(No Model.) 2 Sheets—Sheet 1.

A. & P. DUCHSCHER & M. G. SPOO.

DIFFERENTIAL LEVER PRESS.

No. 298,188. Patented May 6, 1884.

Fig. 1.

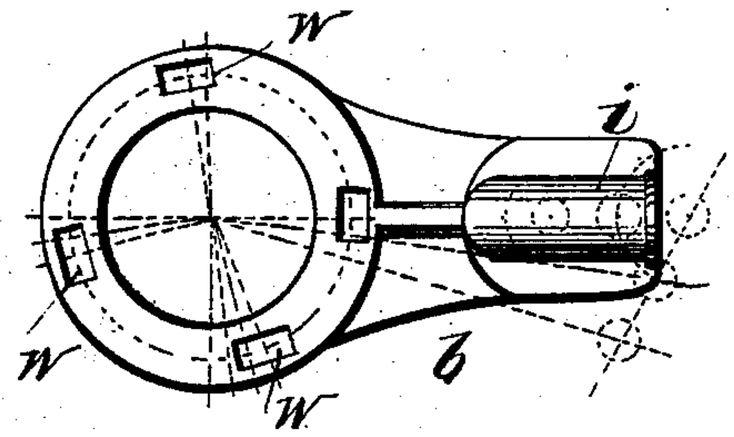


Fig. 2.

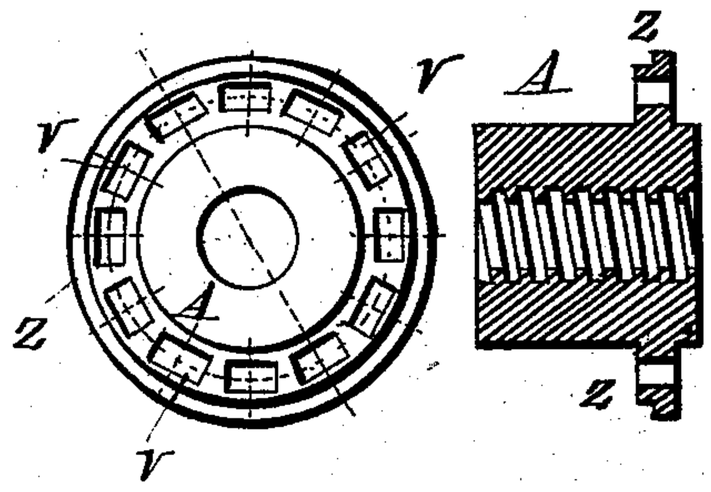


Fig. 3.

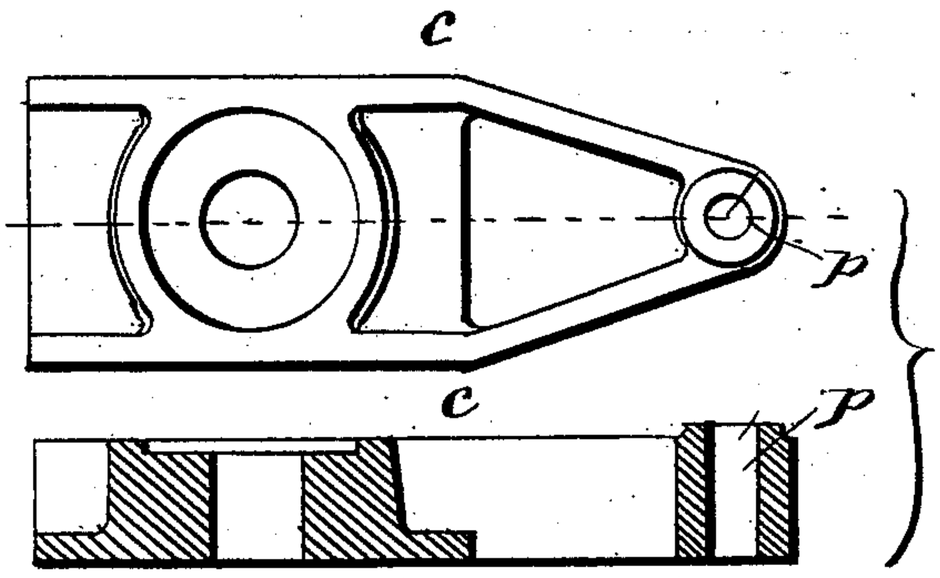


Fig. 4.

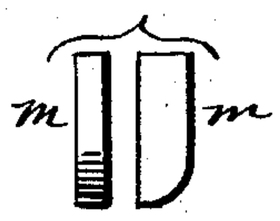
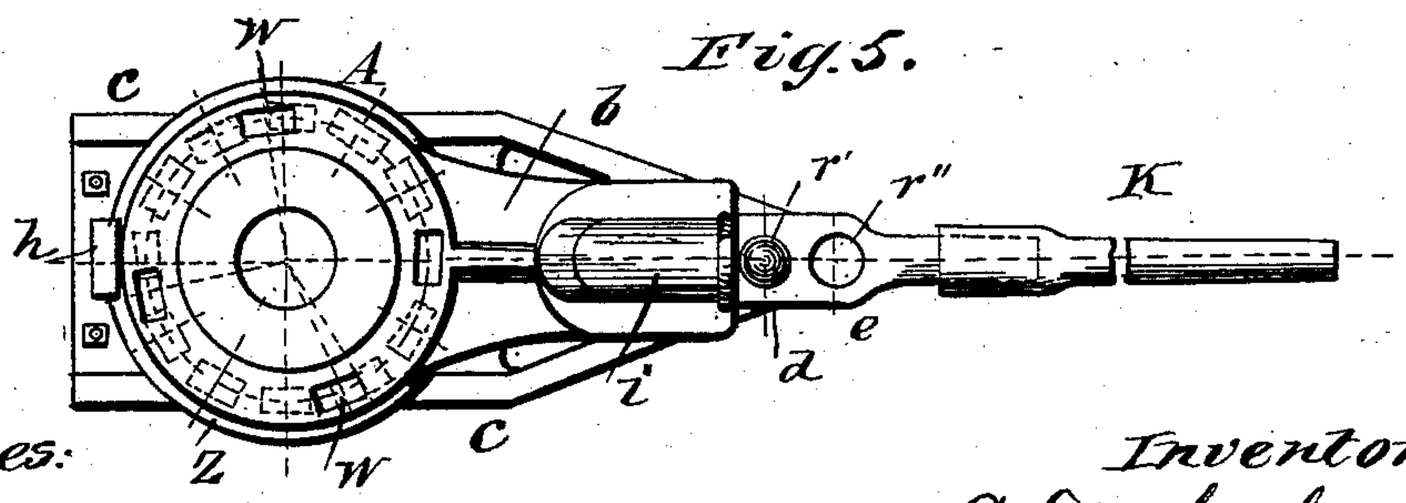


Fig. 5.



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(No Model.) 2 Sheets—Sheet 2.

A. & P. DUCHSCHER & M. G. SPOO.

DIFFERENTIAL LEVER PRESS.

No. 298,188. Patented May 6, 1884.

Fig. 6.

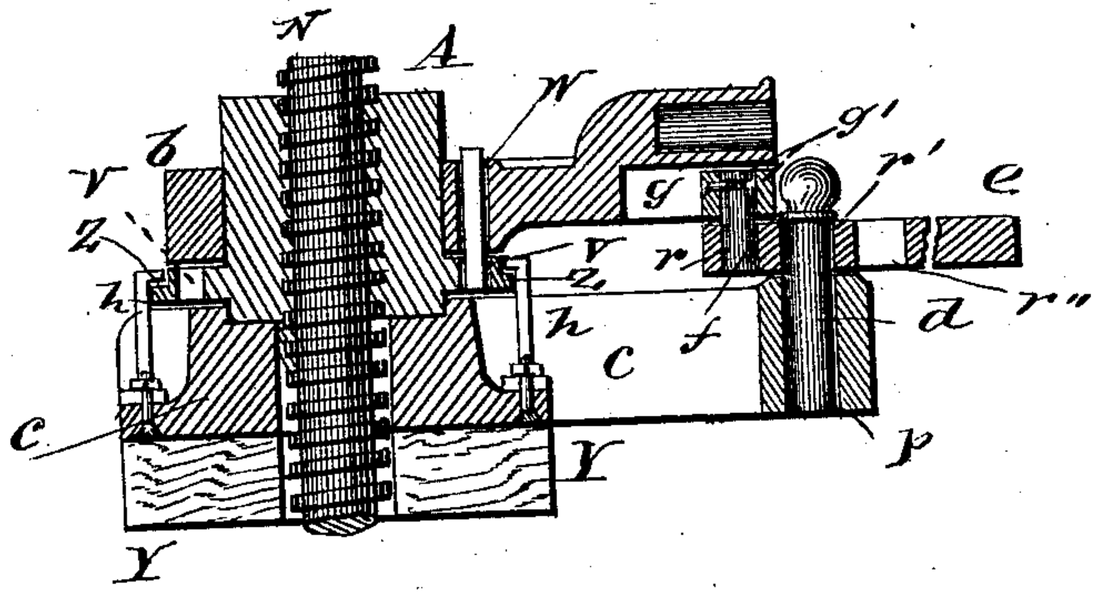


Fig. 7.

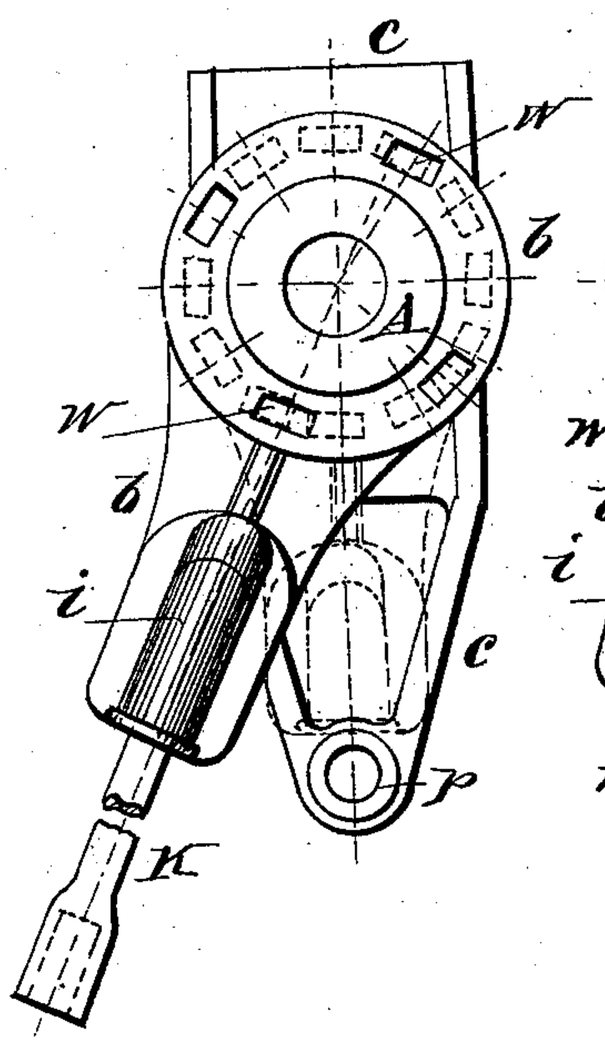


Fig. 8.

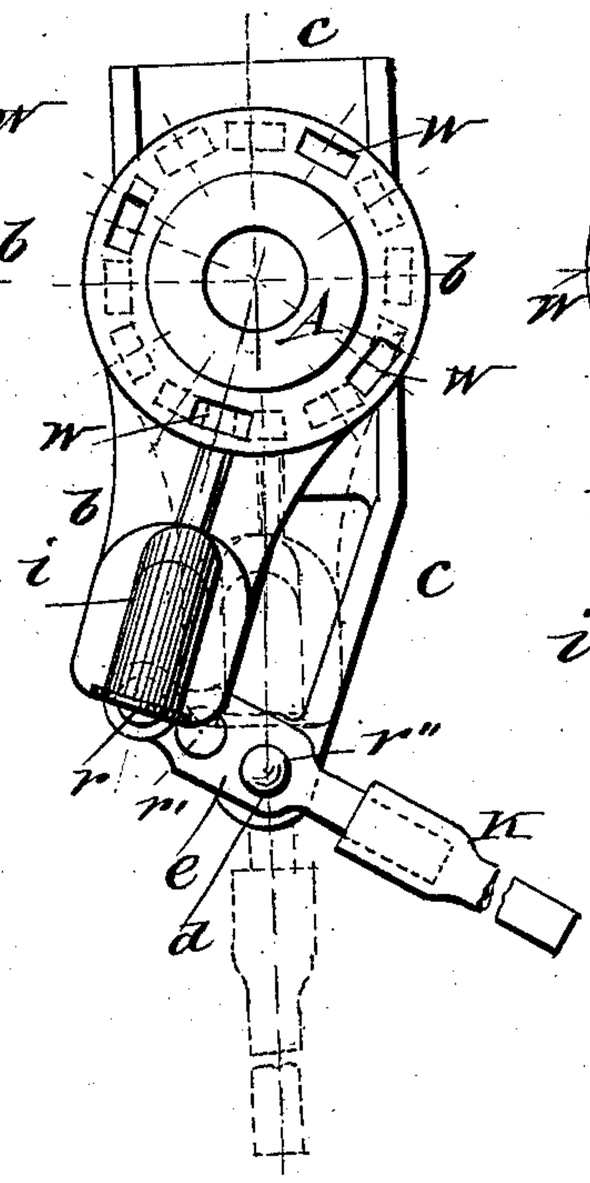
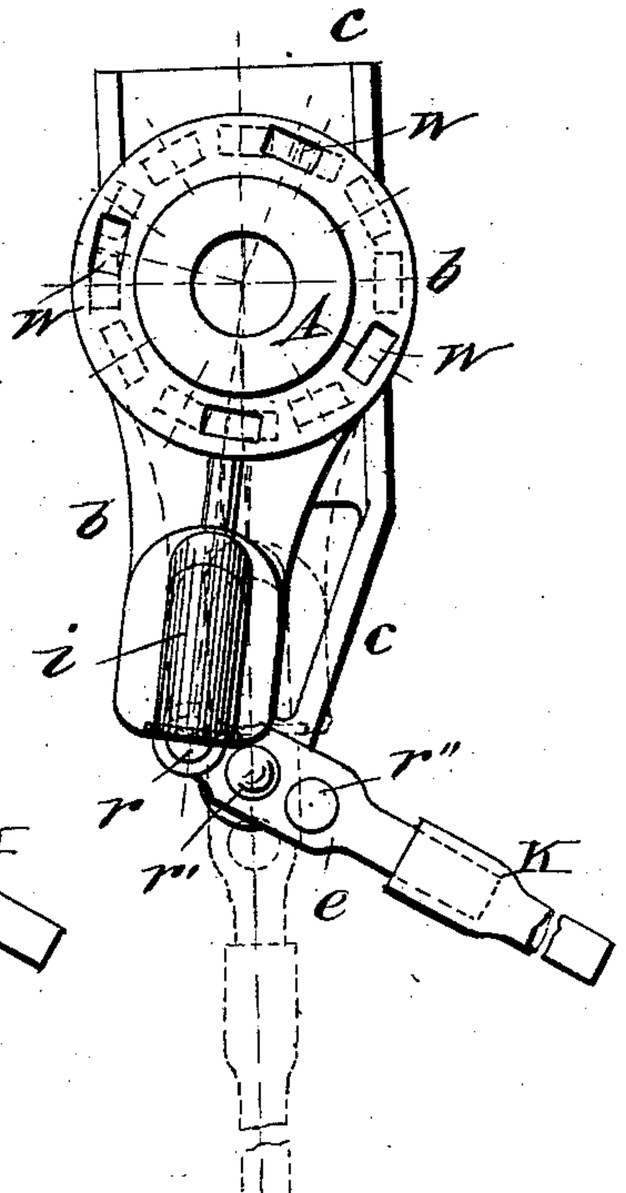


Fig. 9.



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UNITED STATES PATENT OFFICE

ANDRE DUCHSCHER, PIERRE DUCHSCHER, AND MATHIAS G. SPOO, OF LUXEMBURG, LUXEMBURG, GERMANY.

DIFFERENTIAL-LEVER PRESS.

SPECIFICATION forming part of Letters Patent No. 298,188, dated May 6, 1884.

Application filed April 1, 1884. (No model.) Patented in Germany December 10, 1881, No. 19,050; in Luxemburg February 18, 1882, No. 185; in France April 22, 1882, No. 148,508; in Belgium July 25, 1882, No. 58,5?0; in Italy August 3, 1882, XXVIII, 490; in Austria-Hungary August 12, 1882, No. 14,738, and in Spain February 1, 1883, No. 3,541.

To all whom it may concern:

Be it known that we, A. DUCHSCHER, P. DUCHSCHER, and M. G. SPOO, of Luxemburg, Grand Duchy of Luxemburg, Germany, have invented certain new and useful Improvements in Differential-Lever Presses; and we do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form part of this specification, in which—

Figure 1 is a top view of the differential lever. Figs. 2 are views of the flanged nut. Figs. 3 are views of the power-base. Figs. 4 are views of one of the drop-pins. Fig. 5 is a top view of the differential lever, having the lengthening-lever applied. Fig. 6 is a vertical central section of the device. Figs. 7, 8, and 9 are top views of the device, showing the same as used during the different stages of pressing.

This invention relates to differential levers, which are especially designed for presses of various kinds; and it consists in a lever-press power, which will be fully understood from the following description, when taken in connection with the annexed drawings.

A designates a nut, which is provided with an annular rim or flange, Z, having square openings *v*, arranged equidistant from each other and from the axis of the nut, and adapted to receive drop-pins *m*, which prevent the nut from turning when the differential lever *b* is operated. Around the nut A, and sustained on the flange Z, turns the differential lever *b*, which is provided with openings *w*, in which the drop-pins *m* move up or down. The differential lever is provided with four drop-pins *m*. The openings in the nut and those in the differential lever are arranged in circles of the same diameter. The division of the openings *v* in the nut A is the same—that is to say, the distance of all of said openings from one another is equal. The division of the four drop-pin openings *w* in the differential lever is unequal, and is one-quarter of the twelve divisions of the openings in the flange of the nut, and is the sum total of the division differences of the distance of two openings in the nut A, when measured from center to center, as shown in Figs. 1 and 2.

It will be observed from the above description that when the differential lever *b* is moved in opposite directions each movement represents a quarter of the whole difference. The four drop-pins fall alternately in the openings of the nut A, and give motion to the same when the lever *b* is moved. The effect of each pin by the operation of the lever will be one-forty-eighth of the circumference of the nut A; or, in other words, through the differential divisions of the four drop-pins, the same effect is produced as though the nut had forty-eight openings with one or more pins, in a similar division. The greater the number of drop-pins in a differential division the less will be the motion made with the differential lever, so as to allow the pins *m* to operate alternately. With six drop-pins *m*, for instance, the number of working-openings in the screw-nut A would be represented by six times twelve, or seventy-two. The distance of the operating-point *r* from the turning-point r' and r^2 on the operating-lever *e* is determined by the length of the motion made on the differential lever *b;* but said points may be moved nearer together. The greater the number of drop-pins used the greater will be the number of openings in the nut. The functions of the operating-lever *e* have direct relation with the above—that is to say, the nearer the operating-point *r* and the turning-point r' and r^2 are moved together, the greater will be the pressure or purchase obtained by this lever. The length of the arm of the differential lever is important to the functions of the press. In the end of the differential lever *b* is formed an oblong recess, *g*, which is designed to receive the anti-friction roller g' and its axis *f*, as shown in Fig. 6. The openings r' r^2 serve as the turning-points of the operating-lever *e*, r^2 serving for a lesser and r' for a greater pressure. A pin, *d*, fits in the opening *p* of the power-base *c*, or in the openings r' or r^2 of the operating-lever *e*, and serves as the fulcrum for the latter when this pin *d* is in the points *r* or r^2. The lever K

serves to lengthen the operating-lever *e*, which latter terminates in a rounded portion, which fits into a socket in the lever K.

Y represents a wooden base, on which the power-base *c* is applied. To produce a simultaneous raising of the power-base *c* when the nut A is turned loose, we employ angular irons *h*, which are so fastened to the base *c* that they fit over the flange Z of the nut A, (see Fig. 6,) and thus the base is raised by the upward movement of the said nut.

We represent by Figs. 7, 8, and 9 different ways in which the differential lever can be used. Fig. 7 shows the device without the operating-lever *e*, as used at the commencement of pressing, when speed rather than great power is desired; but the lengthening-lever K is shown applied in the socket *i* of the lever *b*. In this manner the nut A can be rapidly turned fast or loose, so that the skipping of a certain number of drop-pin openings in said nut is possible. Fig. 8 represents the press when the full power is to be applied. The operating-lever *e* is here used, and a turn about the pin at r^2 is the result. When the pin *d* is put in r^2, the bearing-point *r* from r^2 is far enough so that a motion of the arm will move the screw-nut A one twenty-fourth of its circumference. Fig. 9 shows how the bearing-point *r* and the turning-point *r'* are brought into requisition. An opposite movement of the lever *e* tends to throw the nut A one forty-eighth of its circumference, and the press distributes its maximum pressure. The backward turning or loosening of the nut A is effected by reversing the drop-pins *m*, and then making the same movement with the operating-lever as before.

N designates the follower screw-shaft of the press.

Having described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination of the differential lever, the flanged nut connected to this lever by drop-pins, the pressure-base connected to said nut, and the operating-lever connected loosely to the differential lever, all constructed and adapted to operate substantially in the manner and for the purposes described.

2. The combination of the screw-shaft, the power-nut applied thereon, the lever *b*, connected to the nut by drop-pins, the lever *e*, provided with openings, a fulcrum-pin, *d*, on the base *c*, and a loose connection with the differential lever, all constructed and adapted to operate substantially in the manner and for the purposes described.

3. The combination of the screw-shaft, the flanged nut thereon, the differential lever connected by pins to the said nut, the lever *e*, for actuating the differential lever, the base *c*, and the angular irons, connecting the flanged nut to this base, all constructed and adapted to operate substantially in the manner and for the purposes described.

In testimony that we claim the foregoing as our own we affix our signatures in presence of two witnesses.

A. DUCHSCHER.
P. DUCHSCHER.
M. G. SPOO.

Witnesses:
V. LEFÉVRE,
JACOBI.