(No Model.) 2 Sheets—Sheet 1.

J. B. BARRODY.

ADJUSTABLE ECCENTRIC.

No. 258,693. Patented May 30, 1882.

Fig: 1.

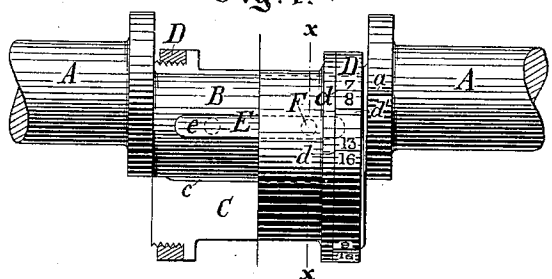


Fig: 2.

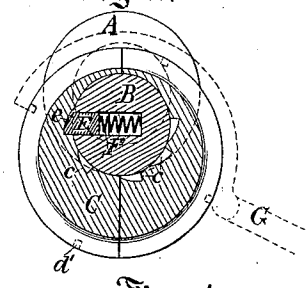


Fig: 3.

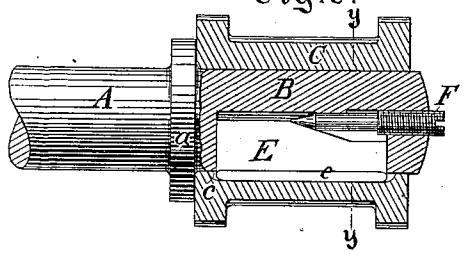


Fig: 4.

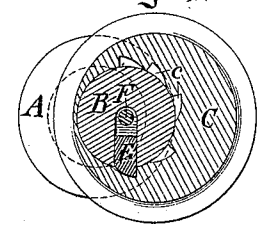


Fig: 5.

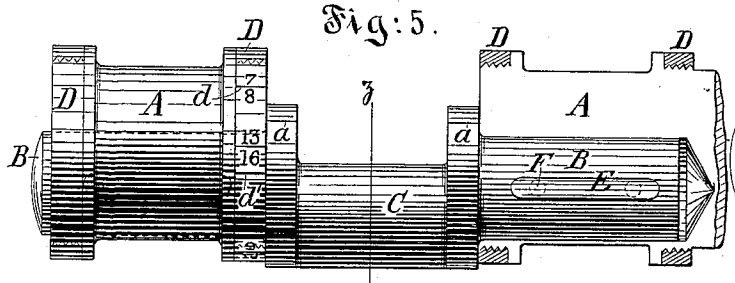


Fig: 6.

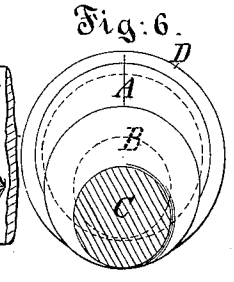
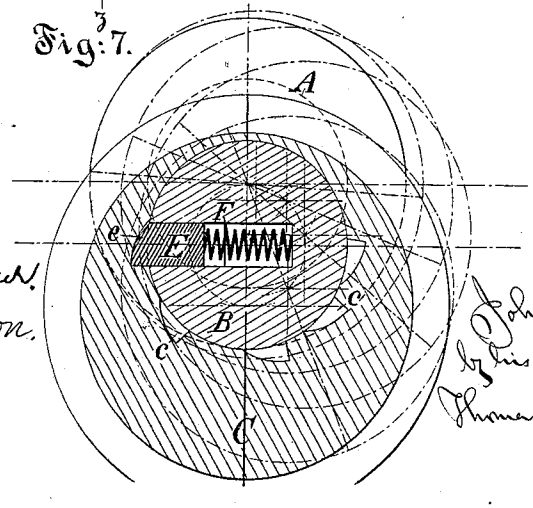


Fig: 7.



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Charles C. Stetson.

Inventor:
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by his attorney
Thomas L. Stetson.

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 2 Sheets—Sheet 2

J. B. BARRODY.

ADJUSTABLE ECCENTRIC.

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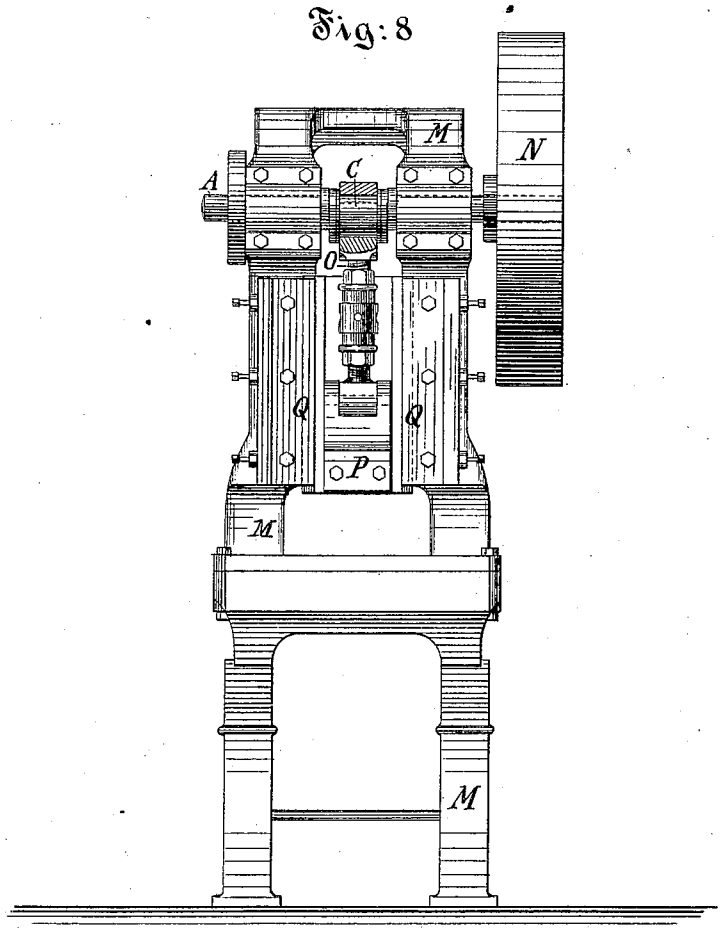
Fig: 8



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UNITED STATES PATENT OFFICE.

JOHN BAPTISTE BARRODY, OF WOODHAVEN, NEW YORK.

ADJUSTABLE ECCENTRIC.

SPECIFICATION forming part of Letters Patent No. 258,693, dated May 30, 1882.

Application filed February 7, 1882. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. BARRODY, of Woodhaven, Queens county, State of New York, have invented certain new and useful Improvements in Adjustable Eccentrics, of which the following is a specification.

The invention is intended more especially for use in punching-presses, or what are known as "cutting" or "drawing" presses, and will be so described; but it will be understood that it may be used with some advantage in other situations. Cutting or drawing presses carry dies which work in connection with stationary dies to cut or draw out pieces of sheet metal or other material in exact forms desired. The dies or die-carriers are guided in suitable grooves, or by other efficient means, and are worked up and down with great force. It is important to be able to easily and rapidly change the amount of motion, while insuring that the strength is retained. It is not important to be able to graduate the stroke very finely. A few distinctly-marked lengths of stroke will suffice, without any capacity for intermediate adjustments. In what I esteem the most complete form of the invention the end is attained in that way. I employ two eccentrics, with but one connecting rod or link to operate the device to which it is connected. One of these eccentrics is made adjustable with reference to the other in such manner that while the throw of one remains under all circumstances the same the adjustable eccentric to which the connecting-rod is attached may be so set in various positions that the combined stroke of both eccentrics will be greater or less according to the position given in every case to the second or adjustable eccentric. Various means may be used to hold the device firmly in position when adjusted. I prefer to employ a feather engaging with corresponding splines or grooves; but in certain cases, particularly when only light work is to be performed, this object may be attained by mere frictional contact of the parts, as will be explained further on.

The details of construction of the device may be varied within wide limits, so as to best adapt it to the different conditions under which it is to be used.

The accompanying drawings form a part of this specification. Figure 1 is a longitudinal elevation, partly in section, showing one method of carrying out the invention. Fig. 2 is a cross-section on the line *x x*, Fig. 1. Fig. 3 is a longitudinal elevation, partly in section, showing a modification. Fig. 4 is a cross-section on the line *y y*, Fig. 3. Fig. 5 is a longitudinal elevation, partly in section, of another modification. Fig. 6 is a cross-section on the line *z z*, Fig. 5. Fig. 7 is a diagram illustrating more explicitly the method of construction of the device. This figure corresponds to Figs. 1 and 2. Fig. 8 represents a punching or cutting press fitted with the device as illustrated in Figs. 1 and 2.

Similar letters of reference indicate corresponding parts in all the figures.

Referring to Figs. 1 and 2, which illustrate the invention as applied to a cranked shaft, A is the shaft, mounted in fixed bearings in a stout framing, and revolved by a belt running on a pulley in the ordinary or any suitable manner, as will appear from the general view, Fig. 8.

B is a stationary eccentric or crank, by which I mean stationary relatively to the shaft, and revolving therewith. The shaft A and the first eccentric or crank, B, are preferably formed of one piece of iron or steel, accurately finished, the crank having a throw of, say, seven-sixteenths of an inch.

C is the second or adjustable eccentric, made in halves, as shown, so that it can be conveniently mounted upon the first eccentric, B.

D are bands screwed from both sides upon the ends of eccentric C to confine the two halves together and make practically one piece of the same. The eccentric B on its exterior surface and the eccentric C on its interior surface are so finished that the latter turns freely, but yet without play, in any direction upon the former. With regard to the dimensions I esteem it preferable that the second or adjustable eccentric shall have about the same amount of throw upon the first or stationary eccentric as the latter has upon the fixed shaft, so that when the longest radius of eccentric C coincides and extends in the same direction with the longest radius of eccentric B the combined throw will be double the throw of eccentric B alone, which in this case would give

seven-eighths of an inch, while when the longest radii of both eccentrics coincide, but extend in opposite directions, the combined throw will be reduced to nothing. Any intermediate position will of course give a combined stroke varying between nothing and seven-eighths of an inch.

E is a pawl seated in a deep slot cut into the first eccentric, B, and urged outward by one or more springs, F, as shown. The outer edge of the pawl E is beveled off on one side, as represented at *e*, and engages with correspondingly-formed longitudinal grooves *c*, cut into the interior of eccentric C. There are as many of the grooves *c* as it may be desired to give different strokes to the compound eccentric, care being taken to so space said grooves *c* that when the flat side of the edge of pawl E engages with the corresponding side of any individual groove, and the shaft A is then turned in the proper direction, the stroke will be exactly that for which such groove is made. It will now be seen that when the shaft A is turned in the direction to bring the working or flat side of pawl E to bear against the radial or straight side of one of the grooves *c* the eccentric C is forcibly turned, and thus operates the attached connecting-rod to perform the work desired, the springs F holding the pawl outward and preventing any liability to accidental disengagement. When it is desired to change the stroke it is simply necessary to turn either the eccentric C forward or the shaft A backward. Then the inclined side of each groove *c*, acting on the beveled edge of the pawl E, will urge the latter gently inward against the force of the springs F, the feather, however, moving outward again every time it passes one of the grooves *c*. The turning of the eccentric C or the shaft A in the respective backward direction is continued until the pawl E clicks into that groove which determines the position of the eccentric C for giving the desired new stroke.

In order to enable the attendant to readily and without experimenting determine whether the pawl E is actually engaged in the right groove to produce a certain desired stroke, a single mark, *a*, is formed on the shaft A, or on the crank-disk forged therewith, as shown, and a series of marks, *d*, is formed upon the adjacent ring D or upon the eccentric C. These marks *d* are so spaced that one comes in line with the mark *a* whenever the pawl E is engaged in one of the gooves *c*, and each mark *d* is provided with numerals indicating the stroke which the eccentric C will make when the groove *c* corresponding to such mark is engaged with pawl E, said mark *d* being then in line with mark *a*.

In cases where only light work is to be performed the pawl E and grooves *c* in the eccentric C may be entirely omitted. In such cases the two halves of the eccentric C are interiorly so finished that when strongly clamped together they come into very efficient frictional contact with the eccentric B, which will suffice to prevent any displacement of the parts while performing their duty. To obtain this result I prefer to make the threaded portions on both ends of the eccentric C slightly conical, the female thread of the clamping-rings being correspondingly shaped.

When it is desired to change the stroke of the device thus constructed it is only necessary to unscrew the clamping-rings to a small extent, so as to relieve their clamping action. Then the eccentric C is turned into the position for the new stroke required, and held there while the clamping-rings D are screwed up again tight by means of a wrench—such as G, Fig. 2, or otherwise—whereby a firm hold of the two halves of the eccentric C is secured upon the eccentric B by reason of the conical threads on eccentric C and rings D. The latter may be provided with notches *d'* to permit the use of the wrench G, as shown.

Figs. 3 and 4 show the application of the invention to a crank on the end of a shaft. This construction may be exactly corresponding to that shown in the preceding figures. I can, however, in this case avail myself of the peculiar position of the parts to employ an absolutely-positive means for urging the pawl E outward into the groove *c* of the eccentric C. For this purpose I replace the springs F of Figs. 1 and 2 by a screw, F, tapped into the end of the crank-pin B, and having a tapered point which bears against the inclined rear edge of the pall E, as shown. It is evident that when it is desired to change the stroke of this eccentric C it is necessary to first screw the pin F outward, so as to allow the pawl E to retreat when the eccentric C is turned from one position into another. When this change of position is effected the pin F is screwed inward again, forcing the pawl E radially outward into the grove *c* now presented. By means of this screw-pin F a very strong and reliable hold of all parts in the proper position can be readily secured.

Figs. 5 and 6 show a construction somewhat modified in its details from the preceding figures, and which may be adapted for cranked shafts as well as for cranks on the end of a shaft, one of the extremities being simply omitted in the latter case. By cranked shaft I mean in this case simply the arrangement of a crank with bearings on each side, there being practically a separate shaft on each side, both, however, having the same motion. According to this construction the shaft or shafts A, which may be either solid pieces or made in halves, similar to the eccentric C of the preceding figures, are bored out eccentrically to receive the ends B of a cranked piece, the crank C of which is intended to receive the connecting-rod. The end or ends B of the cranked piece are engaged with the shafts A by means of pawl E, springs F, and grooves *c* in a manner exactly corresponding to the engaging means between crank B and eccentric C of Figs. 1 and 2, and the ends B may thereby be turned and engaged in vari-

ous positions in their sockets; but it is evident that notwithstanding this fact the said ends B form permanent eccentrics, inasmuch as they have invariably the same length of stroke; but by so turning the ends B in their sockets the eccentric C becomes adjusted with reference to the eccentricity of the ends B as the former is caused to describe a circle around the latter, and is thus removed from or approached toward the center line of shaft A.

I attach some importance to the position in which the pawl E is arranged in the crank B. It is evident that only one-half of the interior of the part C in Figs. 1 to 4, or of the part A in Figs. 5 and 6, need be provided with the grooves *c*, because in every case one-half of a revolution will suffice for moving the eccentric C through all positions for giving the smallest or no stroke at all and all intermediate and the largest strokes, the other half-revolution giving simply a repetition of these positions in inverted order. Consequently when the pawl E is arranged exactly at right angles to the plane passing through the center lines of A and of B the grooves *c*, which, when engaged with pawl E, give the largest and the smallest strokes, will be exactly at right angles to the largest radius of eccentric C, and all intermediate grooves can be formed in that part which presents the greatest strength of metal, thereby avoiding an undue weakening of C or an increase of weight, which would otherwise be unavoidable. This will be clearly understood with reference to Fig. 7.

Fig. 8 shows the construction illustrated in Figs. 1 and 2 applied to a punching or cutting press. M is the general framing; N, the fly-wheel and pulley upon the shaft A. The eccentric C operates the connecting rod or link O, to the other end of which is attached the die-carrier P, which slides in the lateral grooves Q, and works a suitable die fastened in the carrier up and down to a greater or smaller extent, according to the adjustment of the eccentric.

The dimensions in which the invention may be carried out may vary within wide limits, in order to make it applicable to various classes of machines and for different kinds of work.

I claim as my invention—

1. The screw collars or rings D, in combination with the two halves of the eccentric C, the latter being correspondingly threaded, as herein specified.

2. The two eccentrics B and C, one within the other, having a series of grooves or splines in the one jointly with a single pawl in the other, adapted to serve as herein specified.

3. The two eccentrics B and C, one within the other, having a series of grooves or splines in the one jointly with a single pawl, E, in the other, and with means F for urging the pawl into engagement with said grooves, as herein specified.

In testimony whereof I have hereunto set my hand, at Jamaica, Queens county, New York, this 30th day of January, 1882, in the presence of two subscribing witnesses.

JOHN BAPTISTE BARRODY. [L. S.]

Witnesses:
STEPHEN H. LOTT,
J. N. WILLIAMSON.