3 Sheets—Sheet 1.

F. DEMING.

FEEDING-DEVICE FOR PUNCHING-MACHINES.

No. 169,784. Patented Nov. 9, 1875.

fig. 1

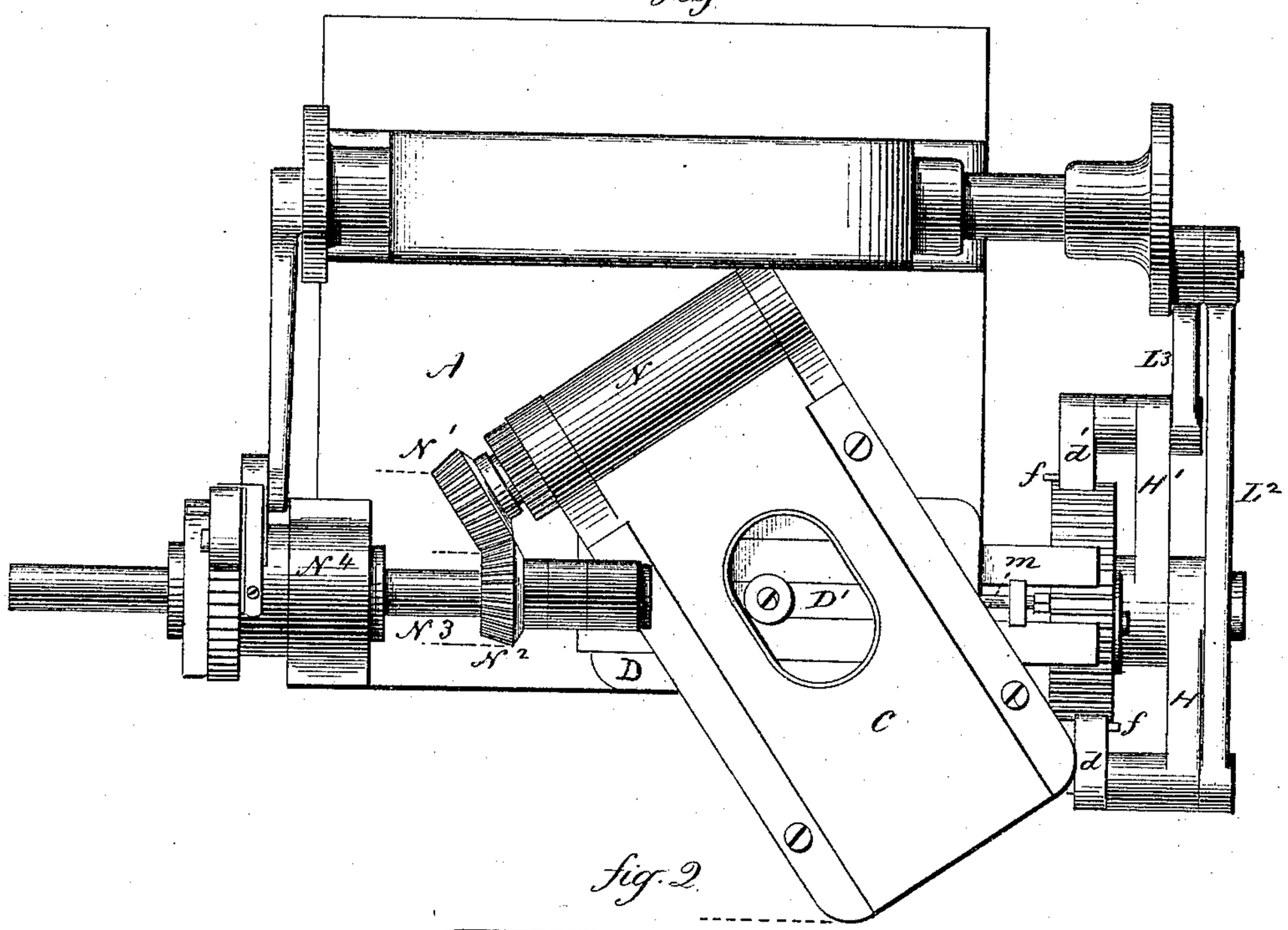

fig. 2.

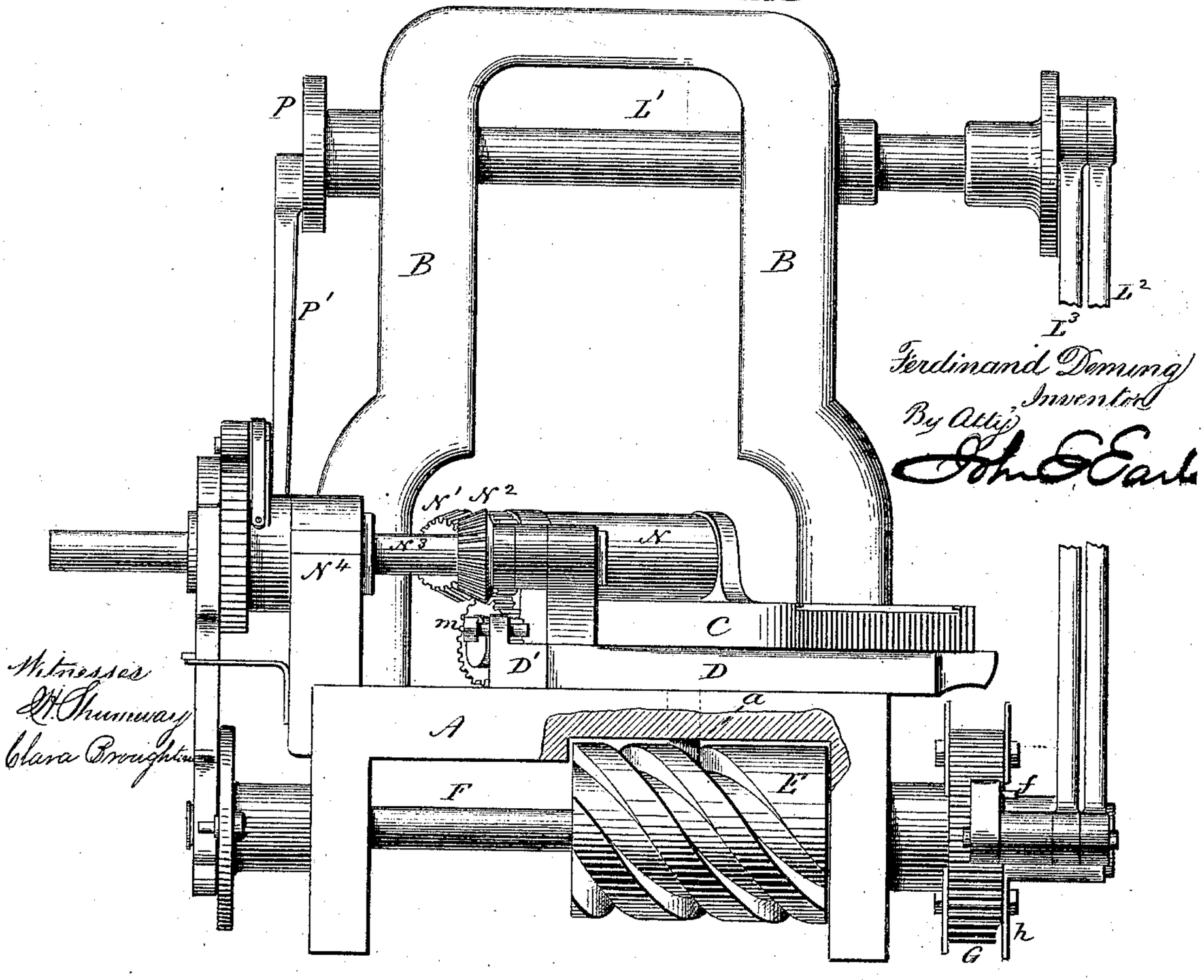

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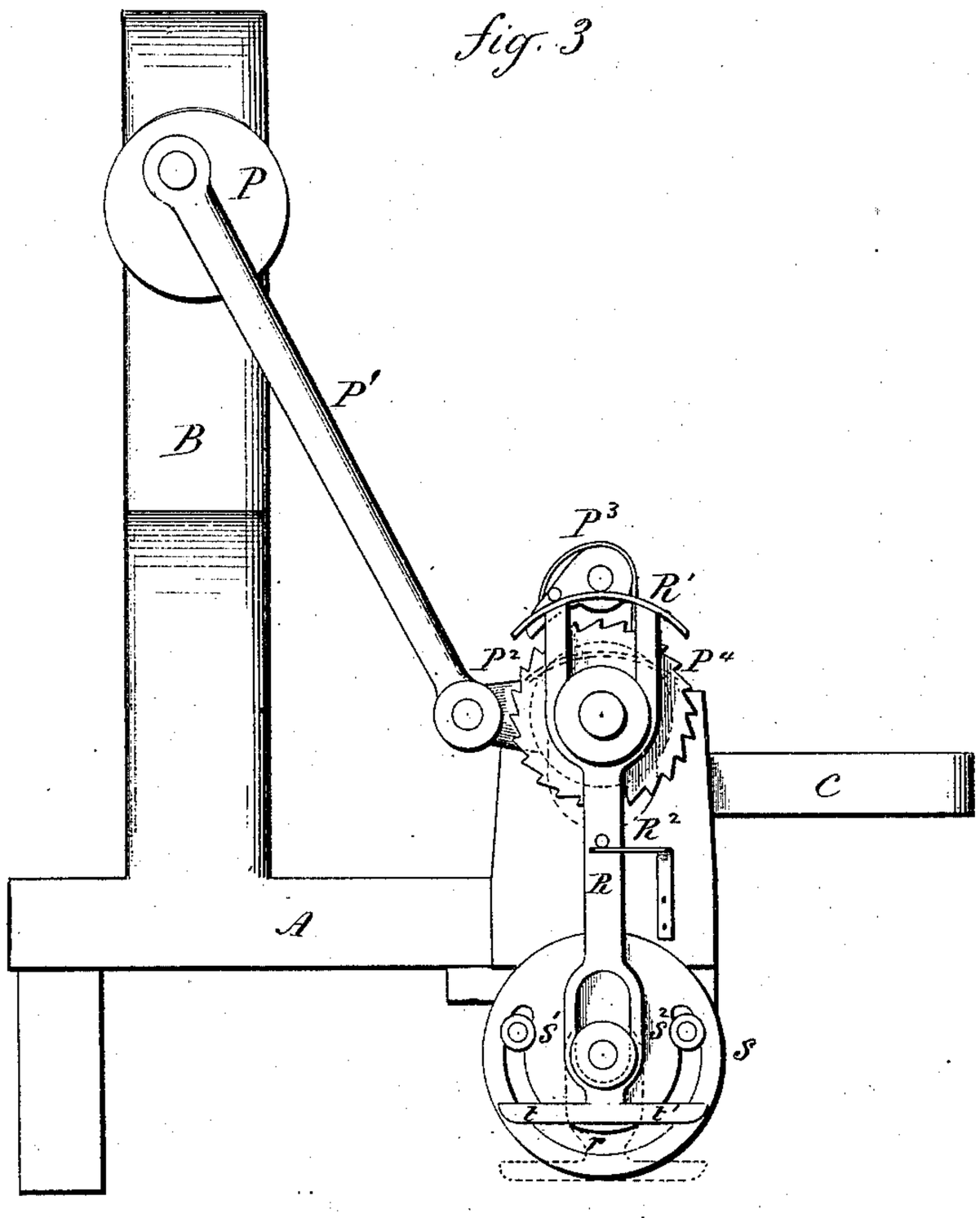
fig. 3



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3 Sheets—Sheet 3.

F. DEMING.

FEEDING-DEVICE FOR PUNCHING-MACHINES.

No. 169,784. Patented Nov. 9, 1875.

fig. 4.

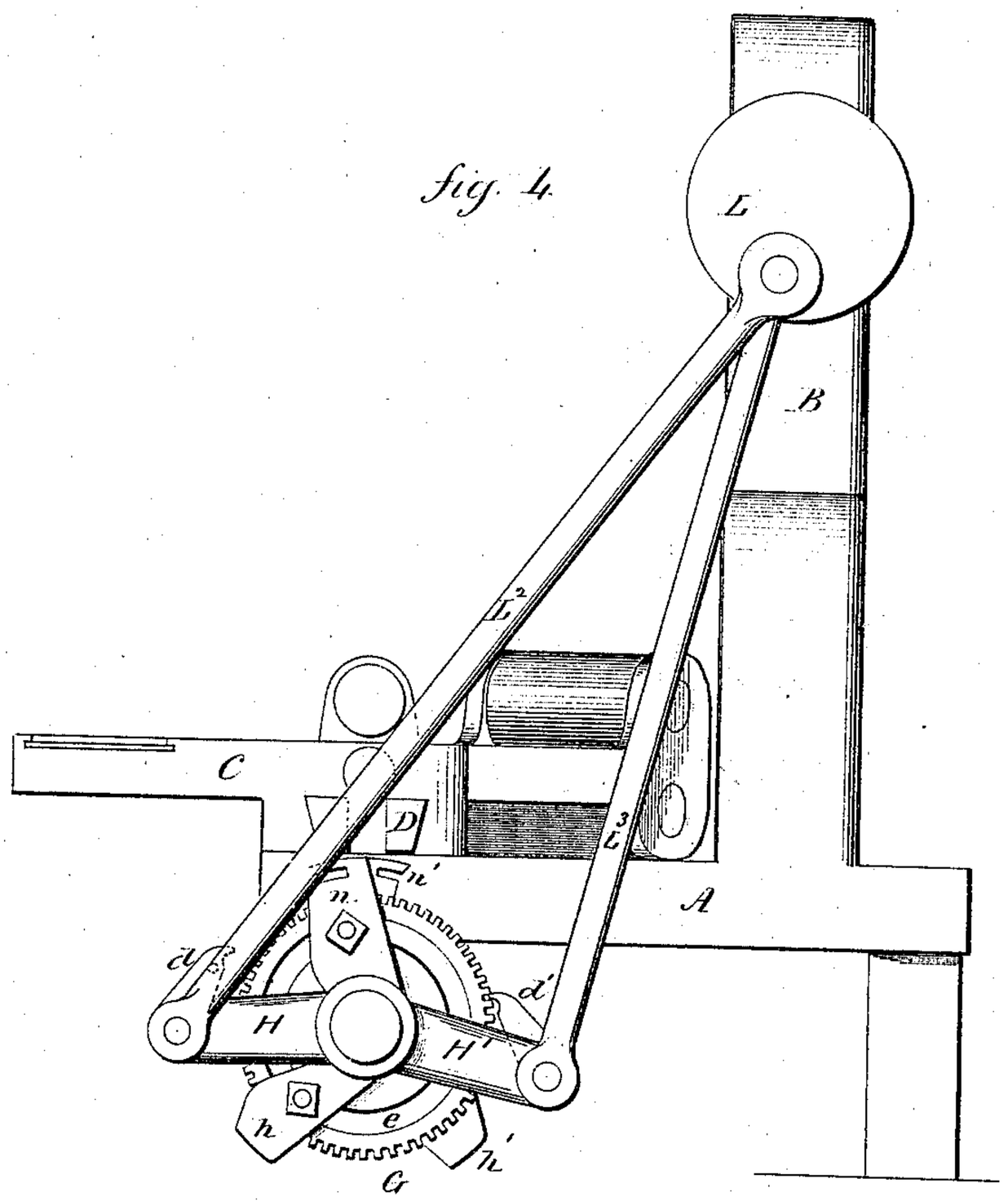


fig. 5

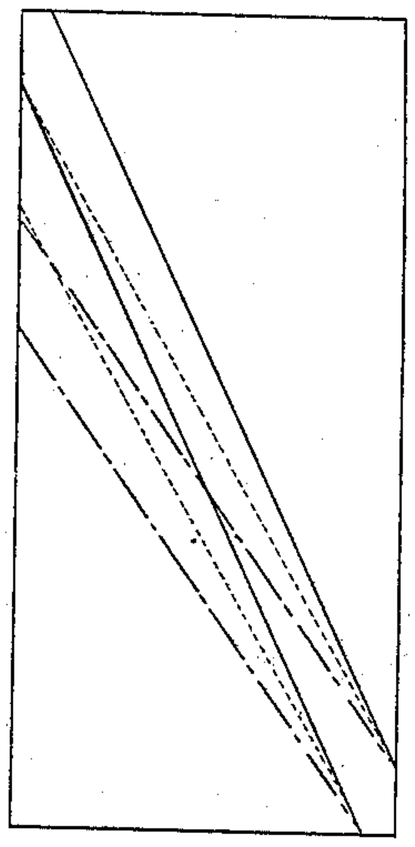
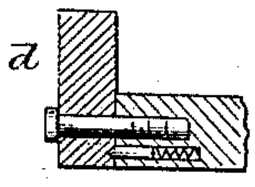


fig 6



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UNITED STATES PATENT OFFICE.

FERDINAND DEMING, OF WATERBURY, CONNECTICUT.

IMPROVEMENT IN FEEDING DEVICES FOR PUNCHING-MACHINES.

Specification forming part of Letters Patent No. **169,784**, dated November 9, 1875; application filed September 28, 1875.

To all whom it may concern:

Be it known that I, FERDINAND DEMING, of Waterbury, in the county of New Haven and State of Connecticut, have invented a new Improvement in Feed for Punching-Press; and I do hereby declare the following, when taken in connection with the accompanying drawings and the letters of reference marked thereon, to be a full, clear, and exact description of the same, and which said drawings constitute part of this specification, and represent, in—

Figure 1, top or plan view; Fig. 2, rear view; Fig. 3, end view, looking from the left of Fig. 2; Fig. 4, opposite end; Fig. 5, diagram illustrating the cam; Fig. 6, detached view.

This invention relates to an attachment for power-presses, to automatically present and feed sheet metal to the punch of the press; the object being to construct the feed so that a strip or sheet of metal placed in the feed will be automatically carried and presented to the punch, so as to cause each successive punching to be in the nearest position to the next adjoining, and so as to avoid waste of metal, this being an improvement upon the invention for which Letters Patent were granted to this applicant July 27, 1875, No. 166,078.

The invention consists in the mechanism, combined with a diagonal carriage, as hereinafter described, and specified in the claims.

A is the bed; B, the uprights of a common power-press. The arrangement of the dies, and the mechanism for operating the same between the uprights or heads, may be of any known construction, and not necessary here to be described. C is the carriage, arranged upon a slide, D, in a position diagonal to the said slide and the face of the press, the angle of the carriage being about sixty degrees from the longitudinal line of the press, the said slide being parallel to the said longitudinal line of the press, and arranged in suitable guides, so that the carriage, maintaining its diagonal position, will move with the slide D across the press in a line parallel to the press, as denoted in broken lines, Fig. 1. The movement of this carriage must be intermittent, and so that a rest will occur for each successive operation of the punch. To impart to the slide this longitudinal movement a spirally-grooved cam, E, is arranged beneath the bed on a shaft, F, and from the slide D a stud, *a*, extends through a slot in the bed into the groove in the cam. The cam is represented with several grooves, the construction and operation of which will be described hereafter. As the shaft F is rotated the groove in the cam works the slide and carriage to the right or left, according to the direction of rotation. Turning in one direction moves the carriage to the right, and in the reverse to the left. On the outer end of the shaft is a toothed wheel, G, and concentric with this wheel G are two levers, H and H′, extending to opposite sides, and from a crank, L, on the shaft L^1 a rod, L^2, connects with the outer end of the lever H, and a rod, L^3, with the outer end of the other lever, H′, so that as the crank L revolves it imparts a corresponding vibratory movement to each of the said levers H and H′. On these levers, respectively, is a pawl, *d* and *d′*, both arranged to alternately work into the teeth of the wheel G, so that one pawl will turn the wheel G, and with it the cam E, in one direction, and the other pawl in the opposite direction. In each side of the wheel G a T-shaped concentric groove, *e*, is formed, and in the groove, on one side, a dog, *h*, is arranged, and in the other a similar dog, *h′*. These dogs are secured in the groove by a T-shaped bolt, so that they may be adjusted to different positions around the wheel. These dogs project beyond the periphery of the wheel, as seen in Fig. 4, and work, respectively, to operate upon the pawls *d d′*. Upon each of these pawls a stud, *f*, projects, in line with the said dogs, and so that, as the wheel G is rotated in one direction until the dog *h* comes beneath the stud on the pawl *d*, it will throw that pawl from the wheel, and in the opposite direction the dog *h′* will, in like manner, turn its dog *d′* from the wheel, the pawls being provided with a spring, as seen in Fig. 6, or other equivalent arrangement whereby, when so turned, they will be held away from the wheel.

In these grooves there is arranged, respectively, a hook, *n n′*, adjustably secured in the same manner as the dogs, as seen in Fig. 4. These hooks are constructed and arranged so

that in turning toward the pawls the hooks will engage upon the stud *f* on their respective pawls, and draw such pawl down onto, and so as to engage, the teeth of the wheel, the spring on the pawl operating to hold it there when once turned into engagement.

Now, supposing the pawl *d'* to be operating upon the wheel while the pawl *d* is disengaged, as shown, it will continue so to operate at each revolution of the shaft until the dog *h'* comes beneath the stud *f* on the pawl. Then the pawl will be thrown out. When this is done, the hook *n* comes upon the stud of the other pawl, *d*, and turns that pawl into engagement with the wheel. This then reverses the wheel G, and turns it in the opposite direction until the dog *h* comes in contact with the pawl *d*. Then that pawl is turned away from the wheel, and the hook *n'*, in like manner, brings the pawl *d'* into engagement with the wheel, and thus, through the cam E, a reciprocating or back-and-forward movement is imparted to the carriage C.

The time of reversing the movement may be varied by simply adjusting the dogs and hooks on the wheel.

To feed the sheet or strip forward after each row of holes has been punched a pair of feed-rolls, N, is arranged upon the carriage, geared together, and on one is a bevel-pinion, N^1, into which a corresponding pinion, N^2, on a shaft, N^3, works. This shaft N^3 is attached to the slide D, and moves longitudinally with it, through its bearing N^4, and so that by the turning of the shaft N^3 the feed-rolls will be rotated, and cause the advance of the sheet toward the punch. This feed only occurs at the two extreme edges of the sheet.

To make this feed automatic, a crank, P, is arranged upon the end of the shaft L^1, and from this a rod, P^1, connects with the lever P^2 of a pawl, P^3, the said pawl being hung concentric to the shaft N^3, and on this shaft is a ratchet-wheel, P^4, splined to the shaft, so as to turn with it, but engaged with the bearing N^4, so as to prevent axial movement of the ratchet, the shaft working freely through the ratchet. When the pawl P^3 is engaged with the teeth of the ratchet it will turn the shaft and the rolls, so as to advance the sheet.

To hold the pawl away from the ratchet, and yet engage it at the time the advance of the sheet is required, a vertical slide, R, is arranged with a shoe, R^1, upon its upper end, on which the pawl rests. This slide is held up by a spring, R^2, so as to support the pawl away from the ratchet, as seen in Fig. 3. On the corresponding end of the shaft F is a plate, S, in which is a concentric slot, *r*, and in this slot two studs, S^1 S^2, are arranged, and on the lower end of the slide R are two arms, *t* and *t'*, projecting to the right and left, and in the path of the studs S^1 S^2.

As the shaft F is rotated, in the manner before described, in one direction, the stud S^2 will come in contact with the arm *t'* upon that side so soon as the shaft will have been turned to that extent, and, bearing upon that arm, will draw down the slide R, as denoted in broken lines, and this operation occurs when the carriage has been moved to its extreme position in one direction. This operation causes the pawl P^3 to engage the ratchet P^4, and turn the rolls to advance the sheet. The next revolution of the shaft L^1 reverses, as before described, the shaft F, and causes the stud S^2 to turn away from and release the arm *t'*, which then rises and disengages the pawl, and when the opposite extreme is reached the stud S^1 operates in like manner upon the other arm, *t*, of the slide R, thus causing the feed of the metal at each extreme.

The cam E will revolve with the plate S, and would, therefore, move the carriage to the right or left while such forward movement of the sheet was made, which would make the next punching distant from the edge. To avoid this the stud *a* is attached to an auxiliary slide, D'. This slide extends to the right and left beyond the carriage, as indicated in Figs. 1 and 2, and in these projecting ends is an adjusting-screw, *m*. If these two screws be turned hard against the carriage, then the carriage will move with the auxiliary slide; but if they be turned away from the carriage, then the carriage will not move until the screw upon the advancing end of the slide D' comes against that side of the carriage, thus creating a lost motion, or a time when the carriage will stand still while the cam E is moving, and this lost motion will occur at each extreme movement to the right or left. This extent of lost motion may be adjusted by means of the screws, and so that the carriage will stand still during the advance of the sheet.

The throw of the pawls *d d'* may be adjusted to give a greater or less extent of movement to the carriage longitudinally by shortening the crank, or the connection with the lever, in the usual manner for such adjustment, and, in like manner, the throw of the pawl P^3, to give a greater or less advance to the sheet. Such adjustment of the pawls *d d'* would, however, be limited by the teeth of the wheel G—that is, the minimum adjustment would be a single tooth, which would not be sufficiently nice for slight variations in the size of the punchings. To make such nice adjustment, the cam E is constructed with several grooves of varying pitch, as indicated by the diagram, Fig. 5, the maximum variation of the groove corresponding substantially to the pitch of the teeth of the wheel G. Hence, if there be three grooves, as represented, their variation, each from the other, would be one-third of the pitch. The stud which connects the carriage with the cam, if set into either of these grooves, would move the carriage accordingly. Hence, if the adjustment by the pawls when in connection with one groove be not sufficiently nice, the stud is set into one of the others, which will produce such required adjustment.

By this arrangement the teeth of the wheel G may be of very much greater pitch than they could be without such auxiliary adjustment.

I claim—

1. The combination, in a power-press, of the diagonal carriage C, having a reciprocating movement parallel with the press, the cam E, toothed wheel G, the two pawls *d d'*, with their respective dogs and hooks *h h'* and *n n'* on the said toothed wheel, substantially as specified.

2. The combination, in a power-press, of the diagonal carriage C, having a reciprocating movement parallel with the press, the shaft F, arranged to impart such reciprocating motion to the said carriage C, and with an intermittent rotating feed for said shaft, the shaft N^3, in connection with the feeding mechanism on the said carriage, the pawl and ratchet P^3 P^4, the slide R, and adjustable studs S^1 S^2 on the shaft F, operating to engage or disengage the pawl P^3 with its ratchet, substantially as specified.

3. The combination, in a power-press, of a diagonal carriage, having a reciprocating movement parallel with the press, a cam with differential spiral grooves for imparting such reciprocating movement to the carriage, and a ratchet-feed to rotate the said cam, substantially as set forth.

4. The combination, in a power-press, of the diagonal carriage, having a reciprocating movement parallel with the press, the auxiliary slide D', with its adjusting-screws *m*, and a cam, in connection with said auxiliary slide, whereby the movement of the said auxiliary slide occurs before the said cam will act directly upon the carriage, substantially as set forth.

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