No. 631,495. Patented Aug. 22, 1899.

# S. J. ADAMS.

## CAM MECHANISM.

(Application filed Apr. 2, 1897.)

(No Model.)

Fig. 1.

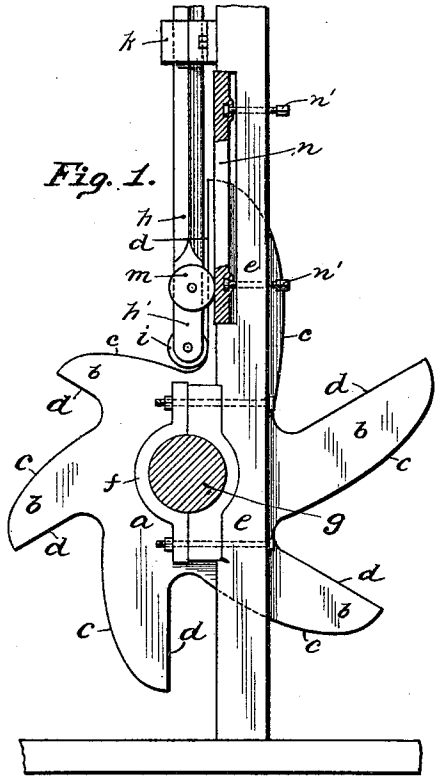



Fig. 2.

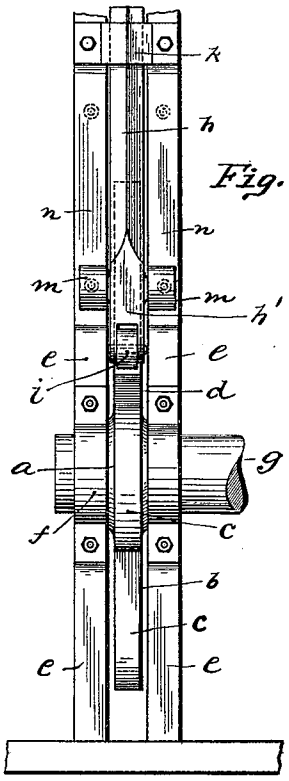
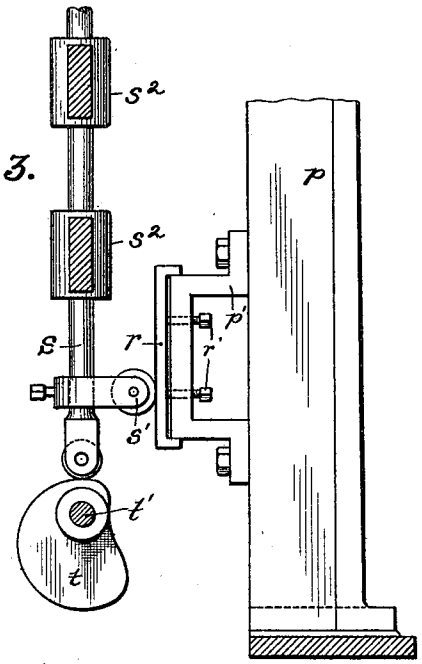



Fig. 3.




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# UNITED STATES PATENT OFFICE.

STEPHEN JARVIS ADAMS, OF PITTSBURG, PENNSYLVANIA.

## CAM MECHANISM.

SPECIFICATION forming part of Letters Patent No. 631,495, dated August 22, 1899.

Application filed April 2, 1897. Serial No. 630,412. (No model.)

*To all whom it may concern:*

Be it known that I, STEPHEN JARVIS ADAMS, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Cam Mechanisms; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to cam mechanism, its object being to provide a simple and efficient arrangement of cam and cam-bar by which the necessity of the cam-box fitting around the cam or eccentric is done away with, while provision is made to sustain the cam-bar against the side movement or strain brought upon it when it is raised by the bar.

It is well known that a cam or eccentric acts to raise the cam-bar by forcing its inclined face under the same and thereby changing the rotary motion to reciprocating motion, and if no cam-box were employed and the free end of the bar rested upon the cam as the cam-face traveled under the same it would press the cam-bar to one side of its proper course and so bring heavy side strain upon the guides for the same beyond the stroke of the cam. By my invention these difficulties are overcome.

It consists, generally stated, in combining with the cam a cam-bar having its free end in the course of the cam and having a guide-face on the side of the cam-bar opposite to that against which the face of the cam presses in raising the bar and a contact-piece between such bar and guide-face.

It also consists in carrying such guide-face to a point nearer the bearing of the cam than the length of stroke of the cam, so providing support to a cam-bar where it is employed with a cam having a series of cam-arms, and also in forming such support on one side of the cam and so providing support for the cam-bar close to the point at which the cam presses against the same.

It also consists in certain details of construction hereinafter more particularly set forth.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a sectional side view of apparatus embodying the invention. Fig. 2 is a face view of the same, and Fig. 3 is a view of another form of the mechanism.

Like letters of reference indicate like parts in each of the views.

The invention may be employed with either cams or eccentrics, the term "cam" being intended to include both, or any irregular form adapted to operate to change rotary to reciprocating motion. Its ordinary functions are best produced where the operation is to raise a cam-bar, and it is so illustrated in the drawings, the cam *a* having a series of cam-arms *b*, which are shown of different lengths to fully illustrate the invention, said cam-arms having the inclined cam-pressing faces *c* and the radial faces *d*. In the preferred construction the cam is mounted between two standards *e*, to which the bearings *f* are secured, the cam-shaft *g* being mounted in these bearings, while the cam when rotated passes between the standards *e*. The cam-bar *h* is intended to raise any desired object and is shown as having a vertical movement, having suitable guides therefor above the line of stroke of the cam, while it has the free end *h'*, which carries the roller *i*, contacting with the cam-faces *c* of the cam-arms. A bearing for the cam-bar is shown at *k*, and the movement of the cam-bar may be imparted to any desired piece of mechanism. It will be seen that, especially with long cam-arms, if the free end *h'* were unsupported it would be liable to bend under the strain when raised by the cam, and in any event the side pressure generated when the inclined cam-face *c* traveled under the cam-bar would bring heavy strain upon the bearings *k* of the bar. To overcome this, I employ any suitable contact-piece *m* which contacts with a guide-face *n* on the standard *e*, and to properly support the cam-bar I form such guide-faces *n* on the standards on each side of the cam, the contact-pieces *m* extending out on each side of the cam-bar and traveling along such guide-faces *n*, which are parallel to the line of movement of the cam-bar, while the contact-pieces *m* are located close to the base of the cam-bar and so provide proper support against side movement of the free end thereof. To overcome friction, it is of course preferable to form these contact-pieces *m* of antifriction-rollers which travel

on the guide-faces $n$ of the standards without largely increasing the friction or the power necessary to move the cam-bar. To obtain perfect alinement, the guide-faces $n$ may be formed of separate plates adjustably secured on the standards, such as by set-screws $n'$. With such construction as the cam is rotated and the inclined faces of its arms travel under the free end of the cam-bar they will press it to one side, as above stated, when the rollers $m$, traveling up the guide-faces $n$, will hold the cam-bar in proper line and will entirely relieve the upper bearings from such side strain, so doing away with the necessity of any cam-box connected to the cam-bar and fitting around the cam and having the further advantage that where the cam is of irregular shape, such as where it has long arms with deep depressions between them, the cam-bar can enter between the arms, its movement conforming exactly to both the inclined faces and the radial faces of the cam-arms or of the cam itself, thus largely increasing the length of stroke possible with the cam and the character of the stroke which can be generated and simplifying cam-operated structures. By the employment of the two standards close to the cam and providing contact-pieces carried by the cam-bar and traveling over guides on both standards twisting of the cam-bar is prevented and proper contact with the antifriction-rollers at the base of the bar with the cam-faces is insured.

The construction of the apparatus can of course be varied according to the shape and class of cams with which it is employed.

In Fig. 4 I have illustrated another form of apparatus embodying the invention in which instead of the employment of the standards on each side of the cam the machine-frame $p$ is provided with a bracket $p'$, which carries the guide-face $r$, with which the contact-piece $s'$ on the cam-bar $s$ contacts, preferably carrying an antifriction-roller, as shown, while the cam-bar is mounted in bearings $s^2$, and the cam $t$ is secured to the cam-shaft $t'$ and rotates under the base of the cam-bar, the necessity of bearings on each side of each cam being thus overcome. In such construction, as well as in the other construction described, the guide-faces $r$ may be formed of a separate piece, which can be adjusted to perfect alinement to the cam-bar by set-screws $r'$.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of a cam, a cam-bar mounted in bearings and having a free end in the course of the cam, a guide on the side of the cam-bar opposite to the pressure of the cam, and a contact-piece on the cam-bar traveling along the guide, substantially as set forth.

2. The combination of a cam, a standard on one side thereof carrying a bearing for the cam-shaft, a cam-bar having its free end in the course of the cam and a contact-piece on the bar contacting with a guide on the standard, and at one side of the cam-bar, substantially as set forth.

3. The combination of a cam, standards at each side thereof, a cam-bar having its free end in the course of the cam and contact-pieces carried by the cam-bar and contacting with guides on the standards on each side of the cam-bar, substantially as set forth.

4. The combination of a cam, a cam-bar having its free end in the course of the cam, a guide at the side of the cam-bar having a guide-plate adjustable therewith, and a contact-piece on the cam-bar traveling along said guide-plate, substantially as set forth.

5. The combination of a cam having a series of cam-arms and deep depressions between them, a guide at one side of the cam and extending to a point nearer the cam-bearing than the length of stroke of the cam, and a cam-bar having a contact-piece near its free end traveling along said guide, substantially as set forth.

In testimony whereof I, the said STEPHEN JARVIS ADAMS, have hereunto set my hand.

STEPHEN JARVIS ADAMS.

Witnesses:
ROBERT C. TOTTEN,
ROBT. D. TOTTEN.