

L. FRANCIS.

Machine for Perforating Paper.

No. 164,289.

Patented June 8, 1875.

Fig. 1.

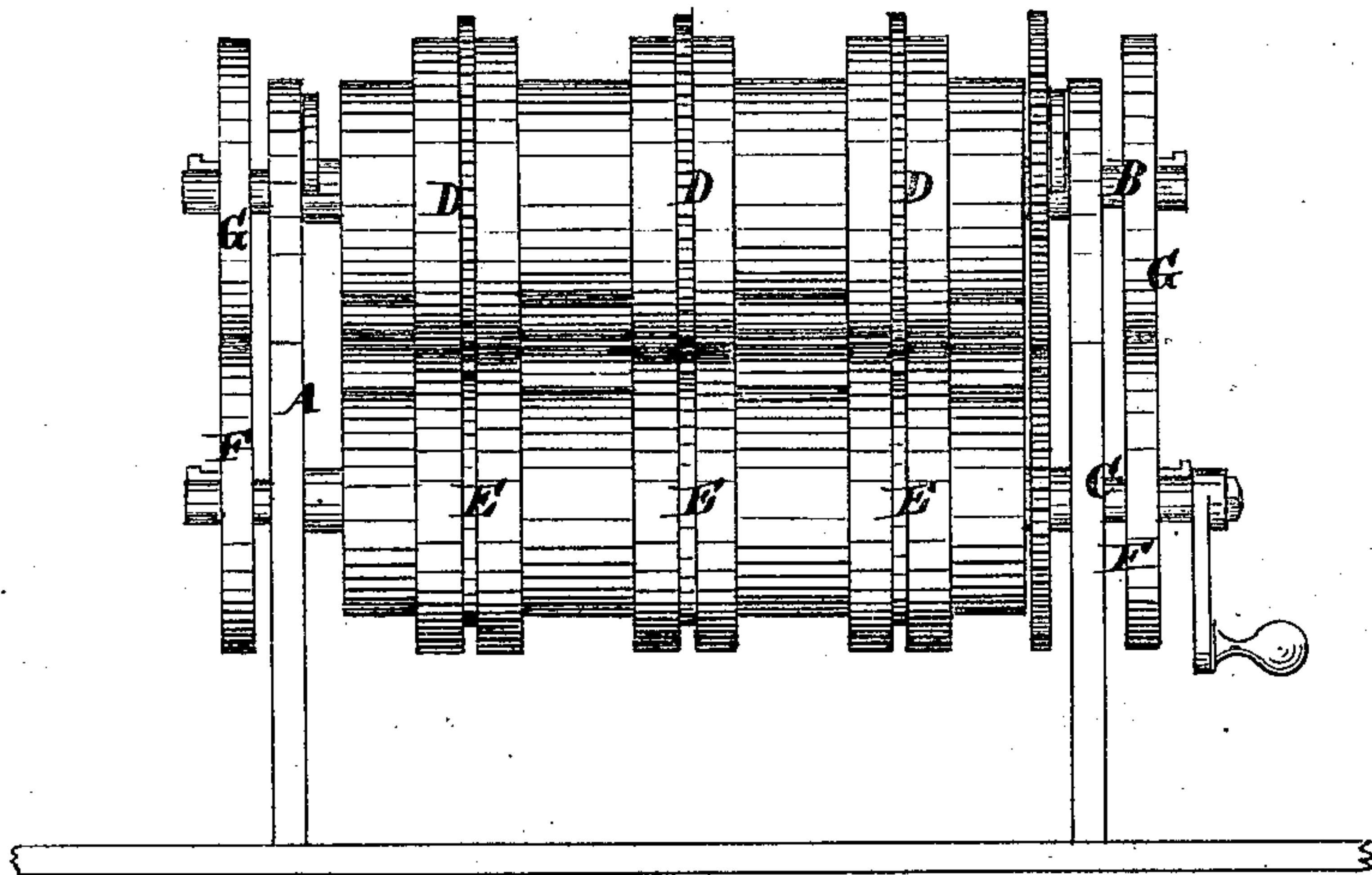


Fig. 2.

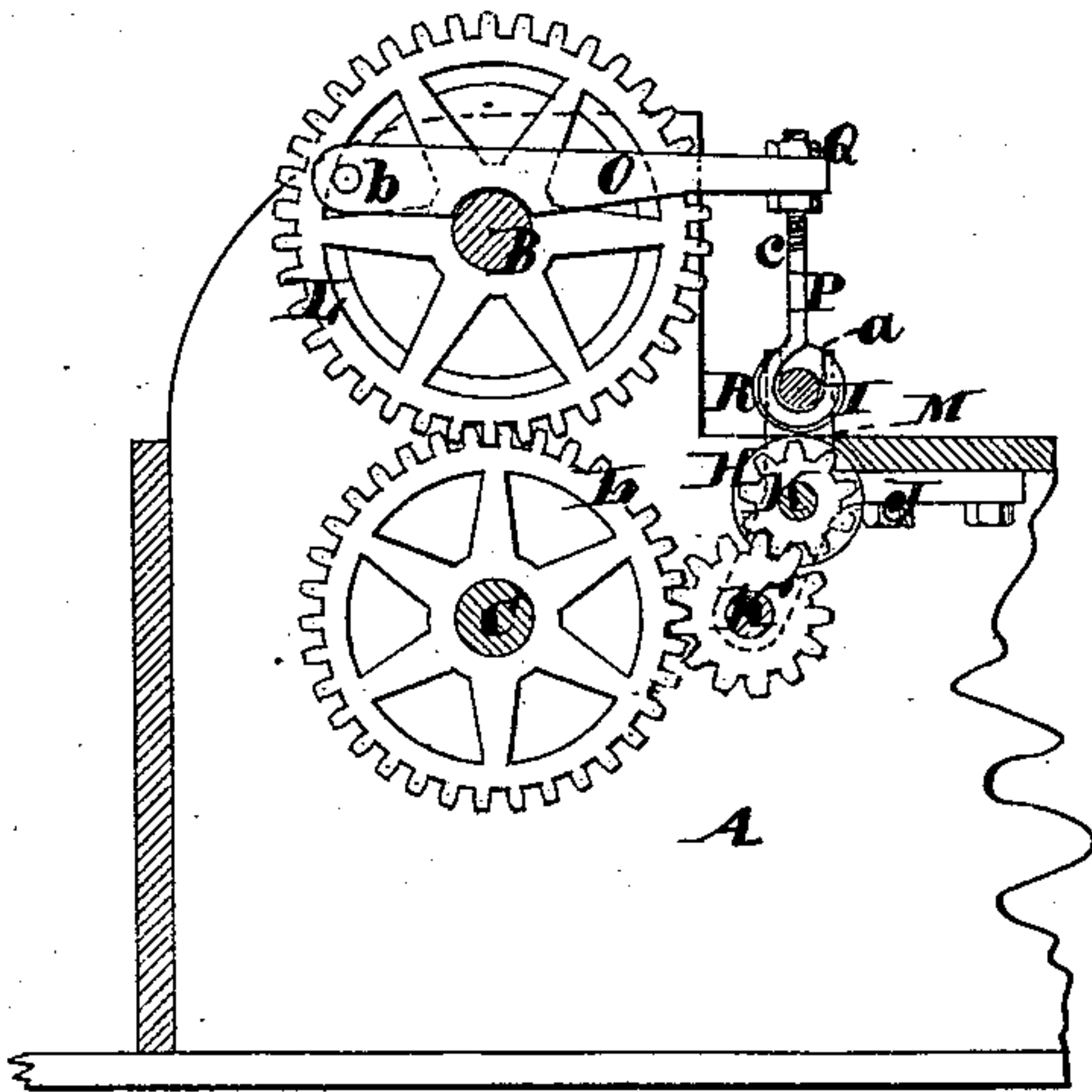
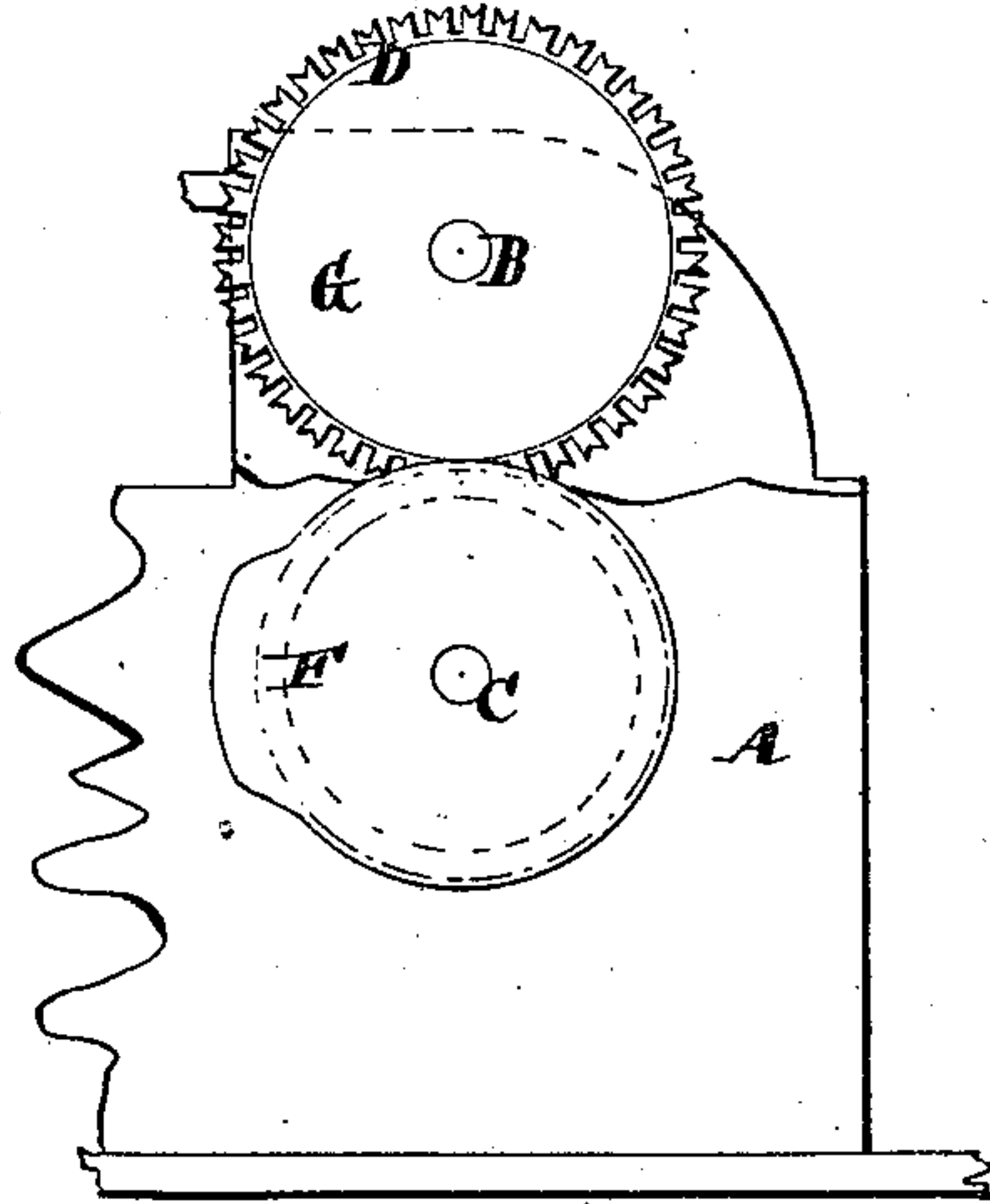


Fig. 3.



Witnesses.

Wm. Hufeland
Chas. Wahlen.

Inventor.

Lewis Francis

per
Van Santvoord & Hauff
attys

UNITED STATES PATENT OFFICE.

LEWIS FRANCIS, OF NEW YORK, N. Y.

IMPROVEMENT IN MACHINES FOR PERFORATING PAPER.

Specification forming part of Letters Patent No. **164,289**, dated June 8, 1875; application filed May 15, 1875.

To all whom it may concern:

Be it known that I, LEWIS FRANCIS, of the city, county, and State of New York, have invented a certain new and useful Improvement in Machines for Perforating Paper and other Materials, of which the following is a specification:

This invention is illustrated in the accompanying drawing, in which—

Figure 1 represents a front elevation. Fig. 2 is a cross-section in the plane of the line *xx*. Fig. 1. Fig. 3 is a side elevation, part of the frame-work being broken away to expose the cutters.

Similar letters indicate corresponding parts.

My invention relates to improvements in that class of machines for which Letters Patent of the United States were granted to William Braidwood, August 25, 1874, No. 154,450, and in which I have a joint interest with said Braidwood and Cyrus H. Loutrel. I have found by experience that with the devices used in these machines it is difficult to guide a sheet of paper through to the cutters with the required degree of exactness in order to produce a straight line of perforations, and to overcome this difficulty is the object of my invention.

To this end my invention consists in a guide mechanism constructed of a fixed and a loose roller, which revolve in surface contact with each other, the fixed roller being geared in such a manner that it, together with the loose roller, has a like superficial speed to the cutters of the machine, while, by means of the rollers, the sheet of paper or other material to be perforated is accurately and evenly guided through the cutters. The loose roller is connected with the cutter-shaft in such a way that it partakes of the rising and falling movement of the shaft, in order to admit of removing or changing the position of the paper that is being perforated. The connection of the loose roller with the cutter-shaft is effected by means of yokes and of arms fastened to the yokes, and which form bearings for the loose roller. The yokes are pivoted to the machine-frame, and are arranged in such a manner relatively to the cutter-shaft that when the shaft rises it carries with it the yokes, the arms, and the loose roller. The lower ends of

the yoke-arms have the form of hooks, in which the loose roller is journaled in such a manner that the roller is removable, while the said arms are fastened to the yokes through the medium of lock-nuts, by means of which the hooks may be adjusted with proper relation to the loose roller.

In the drawing, the letter A designates the frame-work of my machine, forming bearings for the cutter-shaft B and the cam-shaft C. D designates the cutters, any number of which may be used, and which have the form of a wheel provided with M-shaped teeth. The cutters perforate the paper or other material subjected to their action, in conjunction with grooved wheels E, mounted on the cam-shaft C. F are the lifting-cams, which, in the present example, are located at the respective ends of their shaft C. The cams F are arranged to bear against anti-friction wheels G, mounted on the cutter-shaft B, and through the medium of these wheels the cutter-shaft and the cutters are caused to rise and fall at regular intervals by the action of the cams. At a suitable point in front of the cutters, and approximate to the feed-board of the machine, are arranged my guide-rollers H I, which have a revolving motion, and occupy, respectively, a fixed and a loose position. H is the fixed roller, which is mounted in brackets J, (or in the machine-frame,) and the shaft of which bears a cog-wheel, K, that connects by an intermediate wheel, K', with one of two cog-wheels, L L, mounted on the cam and the cutter-shafts. By this means a revolving motion is imparted to the fixed roller H from the shafts B or C, either of which may form the driving-shaft, and the gearing of the parts is such that the guide-rollers H I have a like superficial speed to the cutters D. I designate the loose guide-roller, which is arranged in slotted brackets M, the upper ends of whose slots *a* are open, so that the roller may be removed.

The object of this arrangement is to admit of substituting for the loose roller I a roller of different form or diameter. The loose roller I rests on the fixed roller H. By its inherent weight and by this arrangement the loose roller acquires a revolving motion.

The object of the rising and falling move-

ment of the cutter-shaft B is to admit of removing or changing the position of the paper or other material passing through the machine when the cutters are raised, in order that only a portion of the paper is perforated. To admit of this movement it becomes necessary that one of the guide-rollers H I also should rise, together with the cutters, and to this end the roller I has a loose arrangement, as before stated; and the roller, furthermore, is connected with the cutter-shaft B by means of yokes O and arms P, so that it partakes of the rising and falling movement of the cutter-shaft. The yokes O are connected at one end to the machine-frame by means of a pivot, *b*, while to the other end of the yokes are fastened the arms P. The yokes lie above and across the cutter-shaft B, or may be connected thereto if seen fit, so that when the shaft is lifted it carries with it the yoke, the arms P, and the loose roller I. The yoke-arms P are provided with a screw-thread, *c*, for part or the whole of their length, and are fastened to the yokes O by means of screw-nuts Q bearing against the yokes, so that the arms are locked in position, and at the same time are rendered adjustable. The lower ends of the yoke-arms P are bent to the form of hooks R, which are fitted to the gudgeons of the loose roller I, and form its immediate support. By means of the nuts Q I am enabled to adjust the yoke-arms and the hooks R accurately to the gudgeons of the roller I, or to the gudgeons of a roller of different diameter, which may be used instead of the roller I.

The object of the hooks R is, as described, with respect to the slotted brackets M, to admit of removing the loose roller I.

It is apparent that by the rollers H I a sheet of paper is guided to the cutters D in a perfectly straight line, inasmuch as shifting of the paper to either side is prevented, and a straight line of perforation is insured. The rollers H I also serve to smooth the paper, or to remove therefrom any irregularities that it may contain, so that it is subjected to the action of the cutters in a perfectly flat condition.

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

1. In a machine for perforating paper and other materials, the guide-rollers H I, having a like surface speed to the cutters D, the upper one of which is arranged to partake of the rising and falling movement of the cutters, substantially as described.

2. The combination, with the cutter-shaft of a paper-perforating machine, of the pivoted yokes O, vertical arms P, and feed-rollers H and I, substantially as shown and described, the said yokes and arms forming the connection between the feed-rollers and the cutter-shaft, as set forth.

In testimony that I claim the foregoing I have hereunto set my hand and seal.

LEWIS FRANCIS. [L. S.]

Witnesses:

FRANCIS FORBES,
CHAS. WAHLERS.