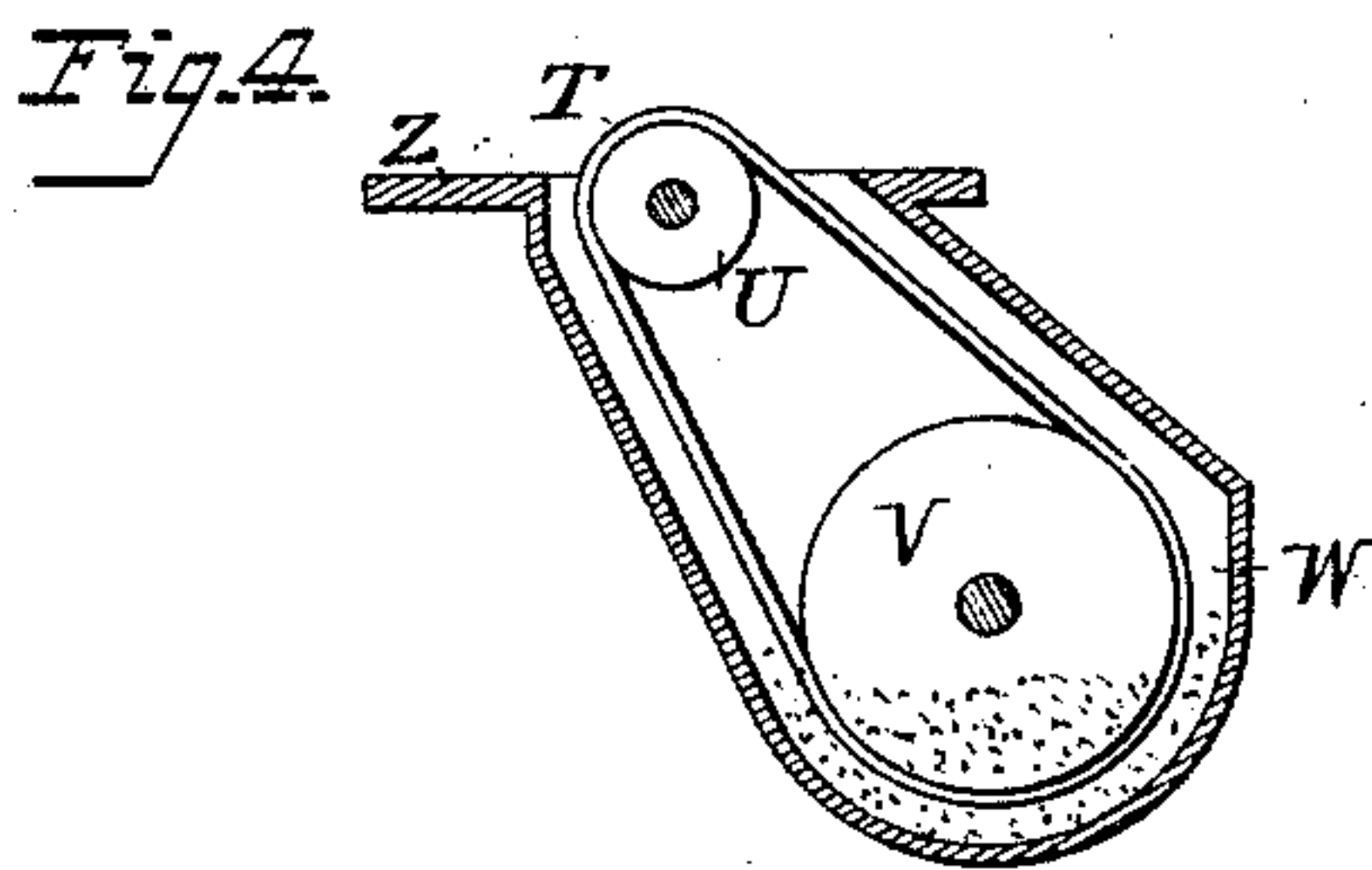
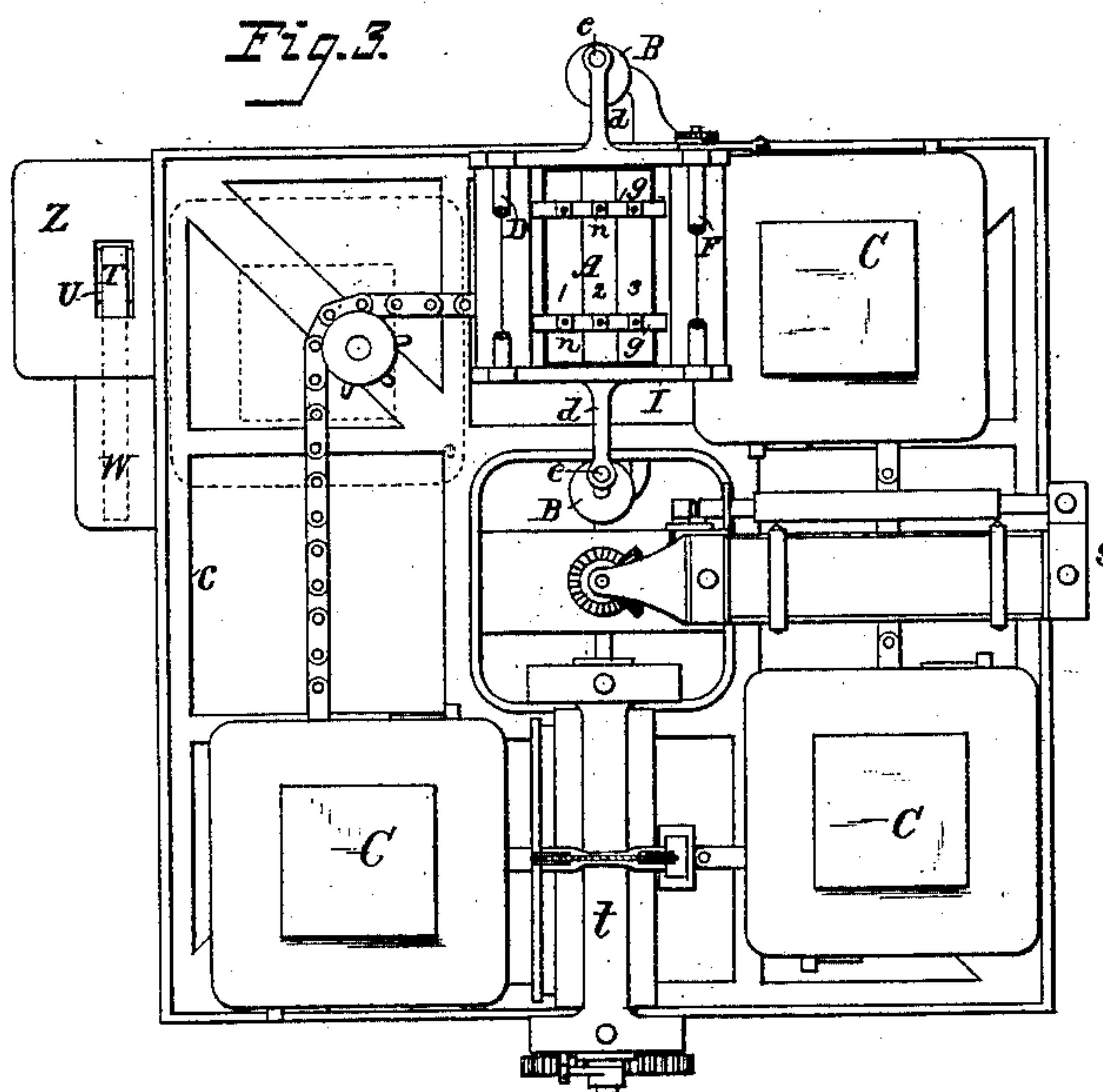
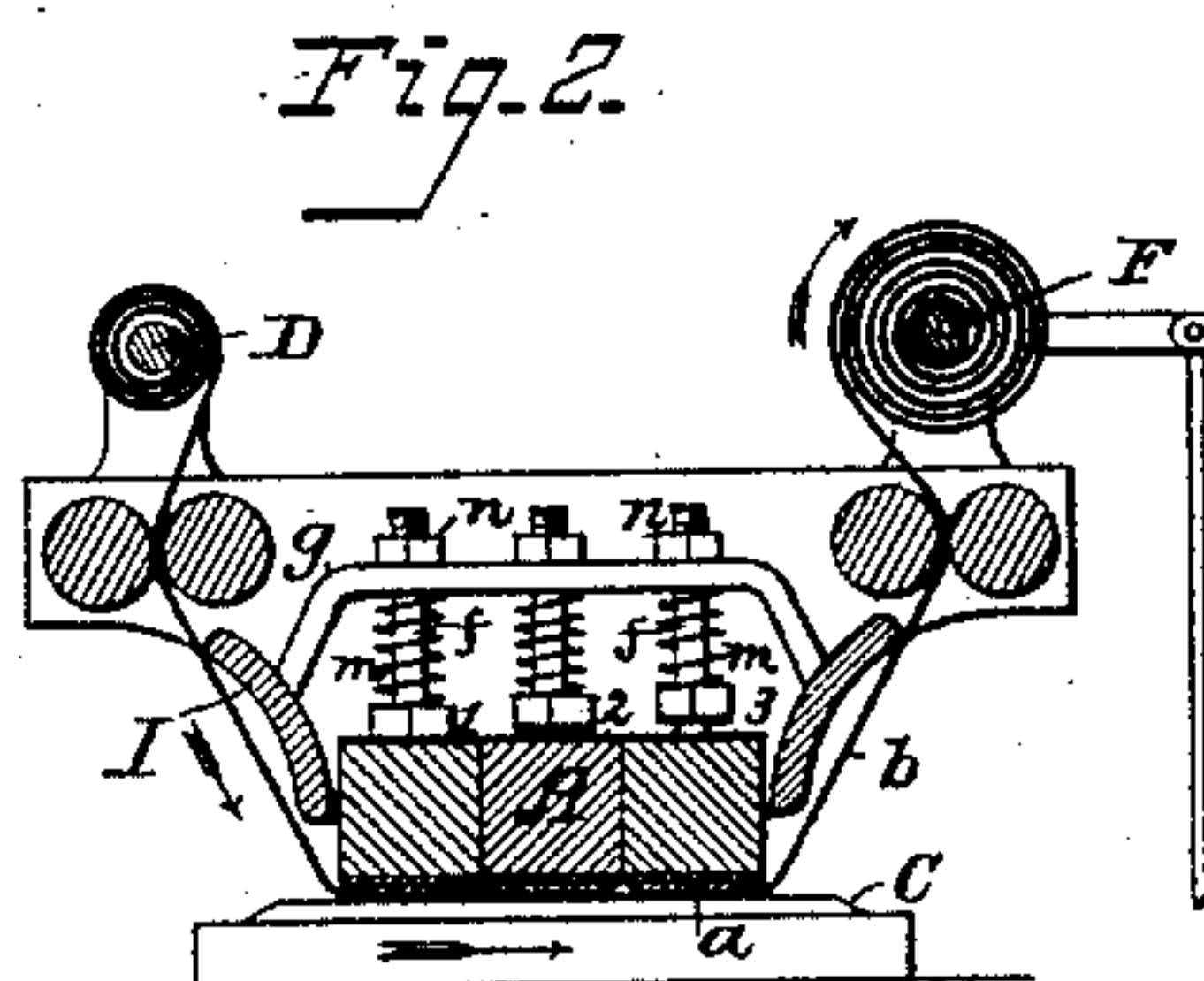
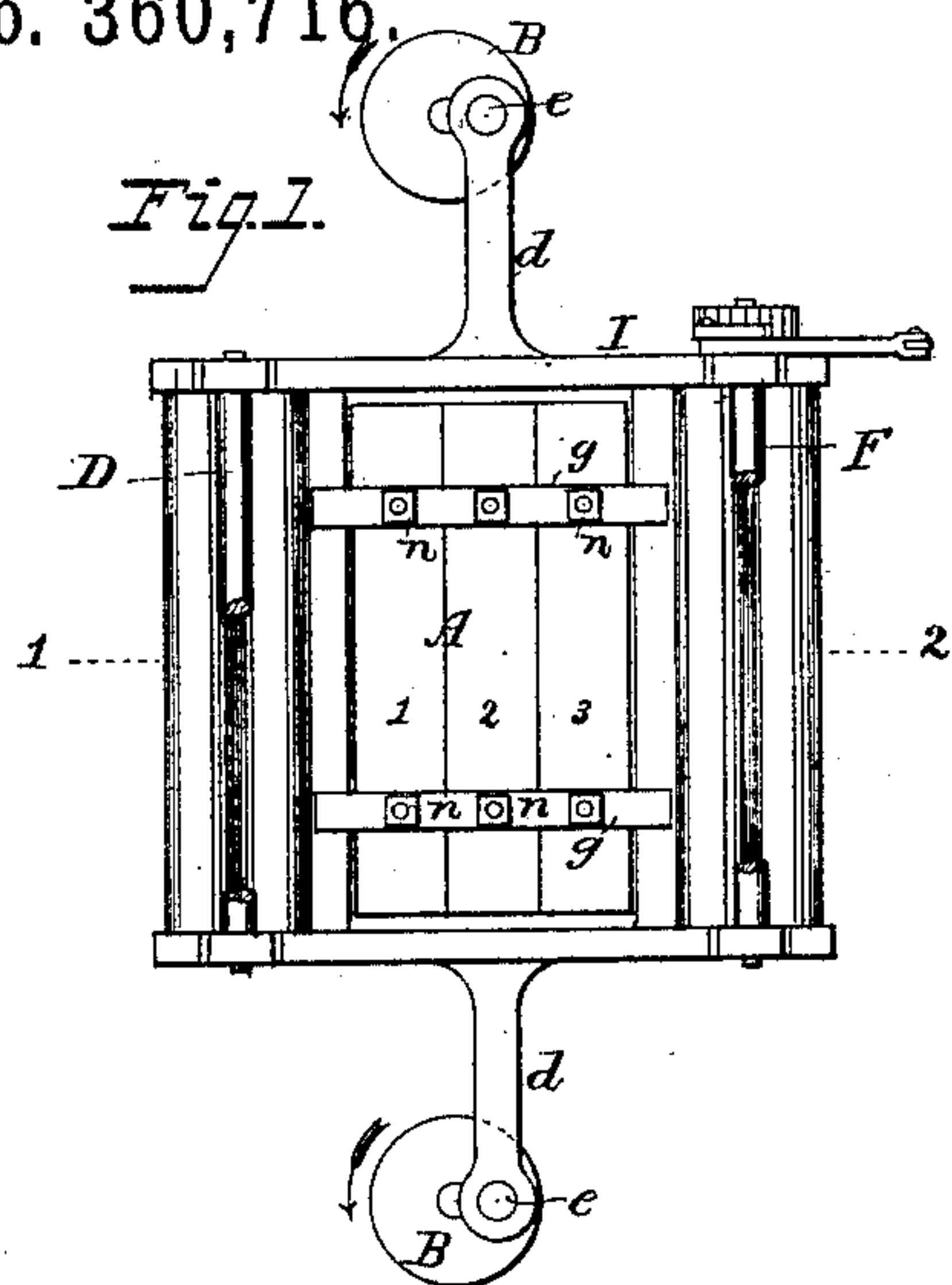


(No Model.)

J. MILLIGAN, Dec'd.  
E. R. MILLIGAN, Executrix.  
PLATE PRINTING MACHINE.

No. 360,716.

Patented Apr. 5, 1887.



*Attest:*  
*Gustav A. Cooper,*  
*A. Hansmann.*

*Inventor:*  
*James Milligan*  
*By his attorney,*  
*Charles E. Foster*



# UNITED STATES PATENT OFFICE.

JAMES MILLIGAN, OF BROOKLYN, NEW YORK; ELIZABETH R. MILLIGAN  
EXECUTRIX OF SAID MILLIGAN, DECEASED.

## PLATE-PRINTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 360,716, dated April 5, 1887.

Application filed October 21, 1880. Serial No. 19,282. (No model.) Patented in England July 8, 1885, No. 8,278, and in Canada March 24, 1886, No. 23,629.

*To all whom it may concern:*

Be it known that I, JAMES MILLIGAN, of Brooklyn, Kings county, New York, have invented certain new and useful Improvements in Plate-Printing Machines, of which the following is a specification.

The invention is covered by British Patent No. 8,278, of July 8, 1885, and Canadian Patent No. 23,629, of March 24, 1886.

My invention is an improvement in that class of printing in which the impressions are taken from engraved plates; and the invention consists in means, hereinafter fully described, whereby a perfect wiping of the ink from the plate is automatically effected, and whereby in machines for plate-printing the polishing is facilitated and the machine rendered more efficient in its general operation.

In the drawings, Figure 1 is a plan of a wiper illustrating my invention; Fig. 2, a section on the line 1 2, Fig. 1; Fig. 3, a plan view of a machine with my improvements; Fig. 4, a detached section illustrating the mode of supplying polishing material to the attendant.

Many machines have been devised for automatically printing from engraved plates; but great difficulty has been experienced in practice, so far as I am aware, in rendering such machines effective for general purposes, owing mainly to the difficulty in securing by mechanical means the wiping or removal of the ink from the surface of the plate without at the same time wiping out some of the lines.

After many experiments I have made a mechanical "wiper," which will operate with all the accuracy of a skilled workman, producing in many respects better results and with much greater facility. This wiper consists, substantially, of a block or plate, A, covered at its under side with printing-blanket *a*, of suitable thickness, or its equivalent, over which extends a wiping-cloth, *b*, which is moved across the block in the same direction as that in which the plate travels beneath the block. The engraved plate C, after being inked mechanically or by hand, is carried beneath this wiper, and as the plate travels forward such a motion is imparted to the wiper that it will cross in various directions the lines in the plate, thus

assimilating the motion used in hand-wiping where the operator carries the cloth in circles, as he also moves it over the face of the plate.

The motion of the wiper is not limited to any special direction, except that it must be such that different points of the wiping-surface shall travel back and forth and across the plate, so as to cross the engraved lines in different directions, thereby preventing the "wiping out" of the ink "filled in" the lines, while at the same time clearing the polished portion of the plate of its ink. I have found in practice that the best motion is that obtained by connecting the wiper to the eccentric wrist-pins of two revolving horizontal disks, as shown in Figs. 1 and 3, where the frame I of the wiper A has at each end a projecting arm, *d*, perforated to receive the wrist-pin *e* of a horizontal disk, B, the disks being driven at the same rate of speed in the same direction, and carrying the wiper in a circular path while the plate C passes beneath, thus approximating very closely the motion used in hand-wiping.

To prevent the wiping-cloth from "inking-up," and thereby losing its efficiency, I use a long cloth, which is fed at such a speed over the face of the block, when the latter is not in contact with the face of the plate, that the wiping-surface is constantly renewed. While the plate is moving beneath the block, the cloth remains stationary upon the latter, so as to secure a broad flat wiping-surface bearing upon the plate with any desired degree of pressure. Various modes of effecting the feed of the cloth may be adopted. That which I have found most effective consists in winding the cloth in a roll on the shaft D, mounted in bearings at one side of the frame of the wiper, and passing the cloth from this roll across the face of the block to a shaft, F, mounted in bearings at the opposite side of the frame and rotated intermittently by a pawl and ratchet, or other device, at such speed as will change the wiping-surface as fast as may be desired.

It is most important in wiping an inked engraved plate to vary the action of the wiping-cloth as well as its surface, so as to remove,



first, the main body of ink, which may be done with a portion of cloth which is fresh or uncoated with ink, and then the remaining portion, which can only be done with portion of the cloth which is already somewhat inked, as the final wiping of a plate with a fresh uninked cloth would result in wiping out the lines. No attempt has heretofore been made to vary the action of mechanical wipers to secure this result, which I attain partly by feeding the cloth across a broad block, as aforesaid, causing the plate to travel beneath the wiper and entering from the side from which the clean cloth is drawn, and partly by so constructing the block that the pressure of the wiping-face upon the cloth will increase as the plate is wiped. Thus the plate passes first beneath the cleanest portion of the cloth, and then below that which has been inked by the removal of ink from the preceding plate, the cloth being fed in such manner as to prevent any part from becoming surcharged with ink, yet cause the final wiping of the plate to be performed with an inked portion of the cloth and the first portion of the wiping with a fresh portion of the cloth. At the same time the light pressure at first applied is effective in removing the body of ink, while the subsequent heavier pressure with the "full" portion of cloth wipes the plate "down close" with the same effect as in hand-wiping. I may use a succession of wipers to give such different pressures, the cloth in each so fed as to secure the desired result; but I have found that most effective work is performed by subdividing the block A into any desired number of sections, 1 2 3, each of which is faced with printing-blanket, and capable of vertical adjustment independently of the others. I have also found that great advantage results from applying a spring-pressure to the block, so that it can yield slightly where and when necessary.

The sections 1 2 3, constituting the block A, are all carried in the frame I. From the back of each section screw-rods *f* extend through yokes or cross-bars *g*, between which and the sections intervene springs *m*. Nuts *n*, turning on the rods and bearing on the yokes *g*, limit the downward movement of the rods, and serve to adjust each independently of the others to any desired angle and at any required height. After the plate has been wiped it must be polished. When this is done by hand, the operator must from time to time coat his hand with whiting or other polishing powder. To enable him to do this with rapidity and accuracy, I convey the whiting to a position convenient to the operator—for instance, by a band or wheel which comes in contact during its movement with a body of whiting, is coated thereby, and carries the same to the desired point.

While I may embody my above-described improvements in machines of various forms, or may use them as auxiliary to hand-printing, I have found that they can be used most effectively in connection with the machine de-

scribed in the Letters Patent of the United States granted to me on the 17th day of July, 1877, No. 193,097, and illustrated in plan in Fig. 3 of the accompanying drawings. In the said machine a traveling chain or band, *f*, carries four beds along a course in a rectangular frame, *c*, the plates *C* being fixed to said beds. In place of using only an inking and an impression device, however, as in the aforesaid machine, I embody therein my above-described wiping device, the inking appliances *s* being arranged at one side of the frame, the wiper *A* at another, and the impression devices *t* at another, the operator standing in a position to polish the plate after it leaves the wiper, and a traveling band, *T*, coated with whiting, passing over a roller, *U*, in proximity to the operator's position. The band *T* also passes over a drive-roller, *V*, moved from any operating portion of the machine and situated in a box, *W*, containing a supply of powder, with which the band becomes covered; but a buffer-wheel revolving with its lower portion in a box containing the whiting, or any other mode of conveying the latter to the desired position, may be used as a tube for dropping it regularly upon the plate or table *Z*.

It will be apparent that as the plates are wiped by the means described while in motion, there is no necessity of arresting the movements of the beds as in my aforesaid machine. I therefore may substitute a continuous for the automatically-intermittent motion described in said Letters Patent, the polishing being effected, at least with small plates, while the latter are traveling from the wiper to the impression-roller, and the sheets to be printed being applied before a plate reaches said roller and removed after it passes the same.

It will be obvious that the plates may be stationary and the reciprocating wiper may travel above the same.

I do not here claim arranging the chalk-carrying apparatus as shown, as this may be the subject of a separate application.

I am aware of the proposed use of rotating and reciprocating rollers in connection with flat plates and of cloths moving with rollers or over flat blocks for wiping curved engraved plates carried by cylinders. I am also aware of the proposed use of flat wiping-blocks arranged radially upon a cylinder to wipe a flat plate. These features in themselves I do not claim; nor do they constitute my invention, for I have found that effective work can only result by the use of the following features:

First. A flat plate. With a curved plate the wiping must all be performed on a narrow line, and it is not possible to "wipe in" the ink which has once been "wiped out". It is, further, almost impossible to bend an engraved plate so exactly as to present it with the desired accuracy to the wiping-surfaces.

Second. A flat wiper. If the wiper is cylindrical, the result is the same as with a curved plate.

Third. A wiping-cloth traveling over the



flat wiper-block in the same direction that the plate travels. If the cloth travels in a reverse direction to the plate, the full portion of cloth is presented to the plate as it meets the wiper, while the fresh portion of cloth gives the final wiping, cleaning the ink from the fine lines.

Fourth. The flat wiper must move back and forth upon the flat plate traveling beneath it, as the latter passes in contact, first, with the fresh and then with the full portion of cloth.

I claim—

1. A device for wiping engraved plates, in which are combined, first, a flat wiping-block; second, means for carrying a cloth across the face of the block in the direction in which the plate travels; third, appliances constructed to impart to the wiper a reciprocating motion, substantially as set forth.

2. The combination of the flat wiper-block, its cloth, devices for carrying the cloth across the face of the block, and appliances whereby the plate is carried beneath the wiper in the same direction as the cloth travels, substantially as set forth.

3. The combination, in a wiping apparatus for engraved plates, of a wiper consisting of two or more flat wiping-sections positively adjusted to different heights, a wiper-cloth passing beneath said sections, and means for carrying flat plates first beneath the highest and then beneath the lower sections, as set forth.

4. The combination, in a wiper-block, of two

or more sections, devices for adjusting the same to different heights and limiting their downward movements, and springs pressing said sections downward upon their bearings, substantially as set forth.

5. The combination of a frame and a wiper-block in sections, having spring-bearings, and adjusting devices, whereby said sections may be separately adjusted to yield independently of each other, substantially as set forth.

6. The combination, in a mechanical wiper for engraved plates, of two or more sections, a cloth crossing the face of all of said sections, and springs and adjusting devices, whereby said sections may be set to bear upon the plate with different pressures, substantially as set forth.

7. The combination, with two or more wiper-sections, of a single wiper-cloth and means for automatically reciprocating the same, as set forth.

8. The combination, with two or more independently-adjustable wiper-sections, of a single wiper-cloth, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES MILLIGAN.

Witnesses:

C. S. DRURY,

F. O. McCLEARY.