

May 24, 1932.

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1,859,457

ECCENTRIC CAM DRIVE

Filed Sept. 15, 1930

2 Sheets-Sheet 1

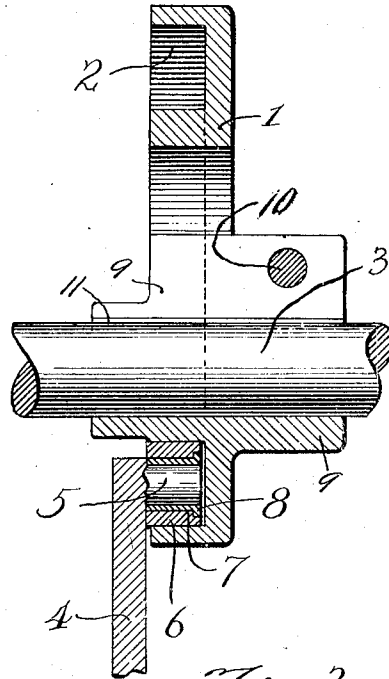
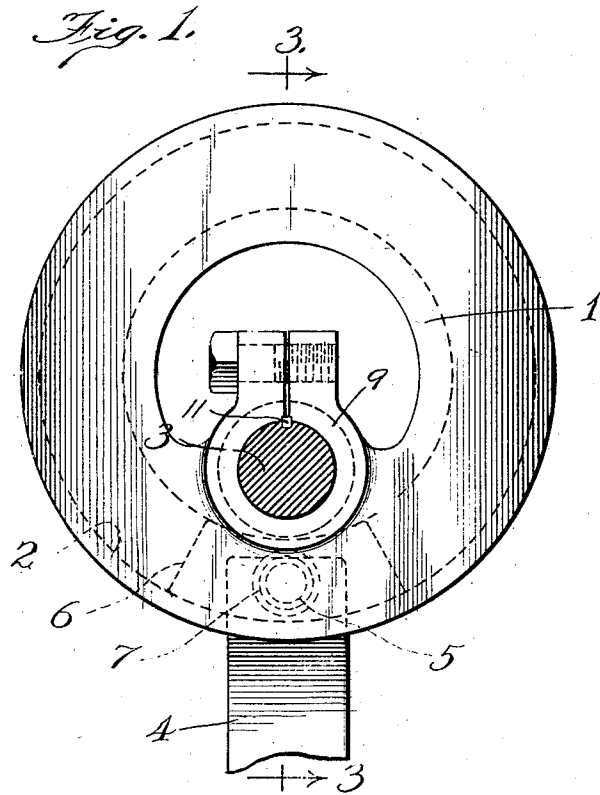


Fig. 3.

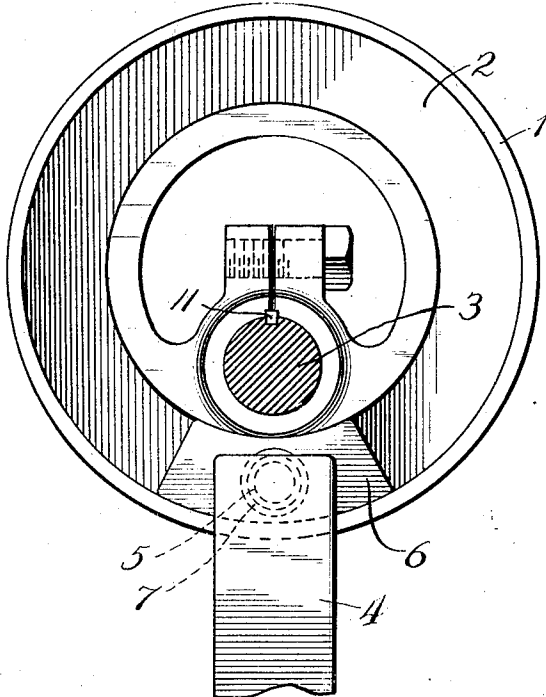


Fig. 2.

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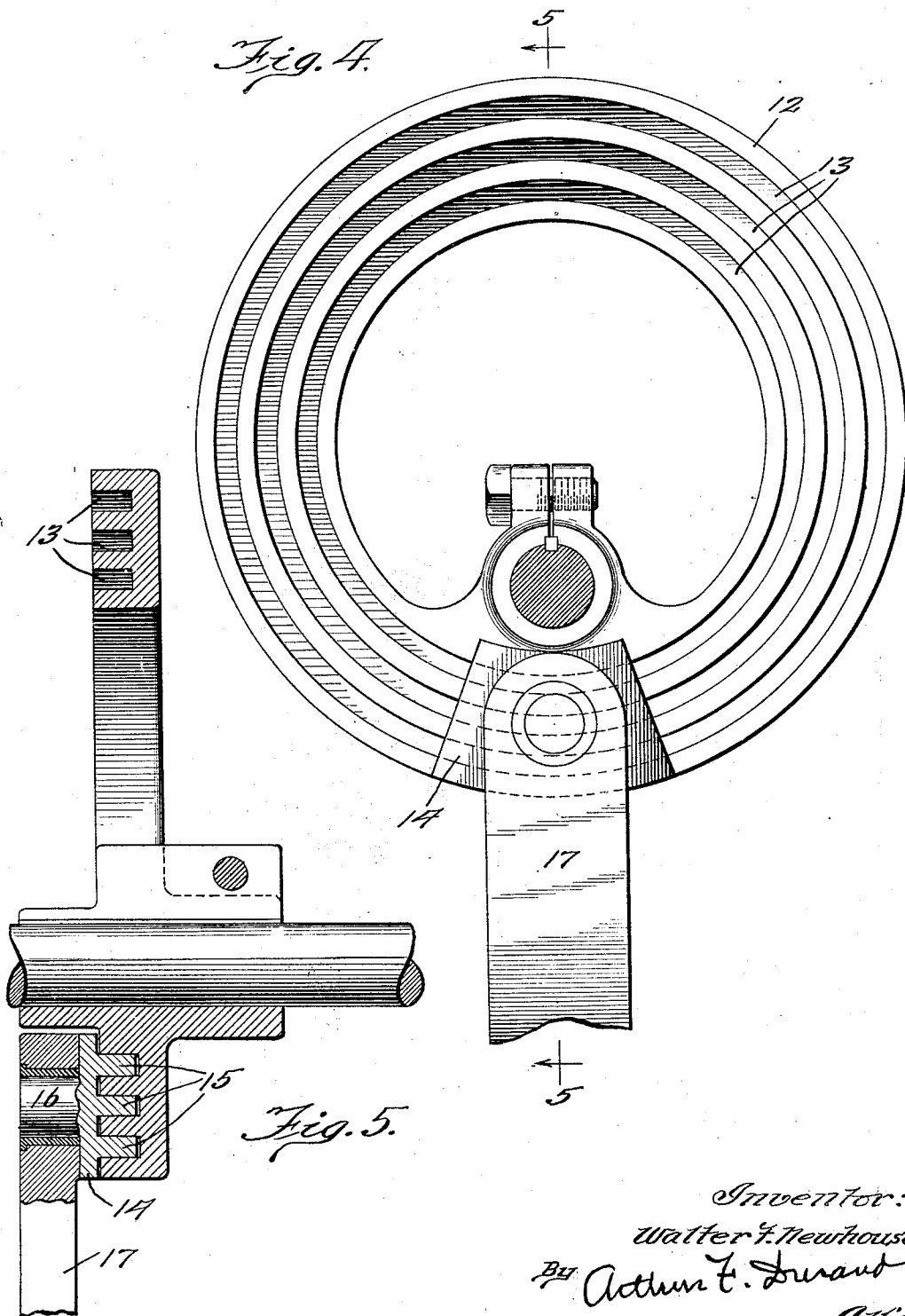
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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ECCENTRIC CAM DRIVE

Application filed September 15, 1930. Serial No. 481,916.

This invention relates to eccentric cams for actuating staplers or other devices.

Generally stated, the object of the invention is to provide a novel and improved construction whereby a curved and non-rotary block is employed for engaging the groove of the eccentric cam, whereby to insure greater smoothness, and less wear and looseness, in the operation of an eccentric cam actuating means of this general character.

It is also an object to provide certain details and features of construction and combinations tending to increase the general efficiency and the desirability of an eccentric cam driving or actuating means of this particular construction.

To the foregoing and other useful ends, the invention consists in matters hereinafter set forth and claimed and shown in the accompanying drawings, in which—

Fig. 1 is a side elevation showing one side of an eccentric cam driving or actuating means embodying the principles of the invention.

Fig. 2 is a similar view showing the other side of said eccentric cam device.

Fig. 3 is a vertical section on line 3—3 in Fig. 1 of the drawings.

Fig. 4 is a view similar to Fig. 2, on a larger scale, showing another form of the invention.

Fig. 5 is a vertical section on line 5—5 in Fig. 4 of the drawings.

As thus illustrated, the invention comprises a rotary eccentric cam 1 having a circular or annular groove 2, the cam being keyed to an operating shaft 3 in any suitable or desired manner.

An upright or vertical reciprocating member 4 may be connected with any device or mechanism to be operated by the eccentric cam. For example, the member 4 may be connected to any ordinary or suitable stapling mechanism, for operating the same, by the vertical reciprocation of said member. The upper end of this member 4 has an integral stud or horizontal pin 5 on its inner side, and a wearing block or shoe 6 is mounted on this stud or pin, said block being curved to fit the groove 2 previously mentioned. A

bushing 7 is provided on the stud or pin 5, the inner end of this bushing being flanged at 8 as shown, and being flush with the inner side of the block 6 and the inner end of the stud or pin 5 as shown. With this arrangement, the rotation of the shaft 3 and the cam 2 will cause the block 6 to travel relatively in the groove or channel 2, and as the cam 1 is eccentric to the shaft 3, it follows that the block 6 and the member 4 will be caused to move up and down or reciprocate. As the block 6 has ample curved surface engaging the walls of the channel or groove 2, forming a substantially tight or accurate fit, it follows that the impacts caused by the actuation of the member 4 up and down, as in driving staples, will not cause undue wear or distortion of the walls of the groove or channel 2, as would be likely to occur if the block 6 was of cylindrical or roller form, as is common, instead of being curved to conform to the curvature of the cam groove. In this way the actuation of the mechanism is smooth and with less wear, and with less looseness between the cam and the engaging member, or the member which engages the cam groove, and there is less wear on the stud or pin 5 with the arrangement shown and described, than would be the case with an ordinary rotating roller. The bushing 7 can be renewed, from time to time, if necessary, to take up wear, and the block 6 can also be renewed when worn, although the block is of such form that it tends to reduce wear thereon to a minimum.

The block 6 tilts back and forth, relatively to the member 4, during the operation of the mechanism, but does not rotate about its axis, simply having an oscillating motion on the supporting pin 5 previously mentioned. In effect, therefore, the block 6 is a segment of an annular eccentric strip or ring, but said block has no oscillation relatively to the cam, as it fits the cam groove. It could be a full ring, but this isn't necessary with the cam having the annular cam groove or channel 2, and hence the block 6 may be only a segment of a ring and still have sufficient wearing surface to co-operate with the rotary cam in the desired manner. The parts

are easily separated, and the construction is comparatively simple and inexpensive, yet capable of long operation under heavy loads.

Preferably, the cam 1 has a split collar 9 provided with a tightening bolt or screw 10, and a key 11 is inserted between the collar and the shaft 3 as shown. This split collar or boss 9 can be of any suitable or desired length, and is thus adapted to provide a firm and strong and rigid fastening device for securing the cam on the shaft. By loosening the bolt or screw 10, the cam can be removed from the shaft.

In Figs. 4 and 5 of the drawings, the construction is similar to that previously described, but in this case the cam 12 is provided with a plurality of concentric cam grooves 13, and the shoe or block 14 is provided with a plurality of segments 15 for engaging said grooves, whereby the block or shoe has more wearing surface, and greater contact with the cam, than when only one cam groove is employed as shown in Figs. 1, 2, and 3 of the drawings.

Furthermore, as shown in Fig. 5, the stud 16 is integral with the block or shoe 14, instead of being integral with the link or member 17, which latter is similar to the member 4 previously mentioned.

In Fig. 3, the bushing 7 is tight on the stud 5 and holds the block 6 in place. In Fig. 5, a similar flanged bushing is rigid with the stud 16 and holds the member 17 against separation from the block 14 which engages the cam.

Thus, it will be seen that the important feature of the invention is the curving of the opposite faces of the block 6, or the block 14, to fit or conform absolutely to the curvature of the side walls of the cam grooves or channels. These faces are formed on curves which are exactly the same as the curves of the side walls of the cam grooves or channels. Thus, the block, in each case, is curved to exactly fit the curvature of the cam groove or channel, with the result that the block cannot oscillate or have a skewing motion relatively to the cam groove or channel. In other words, the curved sides or faces of the block are parallel, and these parallel curved sides or faces are always parallel with the curved side walls of the cam groove or channel. Wherever the block is found in the cam groove or channel, its parallel curved sides or faces are exactly parallel with the curved side walls of the cam groove or channel. Hence, the only oscillation of the block is relatively to the vertically reciprocating member 4 upon which it is pivoted or swivelled in the manner shown and described. In this way, the cam block can have no binding action in the cam groove or channel, as its position relative to the channel cannot change, but must always remain parallel therewith. Of course, the block travels rela-

tively from one point to another in the groove or channel, but it never turns crosswise of the groove or channel, not even to the slightest degree.

What I claim as my invention is:

1. An eccentric drive mechanism comprising a member to be reciprocated, a rotary cam having an eccentric cam groove or channel, the curved sides of said groove being formed on parallel curves, a curved block having parallel curved faces fitting both of the curved walls of said cam groove or channel, and means to pivotally mount said block on said member, whereby rotation of said cam is operative to cause reciprocation of said member, with incidental oscillation of said block on its mounting, while preventing oscillation or skewing of said block relatively to the cam groove, the two sides of the block being curved about the same axis.

2. A structure as specified in claim 1, said block being in effect a segment of a ring that would fit said groove or channel, and said block being held by the cam against complete rotation on its mounting.

3. A structure as specified in claim 1, said means for mounting the block on said member comprising a stud integral with said member.

4. A structure as specified in claim 1, said means for mounting the block on said member comprising a stud integral with said member, together with a bushing interposed between said stud and said block.

5. A structure as specified in claim 1, said cam having another cam groove concentric to said first mentioned cam groove, said block having means fitting and engaging the last mentioned cam groove.

6. A structure as specified in claim 1, said cam having a plurality of concentric cam grooves, of which said first mentioned cam groove is one, and said block having curved segments forming the means for fitting and engaging said grooves, whereby said block is held in position concentric to said grooves.

7. A structure as specified in claim 1, said means for mounting the block on said member comprising a stud integral with one of said elements.

Specification signed this eleventh day of Sept., 1930.

WALTER F. NEWHOUSE.