

No. 802,016.

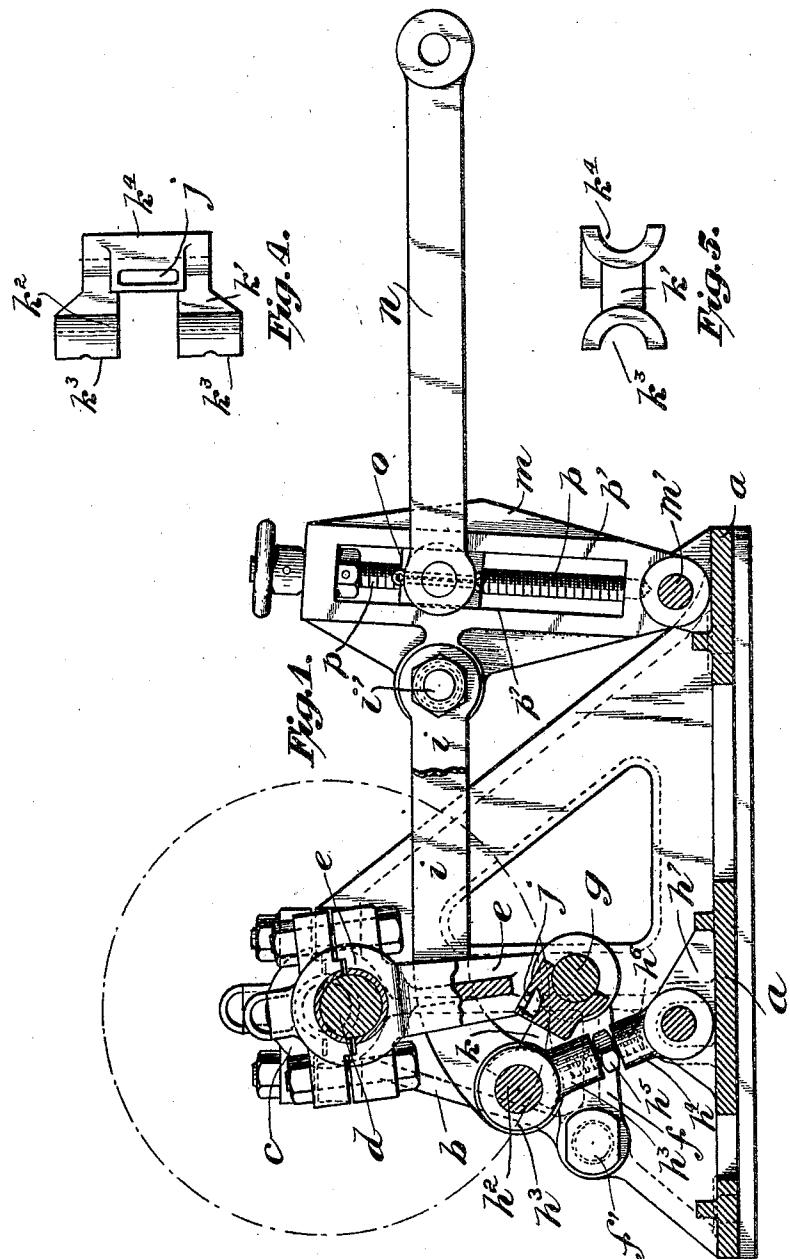
PATENTED OCT. 17, 1905.

H. D. McLEOD.

HEAD MOTION.

APPLICATION FILED JULY 8, 1904.

3 SHEETS-SHEET 1.



Witnesses  
Comstock  
Hildgen Jr.

Howard D. McLeod  
Inventor  
by Dickerson, Brown  
Rogers & Birney  
Atty

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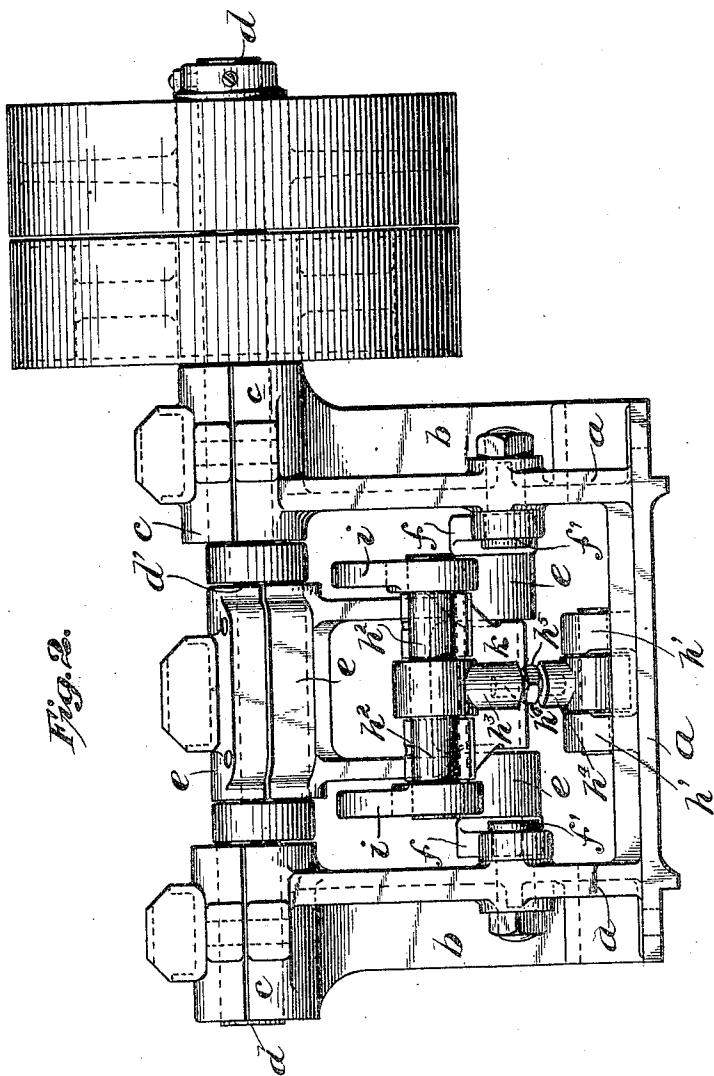
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3 SHEETS-SHEET 2.



Witnesses  
Samuel Mitchell  
Henry Osgood Jr.

Howard D. McLeod  
Inventor  
by Dickerson, Brown  
Raeguer & Birney  
Attest

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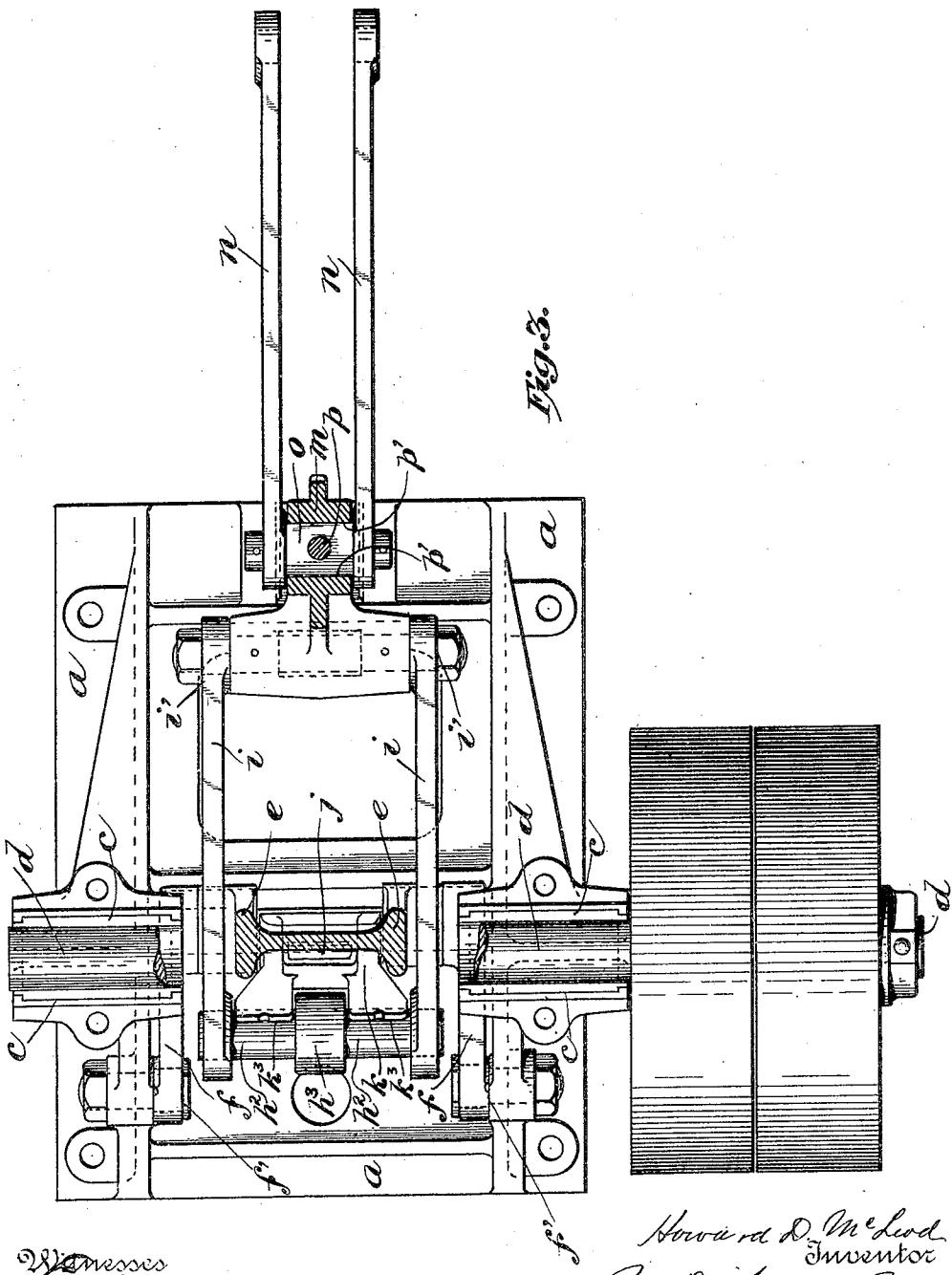
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## HEAD MOTION.

APPLICATION FILED JULY 8, 1904.

3 SHEETS—SHEET 3.



W. William Williams  
Williams  
H. G. Godwin

Howard D. McLeod  
Inventor  
By Dickerson, Brown  
Bruegeman & Bumey  
at top

# UNITED STATES PATENT OFFICE.

HOWARD D. McLEOD, OF GREATFALLS, MONTANA.

## HEAD-MOTION.

No. 802,016.

Specification of Letters Patent.

Patented Oct. 17, 1905.

Application filed July 8, 1904. Serial No. 215,725.

*To all whom it may concern:*

Be it known that I, HOWARD D. McLEOD, a citizen of the United States, residing at Greatfalls, county of Cascade, Montana, have invented certain new and useful Improvements 5 in Head-Motions, of which the following is a specification.

This invention relates to head-motions for imparting a reciprocatory movement to ore-concentrating tables of the Rittinger, Cammett, Wilfley, and other types, and, in fact, to other devices requiring a shaking motion, as to shaking screens, grizzlies, and picking-tables.

One of the objects of the invention is to provide mechanism capable of imparting the desired progressive motion to the particles, especially on an ore-concentrating table, so that any material placed upon the table will 15 be caused to advance along the table-surface in the proper manner, the mechanism being capable of such adjustment as to adapt it to different classes of ores and their attendant gangue.

A further object of the invention is to provide means for obtaining great differences of amplitude of reciprocation and great changes in speed, so that the table may be driven a large number of strokes per minute at small 20 amplitude for very fine mesh material or a smaller number of strokes per minute at greater amplitude of reciprocation. This object is obtained by an exceedingly simple mechanism.

Another object of my invention is to provide a simple means for securing the adjustment of the length of the stroke entirely independent of any adjustment of the quality 35 of the stroke, which latter is obtained in the head-motion alone.

Further objects of the invention will appear hereinafter.

My invention consists of certain features and combinations hereinafter described and 45 claimed, reference being had to the accompanying drawings as showing a suitable form of my invention, and in which—

Figure 1 is a sectional side elevation showing a head-motion embodying the features of 50 my invention. Fig. 2 is an end elevation of the same. Fig. 3 is a plan view, parts being in section and parts removed for the sake of clearness. Figs. 4 and 5 are detail views of the toggle.

Referring to the drawings, the frame *a* is provided with side brackets *b*, at the upper

portions of which are bearings *c*. In these bearings turns a cranked shaft *d*, one end of which may carry fast and loose pulleys, which pulleys may be driven in either direction. 60 Any suitable driving means may be employed. The eccentric portion *d'* for said shaft *d*, and which is located between the bearings *c*, has mounted thereon one end of a pitman *e*, which is carried round in a circle by means of the 65 said eccentric portion. Other means may evidently be substituted for accomplishing the desired reciprocating motion of the pitman. The opposite end of the said pitman *e* is preferably compelled to travel in the arc 70 of a circle, which may be effectuated by means of two links *f*, which links extend from the pitman at some point forward of the vertical central line through the shaft *d*, in reference to the attaching-point of the table or 75 object to be shaken. Said links *f* are tension links or connections. A pin *g* connects said links with the pitman, and the links are pivotally supported on the frame at *f'*. Means other than those shown may be employed for guiding the free end of the toggle 80 in the desired path, which need not necessarily be arcuate. This is evident without illustration and is intended to be comprehended by the invention. A link *h* is preferably pivoted to the frame *a* at *h'*, and through its other end there passes a pin or short shaft *h''*, connecting pull-rods *i*.

Located between and having bearing on the pins or shafts *g* and *h''* is a toggle *k*. This 90 toggle preferably consists of a part such as shown in detail in Figs. 4 and 5 and comprises a shank portion *k'*, a yoke portion *k''*, and a half-box *k'''* on each bifurcation of the yoke and another half-box *k''''* at the other end of 95 the toggle. The half-box *k''''* bears on the pin or shaft *g*, carried by the pitman *e*, while the other half-boxes *k'''* are located one on each side of the link *h* for bearing on the pin or shaft *h''*. The movement of the outer or yoke 100 end of said toggle is controlled by the pin *h''* and the aforesaid link *h*. The toggle is preferably provided with means for lubrication, (indicated at *j*.) For the purpose of adjusting the link *h* preferably as to its length and for 105 moving the point or pin *h''* relatively to the other moving parts, said link *h* is for convenience composed of two sections *h''* *h''''*, provided with right and left screw-threaded bores or sockets to receive the right and left screw-threaded ends of a short shaft *h''''*, provided 110 with a turning-head *h''''* and forming thereby

a turnbuckle. The described or equivalent adjustment of the link  $h$  causes a difference in the length or intensity of stroke of the table or other object which is suitably held to the point at  $h^2$ .

The pull-rods  $i$  may, if desired, be connected with the part to be actuated through the medium of a rocking lever  $m$ , which is pivoted at one end at  $m'$  to the frame  $a$ , the pull-rods being pivoted thereto at  $i'$ . The said rocking lever is connected with the part to be actuated by means of links or rods  $n$ , the inner ends of which are pivotally supported on a cross-head  $o$ , which is internally screw-threaded to receive a screw-spindle  $p$ , whereby the said cross-head may be moved along guideways  $p'$  of the lever  $m$ . The purpose of the intermediate connection afforded by the lever  $m$  and concomitant parts is for adjusting the stroke and intensity of movement. The action in the embodiment of the invention shown is as follows: The eccentric  $d$  imparts a reciprocating motion to the pitman and an oscillatory motion to the links  $f$ , which results in raising the pin  $g$  and through the toggle  $k$  urging the pin  $h^2$  and links  $i$  toward the left and moving the part to be actuated at a gradually-decreasing velocity. On the return stroke the velocity gradually increases, so that by means of the toggle and preferably by means of the vibratory motions of the links or connecting-rods the peculiar quality of motion desired is obtained.

It is to be understood that the word "toggle" used herein contemplates an elemental moving piece of machinery which sustains compression only. The head-motion described therefore contains a toggle which preferably projects, although not necessarily, from the pitman in a direction away from the part to be actuated, such as an ore-concentrating table, and both ends of which are in action, in this instance moving in arcs of circles.

Having thus described my invention and without limiting myself to details, as obviously some of the features may be used without others or in combination with others, what I claim as new therein, and desire to secure by Letters Patent, is—

50 1. A head-motion comprising a pitman, means for restraining the free end of the pitman except as to reciprocation, a link pivoted at one end to a stationary object, an actuating-bar pivoted to the free end of said link, and a toggle directly connecting the free ends of said pitman and of said link.

2. A head-motion comprising a pitman, a link pivoted at one end to a stationary object and at the other end to said pitman, a second link pivoted at one end to a stationary object, an actuating-bar pivoted to the free end of the link, and a toggle directly connecting the free ends of said pitman and of said link. 60

3. A head-motion comprising a pitman, means for restraining the free end of the pitman except as to reciprocation, a longitudinally-adjustable link pivoted at one end to a stationary object, an actuating-bar pivoted to the free end of said link, and a toggle directly connecting the free ends of said pitman and of said link. 65

4. A head-motion comprising a pitman, means for restraining the free end of the pitman except as to reciprocation, a link pivoted at one end to a stationary object, an actuating-bar pivoted to the free end of said link, a toggle directly connecting the free ends of said pitman and of said link, and means connected with the free end of said bar for varying the travel of a reciprocated object attached thereto. 70

5. A head-motion comprising a pitman, means for restraining the free end of the pitman except as to reciprocation, a link pivoted at one end to a stationary object, an actuating-bar pivoted to the free end of said link, a toggle directly connecting the free ends of said pitman and of said link, a rocking lever pivoted at one end to a stationary object and pivotally connected with said actuating-bar, a link pivotally connected to said rocking lever, 80 and means for varying the point of attachment of said link to said rocking lever. 85

6. A head-motion comprising a pitman, means for restraining the free end of the pitman except as to reciprocation, a link pivoted at one end to a stationary object, an actuating-bar pivoted to the free end of said link, a toggle directly connecting the free ends of said pitman and of said link, a rocking lever pivoted at one end to a stationary object and pivotally connected with said actuating-bar, a longitudinally-movable cross-head in said rocking lever, and a link pivotally attached to said cross-head. 90

In testimony whereof I have signed this 100 specification in the presence of two subscribing witnesses.

HOWARD D. MCLEOD.

Witnesses:

W. A. WEBSTER,  
CHARLES E. ROWE.