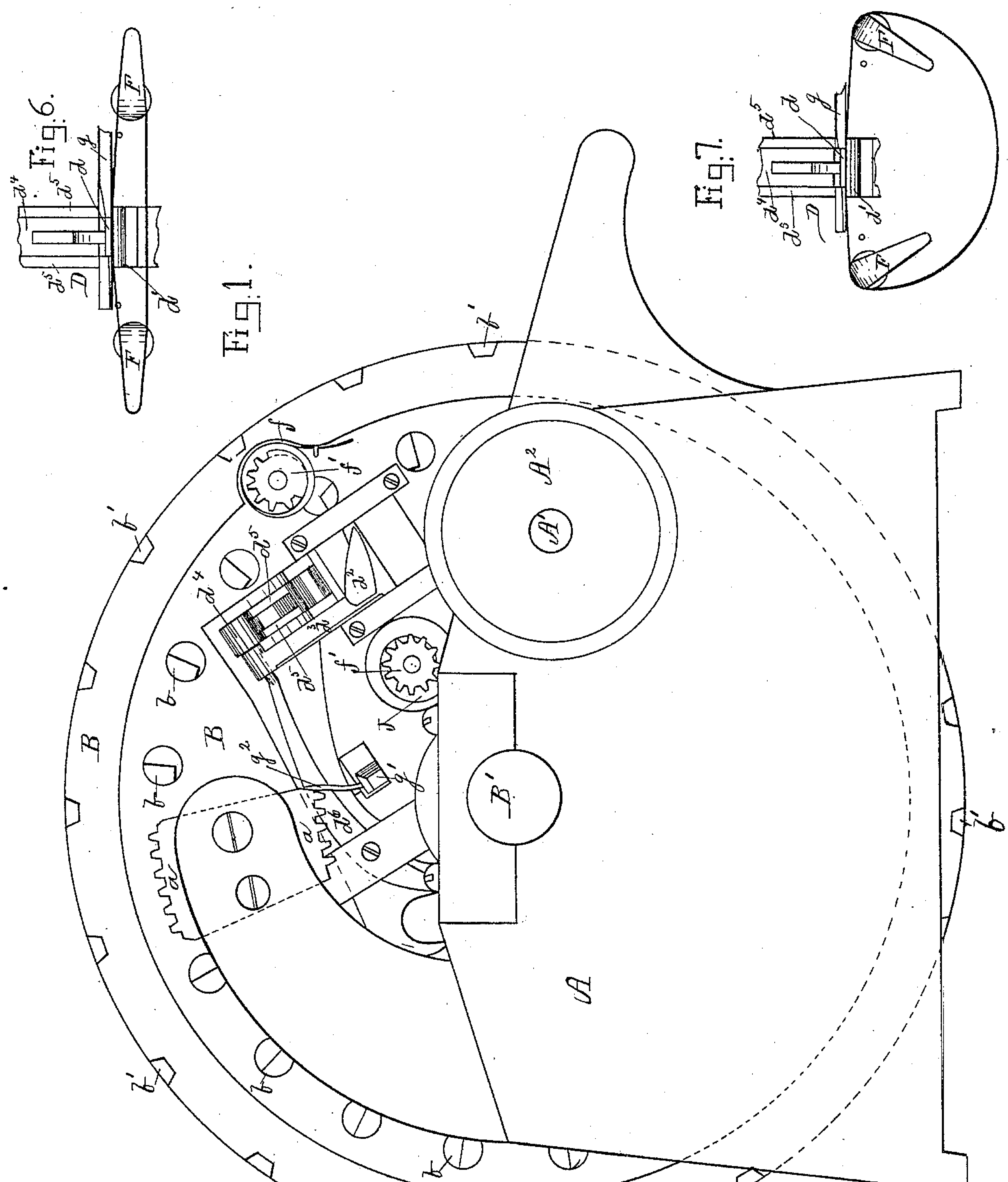
(Model.)

5 Sheets—Sheet 1.

G. A. FULLERTON.

MACHINE FOR FOLDING ABRASIVE BELTS.

No. 432,030. Patented July 15, 1890.



Witnesses:
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John R. Snow.

Inventor
Geo. A. Fullerton.

(Model.)

5 Sheets—Sheet 2.

G. A. FULLERTON.

MACHINE FOR FOLDING ABRASIVE BELTS.

No. 432,030. Patented July 15, 1890.

Fig. 2.

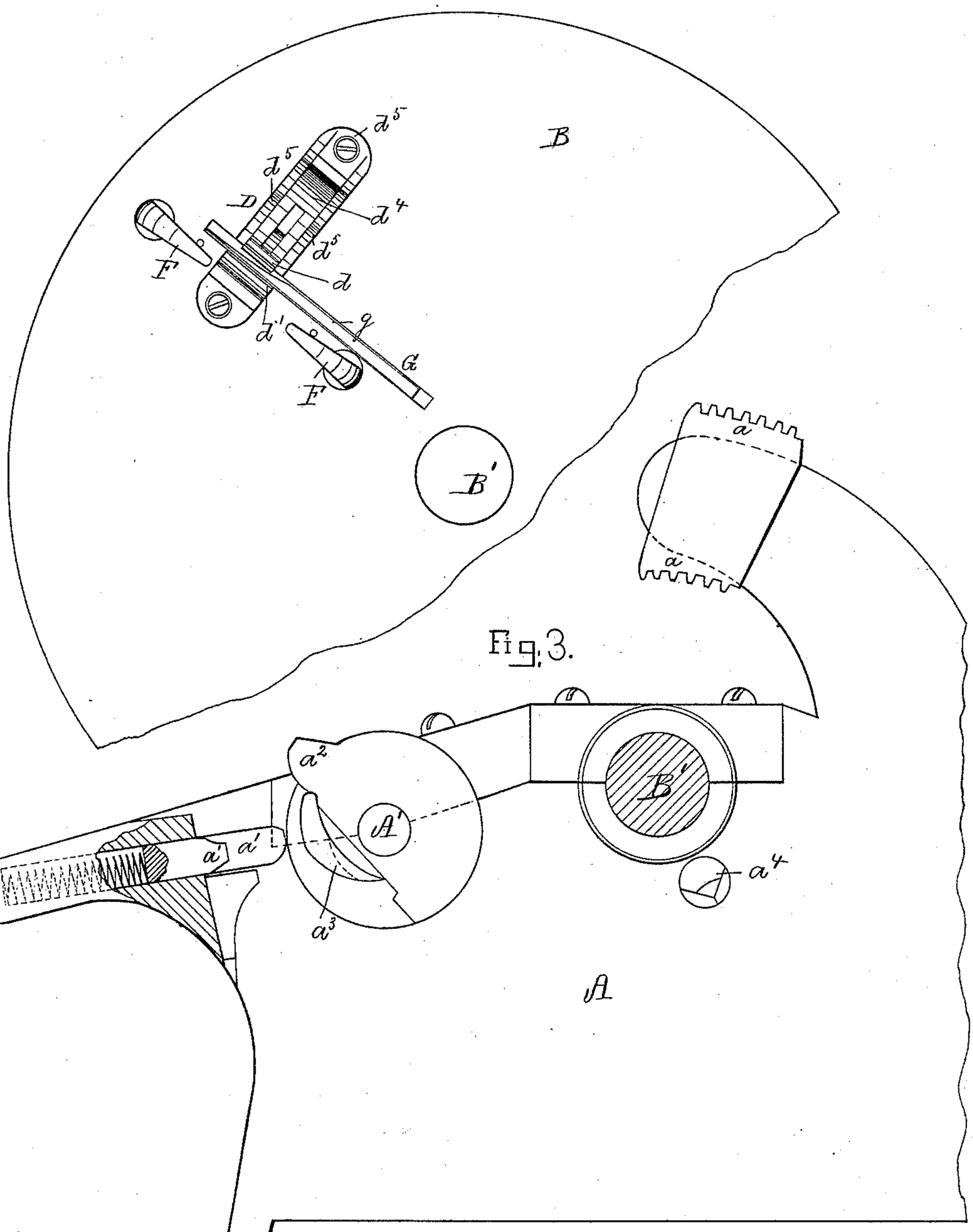

Fig. 3.

Witnesses

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5 Sheets—Sheet 3.

G. A. FULLERTON.

MACHINE FOR FOLDING ABRASIVE BELTS.

No. 432,030. Patented July 15, 1890.

Fig: 4.

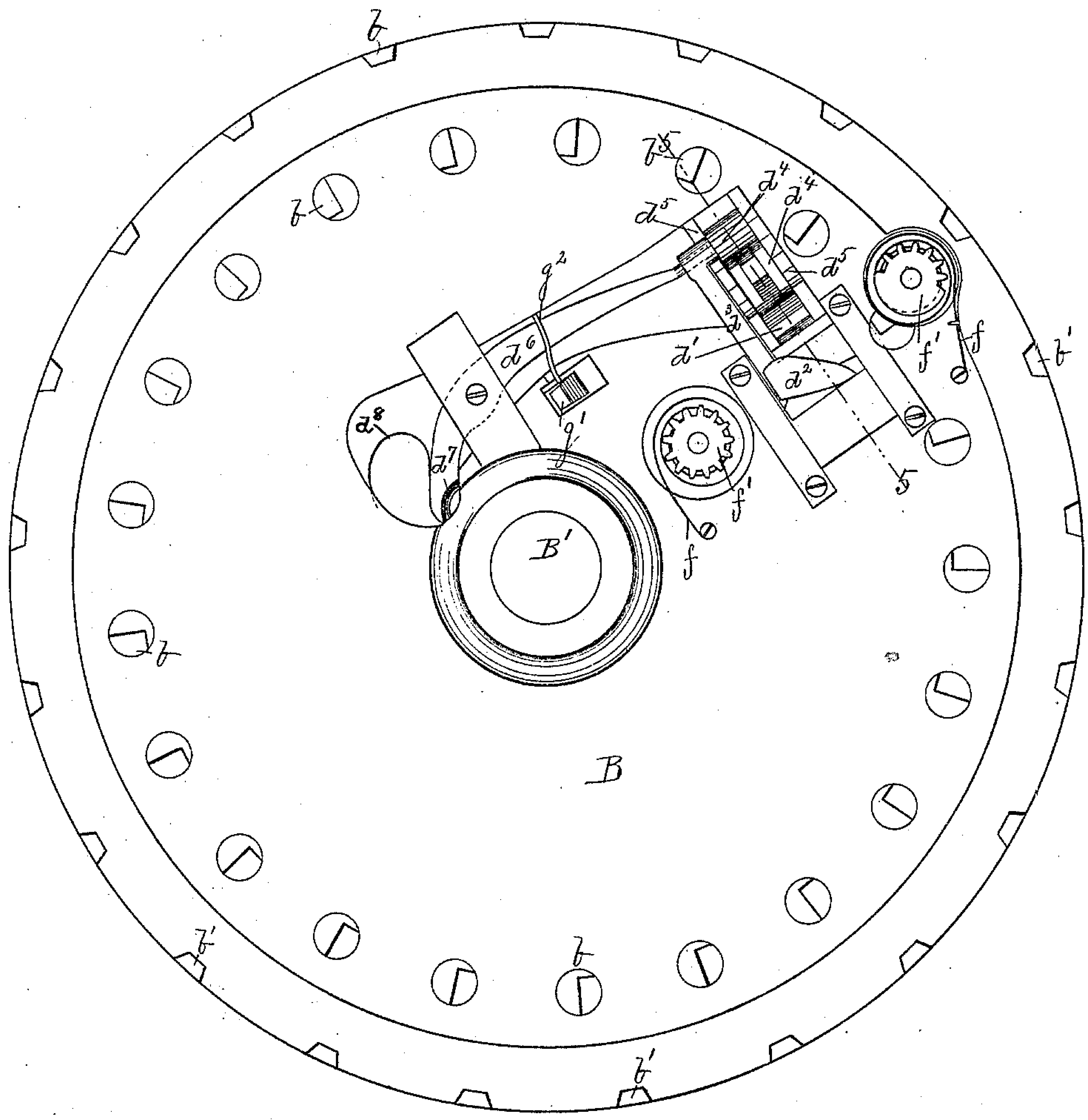
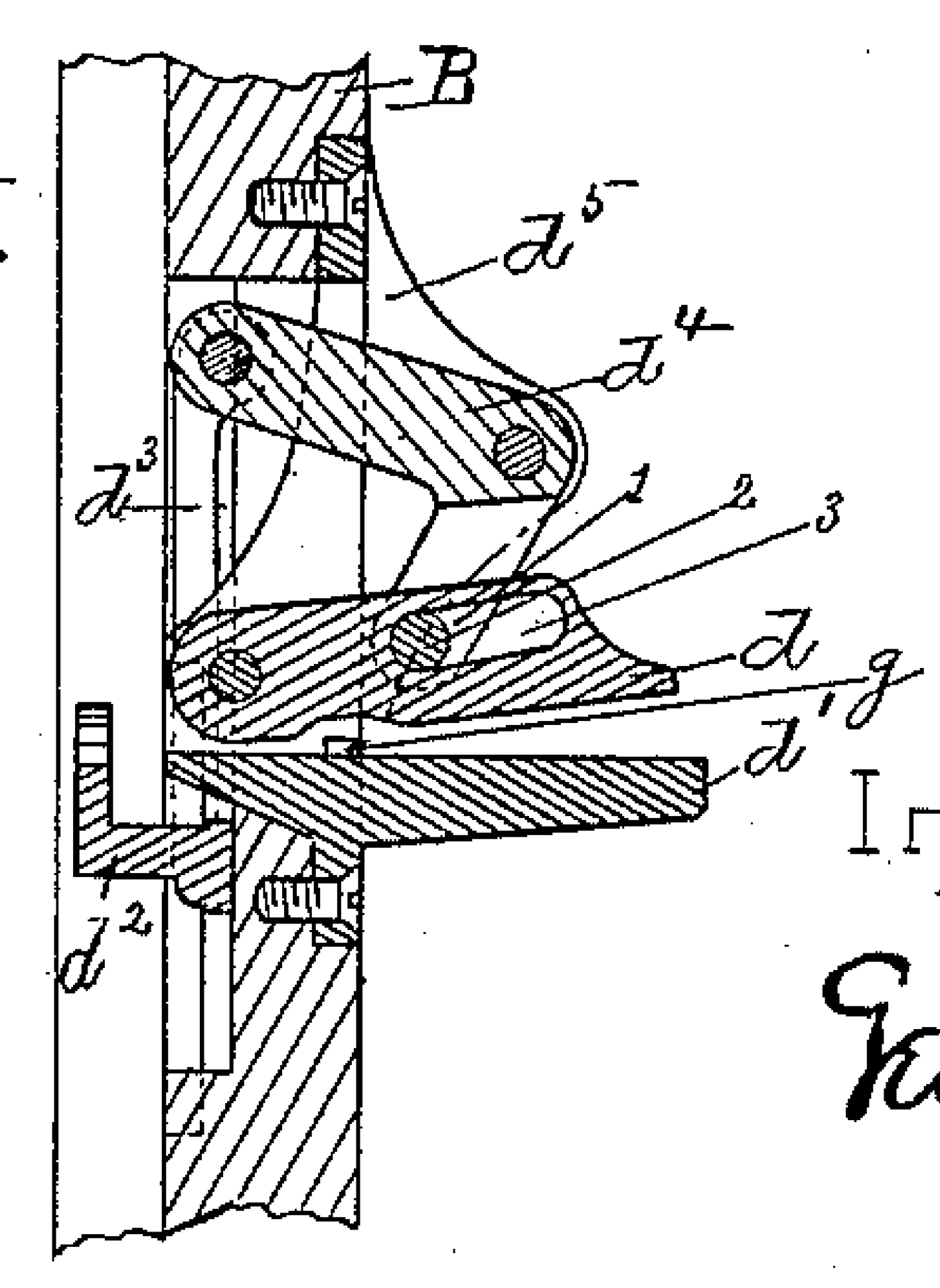


Fig: 5.



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Geo. A. Fullerton

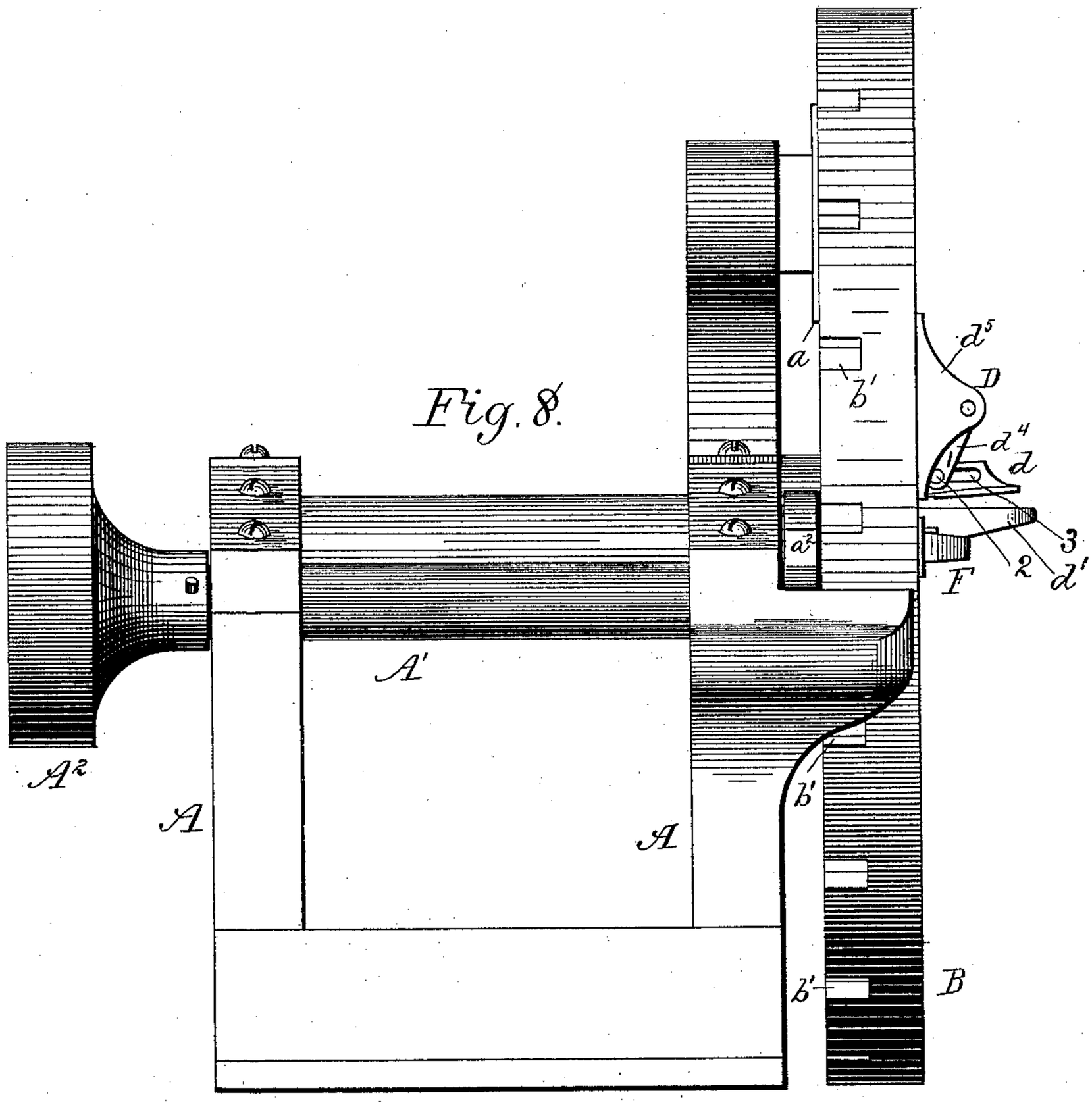
(Model.) 5 Sheets—Sheet 4.

G. A. FULLERTON.

MACHINE FOR FOLDING ABRASIVE BELTS.

No. 432,030. Patented July 15, 1890.

Fig. 8.



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(Model.) 5 Sheets—Sheet 5.

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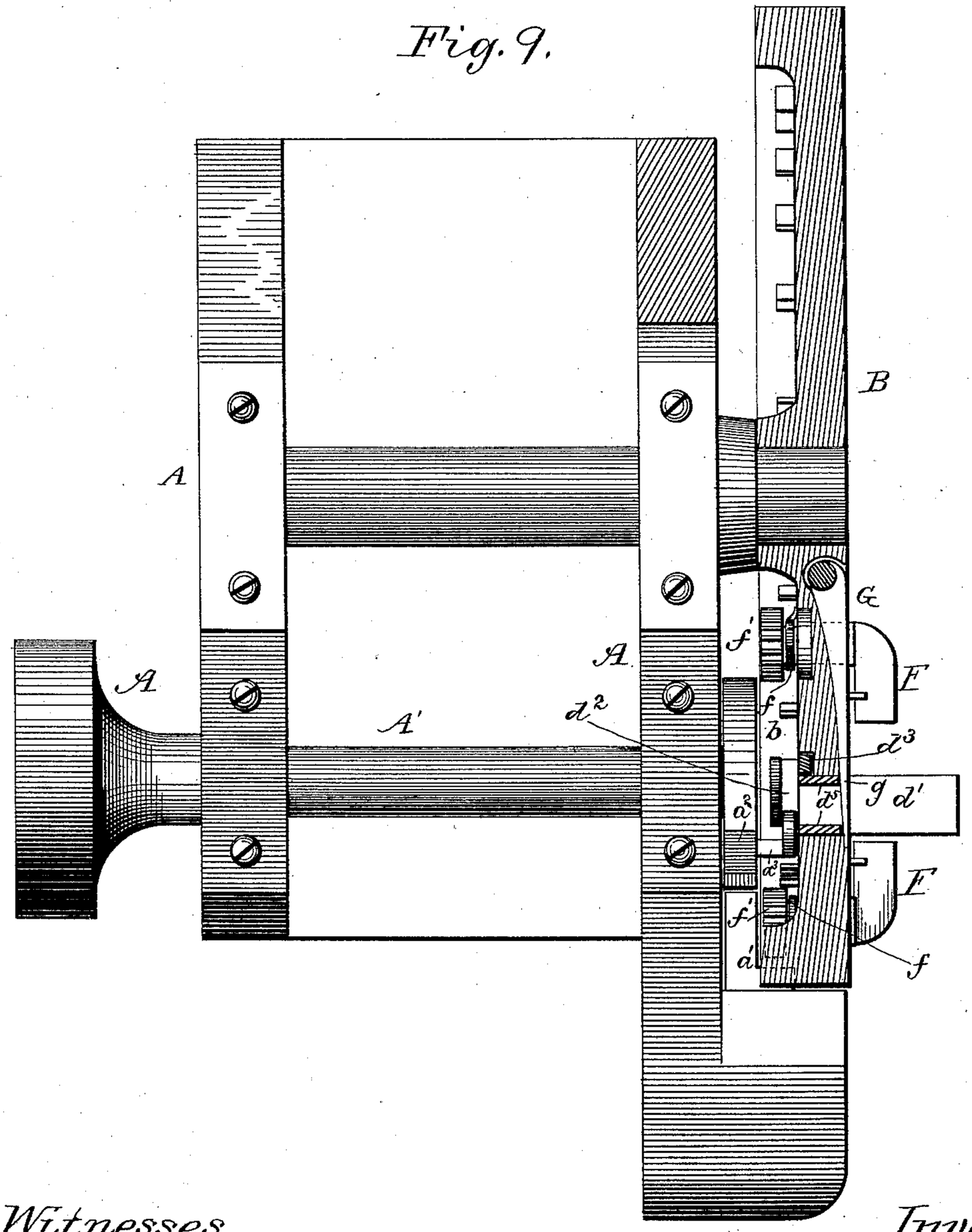
MACHINE FOR FOLDING ABRASIVE BELTS.

No. 432,030. Patented July 15, 1890.

Fig. 9.



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Inventor
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UNITED STATES PATENT OFFICE.

GEORGE A. FULLERTON, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO GEORGE H. P. FLAGG, TRUSTEE, OF SAME PLACE.

MACHINE FOR FOLDING ABRASIVE BELTS.

SPECIFICATION forming part of Letters Patent No. 432,030, dated July 15, 1890.

Application filed December 17, 1886. Serial No. 221,905. (Model.)

To all whom it may concern:

Be it known that I, GEORGE A. FULLERTON, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Machine for Folding Abrasive Belts, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation showing mechanism on the inner face of the carrier; Fig. 2, a view showing mechanism on the outer face of the carrier; Fig. 3, a view, partly in section, showing that side of the frame of my machine which is next the carrier; Fig. 4, a view showing mechanism on the inner face of the carrier. Fig. 5 is a detail, and Figs. 6 and 7 are views, of a belt with the folders of my machine in different positions. Fig. 8 is a front view, and Fig. 9 is a view, partly in section, showing parts of my machine in one position.

Hitherto great practical difficulty has been experienced in folding abrasive belts, owing to the liability of the abrasive substance to crack when the belt is folded, and thereby injure the belt. Prior to my invention abrasive belts have always been folded by hand, and it has been customary for persons engaged in folding these belts to manipulate the belts with their fingers upon the outer or abrasive surface of the strips from which the abrasive belts are made—that is, the workman places a strip having one side covered with abrasive material on a table with the abrasive side downward, and then puts his fingers under the ends of strip and folds the ends upward and over a form until the ends lap and then the ends are secured together. Whatever strain is exerted on the strip in thus folding it is directly exerted upon the abrasive substance and tends to tear the grains of the abrasive substance apart. I have discovered that this cracking of the belts during the operation of folding them may be very largely overcome if the strain exerted in the folding operation is exerted directly upon the inner or non-abrasive side of the strip and only indirectly upon the abrasive side of the strip—that is to say, if a workman engaged in folding abrasive belts over a form could manipulate the strips on the non-abrasive side he would crack very few of the belts during his day's work. The discovery, therefore, that the cracking of belts during the folding operation may be very largely prevented by folding them from the non-abrasive side of the belt-forming strips rather than from the abrasive sides of such strips, and that abrasive belts may be folded by machinery, is of great practical importance to makers of abrasive belts; and my invention consists, mainly, in mechanism adapted to fold abrasive belts in such wise that the force exerted during the folding operation is exerted directly upon the non-abrasive side of the belt and only indirectly on the abrasive side of the belt, the various combinations of the mechanism being described and claimed hereinbelow.

In the drawings, which show the best form of machine now known to me for carrying out my invention, the rotary carrier B (shown with only one clamp, one stripper, and one pair of folders) is supported by frame A, which is provided with racks a and stop a'. Shaft A′ is supported in frame A, and is driven by a belt on pulley A^2. Shaft A′ carries on the end toward carrier B a projection a^2 and a finger a^3. As shaft A′ rotates finger a^3 successively engages pegs b on carrier B, and the carrier rotates while the finger is in contact with the pegs and is at rest while the finger is out of contact with the pegs. Stop a' is thrust forward by its spring, when finger a^3 passes out of contact with the pegs and enters one of recesses b' in carrier B, so that the latter is locked in place until finger a^3 strikes another of pegs b, and projection a^2 moves stop a' back against its spring. As shaft A′ and carrier B are thus rotated finger a^3, after passing a peg b, engages a dog d^2 on slide d^3 and moves slide d^3, so that end 1 of the bent lever d^4, fulcrumed in bracket d^5 and connected to slide d^3, is moved toward the free end of jaw d, which is loosely pinned in bracket d^5. A pin 2 in end 1 of lever d^4 plays in slot 3 in jaw d, and as the pin moves toward the outer end of the slot the jaw d is closed against jaw d', and when the pin 2 is at the outer end of the slot 3 the jaw d is moved toward the jaw d', and when material

is between the jaws the jaw d is firmly clamped against the material and remains so clamped until the rotation of carrier B brings a projection d^7 on the free end of lever d^6, which is connected to lever d^4, into contact with projection a^4 on the main frame, whereby the pin 2 is caused to travel toward the other end of slot 3, and the jaws are unlocked. The spring d^8 is mounted so as to throw the lever d^6, connected with the slide d^3, which is connected with the arm d^4, to hold the jaws open—that is, in the position seen best in Fig. 5; but the tension of this spring d^8 is not sufficient to cause the jaw d to move away from jaw d', when it has been clamped on material inserted between the jaws, as above described, for when the jaw d is clamped upon material between the jaws through the action of finger a^3 and dog d^2, as above explained, the pin 2 is forced into place at the forward end of the slot 3 in jaw d with a considerable degree of friction, depending on the thickness and elasticity of the material, and thus jaw d remains clamped until the carrier has been rotated, as above explained.

The folders F are mounted in carrier B, one on each side of clamp D, with their tips in their normal position toward the clamp. The folders are kept in this position by means of springs f until their pinions f' mesh with racks a, whereby the folders F are turned against the force of spring f, so that their tips point away from clamp D. When pinions f' pass out of mesh with racks a, folders F are returned to their normal position by means of springs f.

The stripper G, which serves to throw the belt out of clamp D, is pivoted in a slot in carrier B, with its arm g' projecting on the inner face of the carrier and its arm g lying in a groove in the face of the carrier and between the jaws $d\,d'$. After the jaws $d\,d'$ are unlocked and opened, as above described, the arm g' is brought in contact with the projection a^4, so that arm g is thrown outwardly between jaws $d\,d'$, so as to throw the belt out of clamp D. As soon as arm g' is carried out of contact with projection a^4 arm g is turned to its place between the jaws by reason of spring g^2.

It will be obvious that the carrier B and shaft A′ and the parts connected with it are shown in the drawings upon a very much smaller scale than the mechanism for operating the clamp, the folders, and the stripper. In the full-sized machine there is but one peg b and one notch b' for each mechanism for working the clamp-folders and stripper, and the space on the carrier between adjacent studs b and notches b' is sufficient to receive this mechanism, the carrier B being about five feet in diameter in the full-sized machine.

The operation of the machine is as follows: The ends of the strip from which the belt is made are fastened together with some adhesive substance and are then placed on jaw d'. The machine is started, and jaw d is moved, as above described, so as to clamp the pasted ends of the belt and firmly unite them. As pinions f' mesh with racks a folders F begin to turn, so that their tips rub against the non-abrasive surface of the belt and straighten out the belt, as indicated in Figs. 5 and 6, whereby the belt is folded without cracking its abrasive material and made ready for packing. Of course the tips of folders F should be smooth and well rounded, so as not to crack the paper on which the abrasive substance is usually placed. Continued rotation of carrier B brings arm g' of stripper G against projection a^4, and arm g is thrown outwardly against the folded belt, so that the belt is thrown out of clamp D, which is now ready to receive the ends of another strip. The number of clamps, folders, and strippers carried by carrier B will depend of course on the circumference of the carrier, the greater the circumference the greater the number of clamps, &c., which it will carry. In practice I prefer to use from ten to twenty clamps, &c.

I am aware of Glover and Church's patent, No. 164,162, dated June 8, 1875, and disclaim all that is shown in it.

What I claim as my invention is—

1. In combination, clamp D and folders F, with means, substantially such as described, for operating the clamp, and means, substantially such as described, to cause the folders to fold the belt while clamped, the folders turning toward and away from the clamp, substantially as and for the purpose set forth.

2. In combination, clamp D, folders F, and strippers G, with means, substantially such as described, for actuating the clamp, the folders, and the stripper, the folders folding the belt while clamped and the stripper moving back and forth between the jaws of the clamp and ejecting the folded belt when the jaws are separated, substantially as and for the purpose set forth.

3. The combination of the rotary carrier and clamp mounted thereon, and means, substantially such as described, for intermittently rotating the carrier and locking and unlocking the members of the clamp and folders F, and means to cause the folders F to fold the belt, all substantially as and for the purpose set forth.

GEO. A. FULLERTON.

Witnesses:
EDWARD S. BEACH,
JOHN R. SNOW.