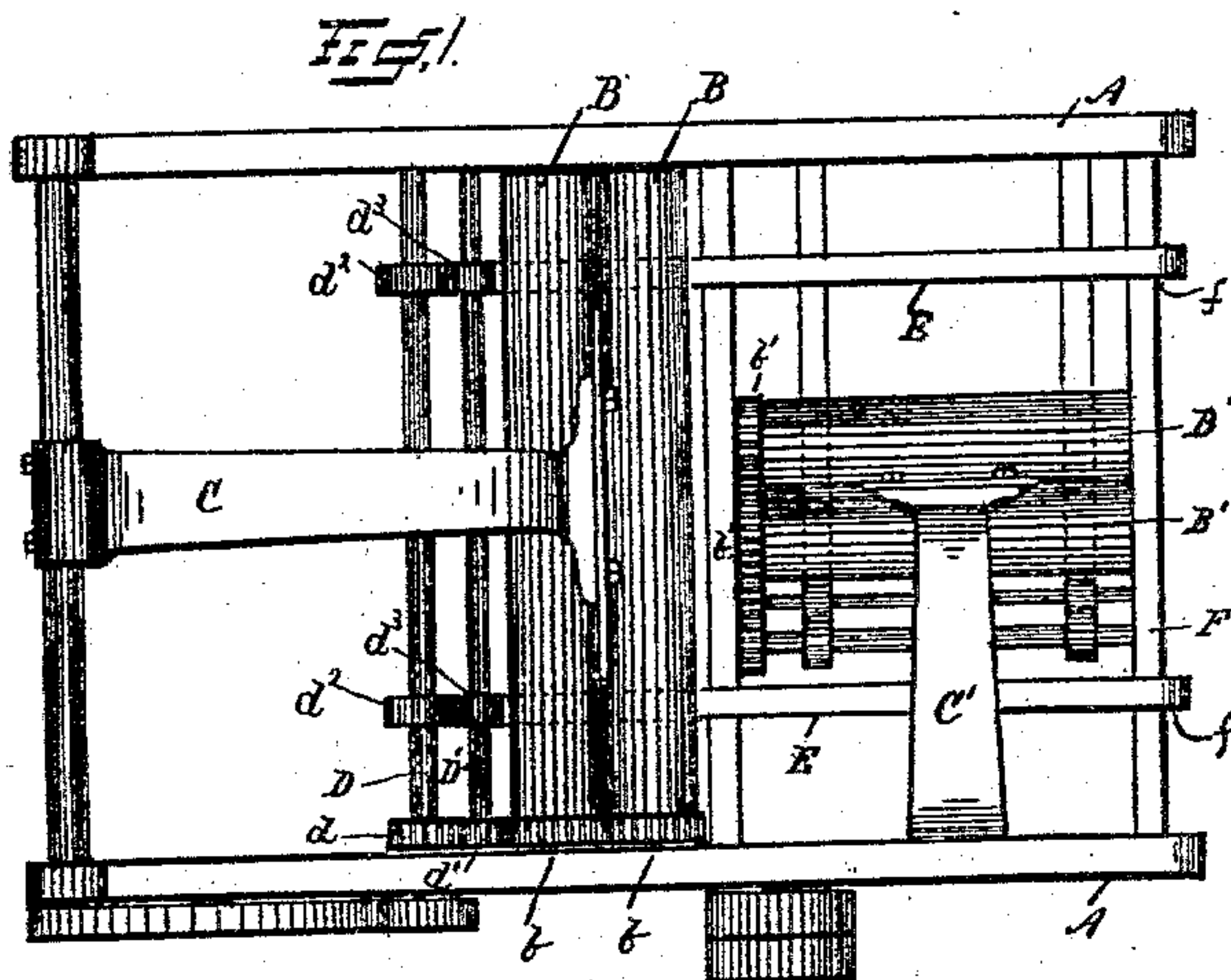


(No Model.)

W. DOWNING.
PAPER FOLDING MACHINE.

No. 553,111.

Patented Jan. 14, 1896.



WITNESSES:

W. Marks, Jr.
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UNITED STATES PATENT OFFICE.

WELLINGTON DOWNING, OF ERIE, PENNSYLVANIA.

PAPER-FOLDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 553,111, dated January 14, 1896.

Application filed December 17, 1894. Serial No. 532,114. (No model.)

To all whom it may concern:

Be it known that I, WELLINGTON DOWNING, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Folding-Machines; 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 relates to folding-machines; and it consists in certain improvements in the construction thereof, as will be hereinafter fully described, and pointed out in the claim.

The invention is illustrated in the accompanying drawings as follows:

Figure 1 shows a plan of a two-fold folder embodying my invention, the top being removed to better show the parts. Fig. 2 shows a pair of folding-rolls in section, with the conveying-tapes and their carrying mechanism in proper position relative to said rolls, the arrangement and construction of these parts being the especial subject of my invention.

A marks the frame of the machine; B B, the first-fold rolls; B' B', the second-fold rolls; C, the starter for the first fold; C', the starter for the second fold; *b b*, intermeshing gears at one end of the first-fold rolls for insuring an equal speed in the two rolls, and *b' b'* like gears at one end of the second-fold rolls. The mechanism for driving the rolls actuating the starter, &c., may be of any desired construction. As shown they are as commonly used.

At the side of the first-fold rolls opposite to that from which the sheets are to be conveyed is a journaled tape-carrying shaft D having a gear *d* thereon, near its end, and in the same plane with the gears at the end of the first-fold rolls. Between this shaft and the adjacent roll is an intermediate shaft D' having a gear *d'* keyed thereon, near its end, which gear *d'* meshes with the gear *b* of the adjacent folder-roll and also with the gear *d* forming an intermediate to said gears. On the shaft D are tape-spools *d*² and on the shaft D' are intermediate tape-spools *d*³. The conveying-tapes E pass in the direction of the arrows shown in Fig. 2 around the spool *d*², under the spool *d*³, under the first-fold rolls,

over and beyond the second-fold rolls, around loose spools *f* on a shaft F, and back to the place of beginning. It will be noted by following the direction of the rolls and gears thereon, the gear *d'* and gear *d* (shown by arrows in Fig. 2) that the spools *d*² and *d*³ rotate in a direction to properly accomplish this movement of the conveying-tapes.

A similar arrangement of shafts, gears, drive-spools and tapes is used in connection with the second-fold rolls; but as their construction and operation are identical with those of the same parts described in connection with the first-fold rolls they are not in this connection described in detail.

Hitherto, so far as I am aware, the conveying-tapes for carrying the sheets from the folding-rolls have been passed around one of the folding-rolls B or B', passing between the rolls with the sheets to be folded. This construction is objectionable for various reasons, among which may be mentioned a tendency of the sheets "buckling" and "smutting," which often happens when a joint, as *e*, in the tape, (shown in Fig. 2,) which is necessarily thicker than the rest of the tape, passes through below the rolls with the sheet. This is sometimes obviated by making grooves in the roller on which the tapes run and placing the tapes in them; but this is objectionable as it does not make so satisfactory a fold, which defect becomes especially noticeable when many folds of the sheet are made. A further objection is the effect of the starter-knives cutting or nipping the joints if the feeder misses a feed and the knife comes in direct contact with the tapes.

With my construction folding-rolls may be used and be perfectly adjusted to pass only the paper itself. This insures a perfectly even fold in all instances. My construction also permits of the use of metallic fasteners for the joints of the tapes, as an enlargement of the tapes at the joints does not in my construction affect the perfect operation of said tapes. From this it will be seen that the main object of my invention is to provide means independent of the folding-rolls for carrying and driving the conveying-tapes, so as to obviate the passage of the tapes between the folding-rolls.

What I claim as new is—

The combination with the folding rolls of a folding machine; and the conveying tapes for carrying the sheets from said rolls; of an intermediate shaft at the side of said folding rolls,
5 for aligning and driving said tapes; a main shaft for carrying and driving said tapes; means of supporting said tapes in proper relative position immediately beneath the delivery point of the rolls; gears on the folding
10 rolls; an intermediate gear carried by the in-

intermediate shaft meshing the gear on the adjacent folding roll; and a gear on the main shaft meshing the intermediate gear.

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

WELLINGTON DOWNING.

Witnesses:

H. C. LORD,

WM. MARKS, Jr.