

(No Model.)

2 Sheets—Sheet 1.

J. M. BRYAN.
ORE CRUSHER.

No. 435,622.

Patented Sept. 2, 1890.

Fig. 1.

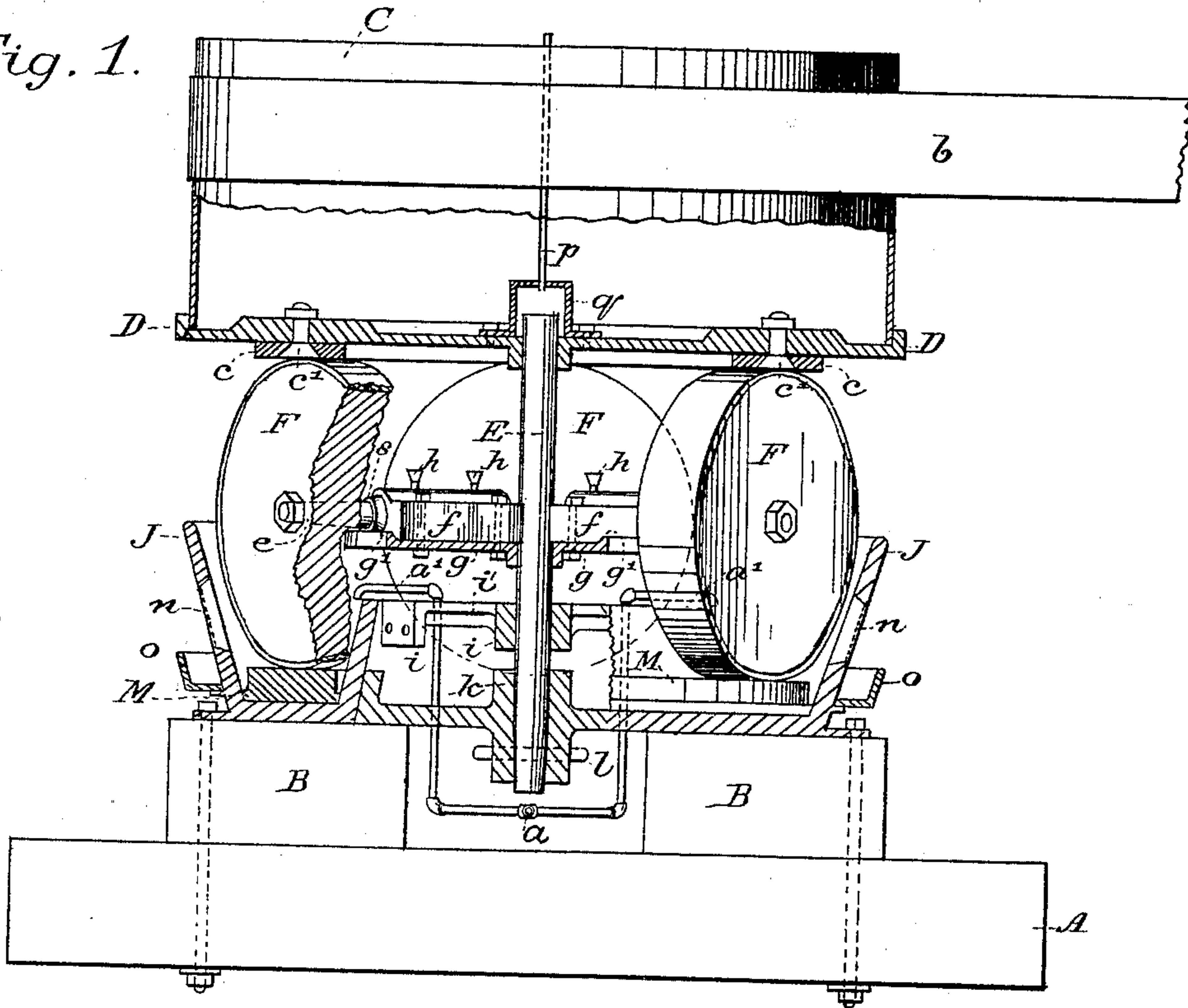
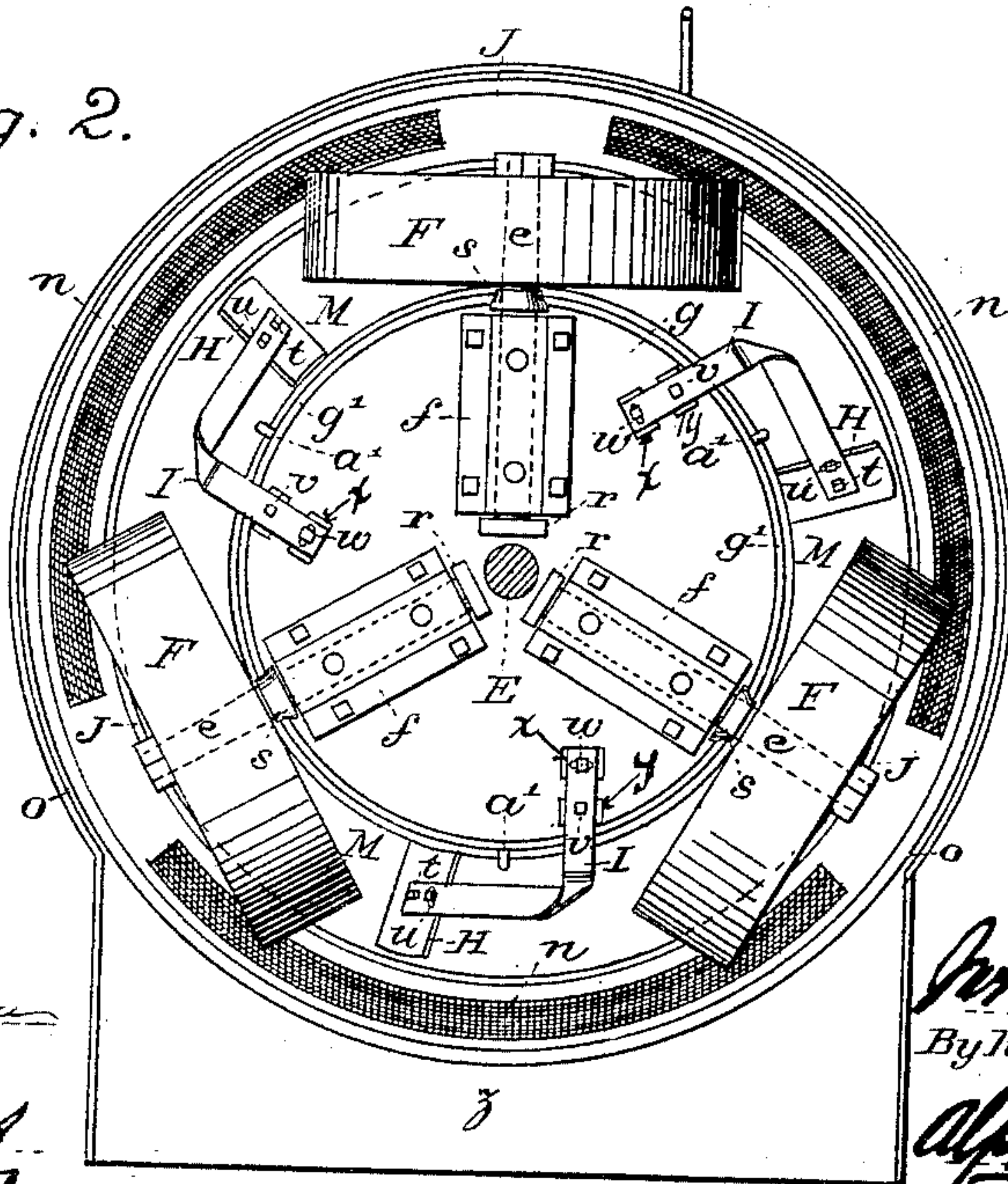


Fig. 2.



Witnesses:

E. A. Brandau

J. H. Henry

Inventor:

John M. Bryan

By his Att'y.

Alfred J. Smith

(No Model.)

2 Sheets—Sheet 2.

J. M. BRYAN.
ORE CRUSHER.

No. 435,622.

Patented Sept. 2, 1890

Fig. 3.

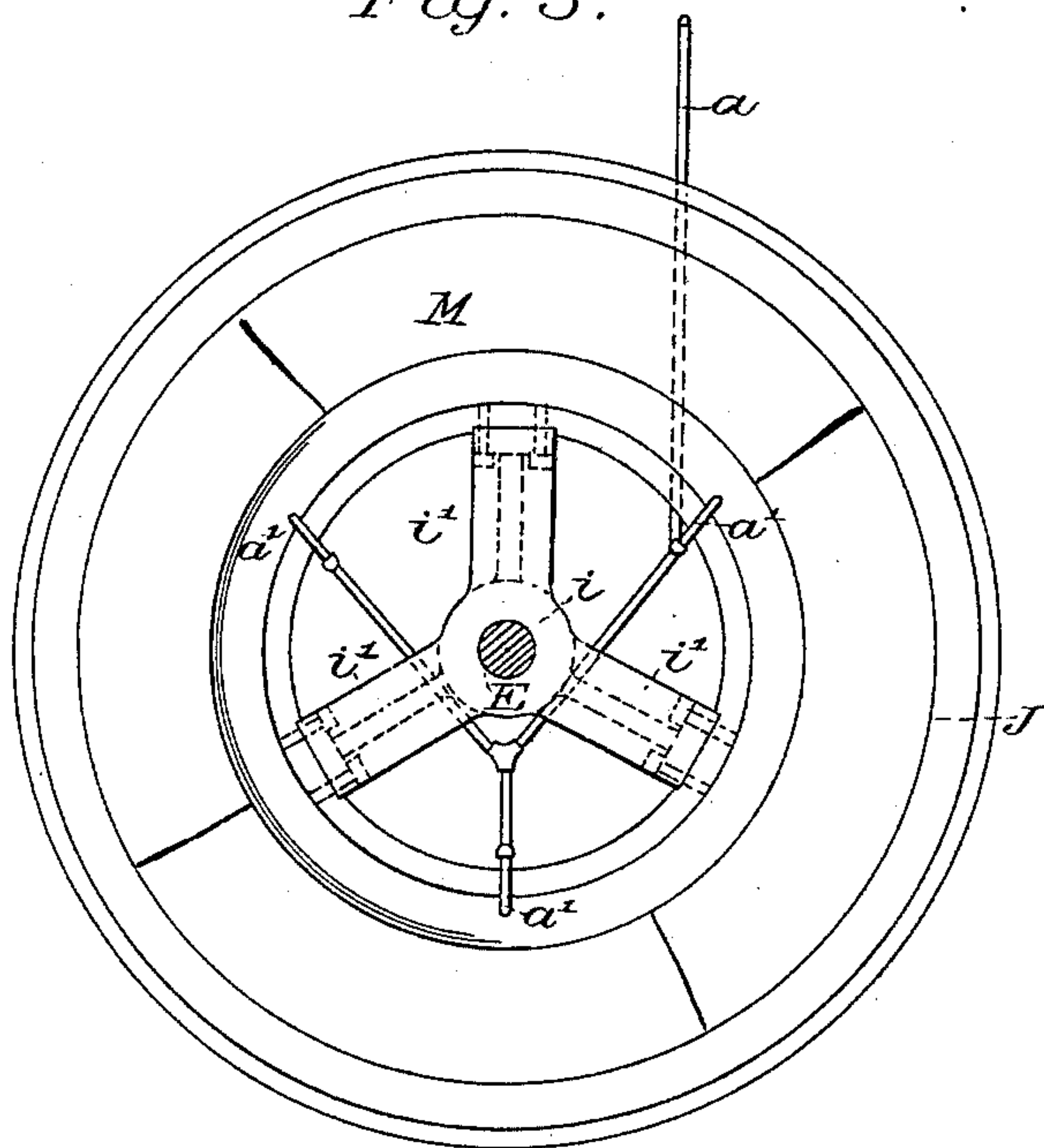


Fig. 6.

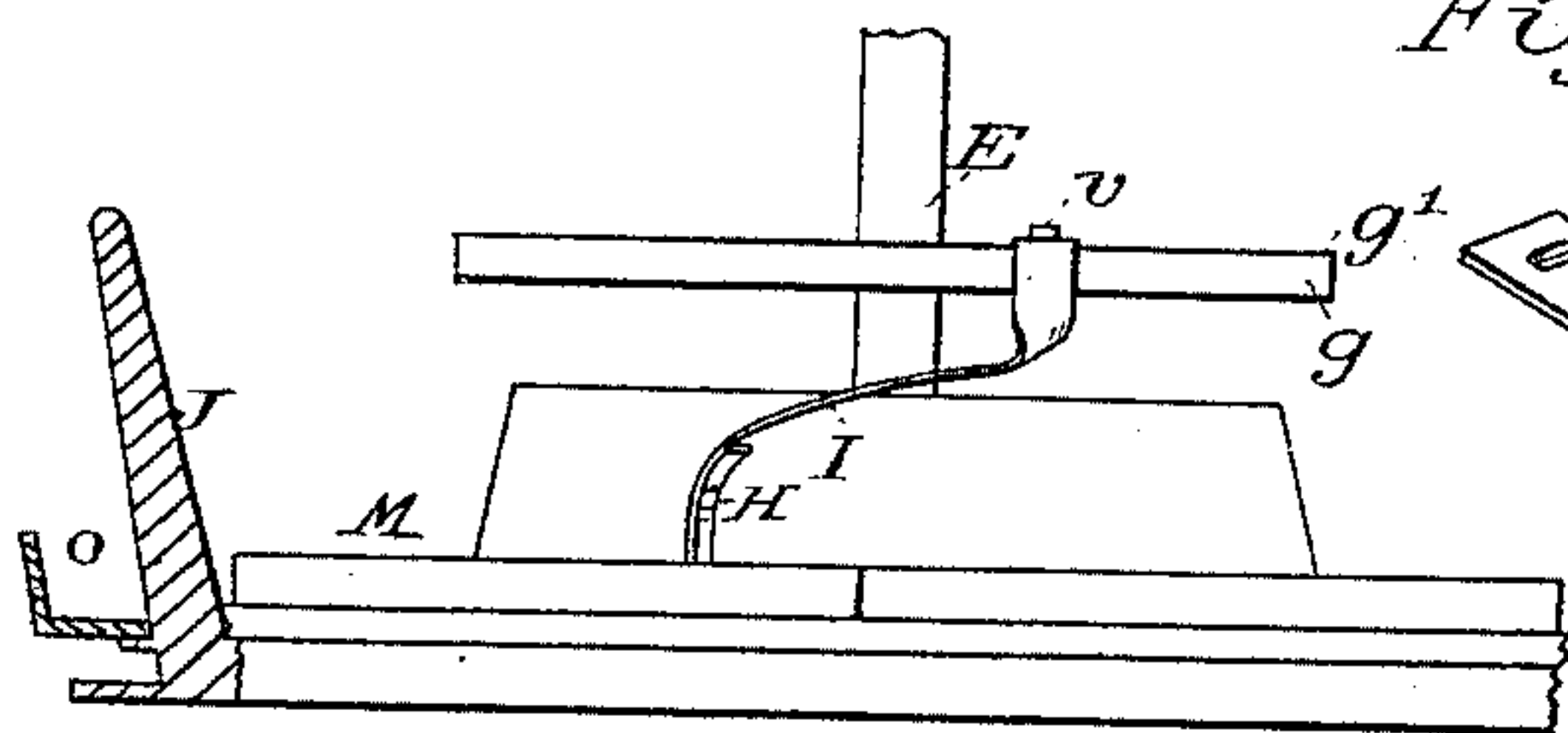


Fig. 4.

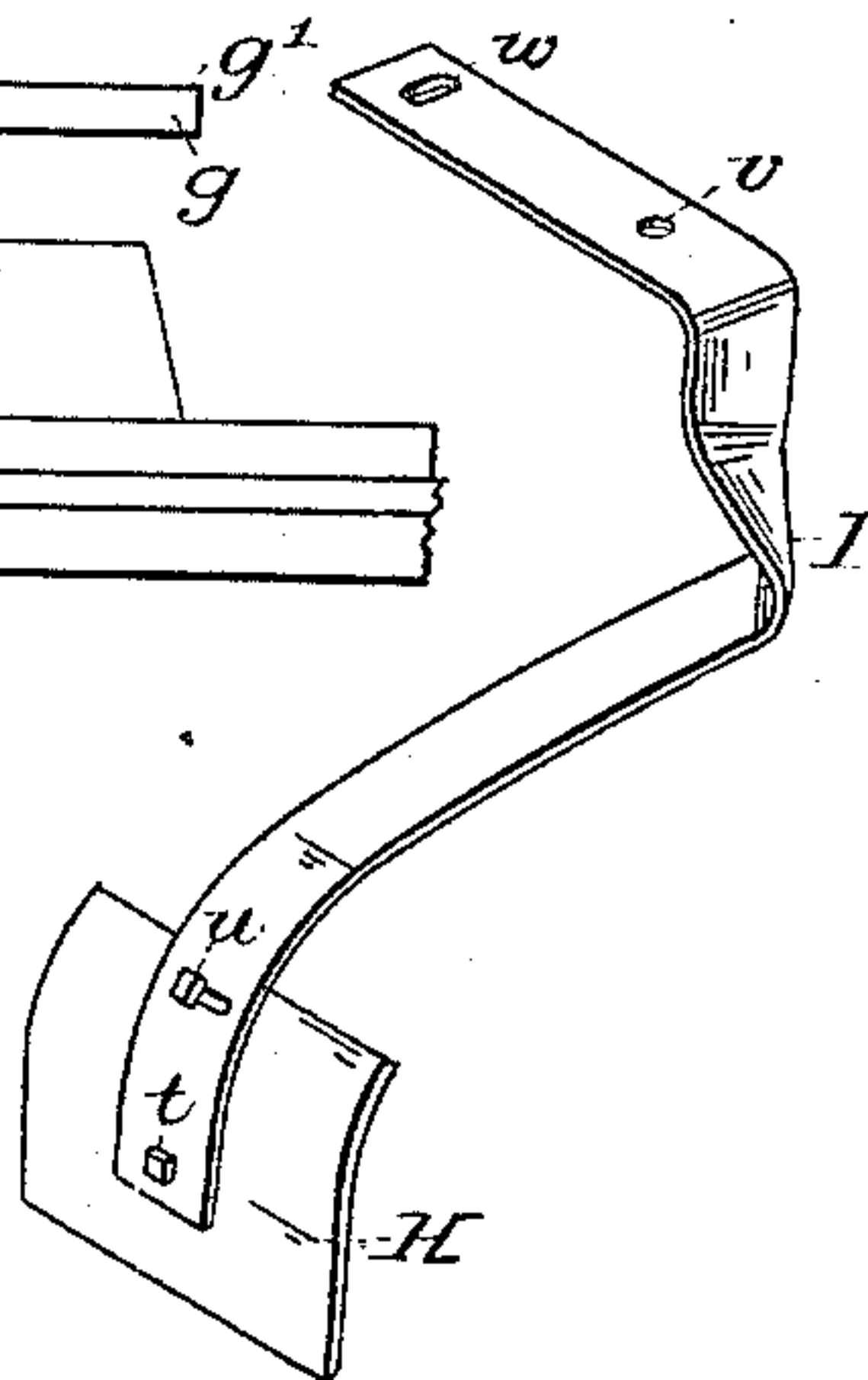
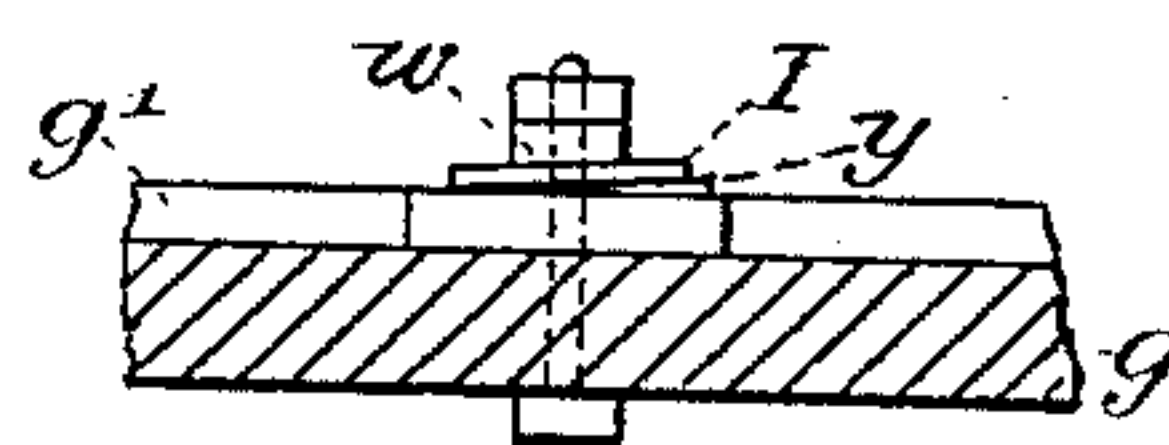


Fig. 5.



Witnesses:

C. A. Beaudan

J. H. Hitching

Inventor:

John M. Bryan
By his Att'y.
Alfred M. Smith

UNITED STATES PATENT OFFICE.

JOHN M. BRYAN, OF SAN FRANCISCO, ASSIGNOR OF ONE-HALF TO P. A. DOANE, OF OAKLAND, CALIFORNIA.

ORE-CRUSHER.

SPECIFICATION forming part of Letters Patent No. 435,622, dated September 2, 1890.

Application filed March 20, 1886. Serial No. 196,027. (No model.)

To all whom it may concern:

Be it known that I, JOHN M. BRYAN, of San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Ore-Crushers, of which the following is a specification.

The invention consists in the novel construction and combination of parts herein-
after described, and pointed out in the claim.

The following description explains the nature of my said improvements and the manner in which I produce and combine them in the construction of roller-mills.

The accompanying drawings being referred to by letters, Figure 1 is a cross-section taken vertically through the mortar, the revolving center plate, and the driving pulley or drum of a mill constructed according to my invention. Fig. 2 is a plan of the mortar with the annular die, the revolving plate, and crushing-rollers in place, the driving-pulley being taken off. Fig. 3 is a plan view of the mortar. Fig. 4 is a perspective view of scraper. Fig. 5 is an enlarged view of the means of attaching the scraper to the revolving bed. Fig. 6 is a detail view showing the manner in which the scraper is applied.

Similar letters of reference indicate corresponding parts in all the views where they occur.

A is the base of the mill, and B the mortar-blocks, to which parts the annular mortar J is bolted.

The mortar is made with divergent walls, the inner wall being lower than the outer wall. The outer wall is provided with screened openings *n*, and a trough or channel *o* is provided outside thereof just below the openings *n*. In the bottom of the mortar is laid a steel die M, the sides of which are perpendicular and stand a distance from the mortar-walls on each side. The base of the die may be broadened out to fill the bottom of the mortar. The die is made in sections, as shown in Figs. 3 and 6.

Upon the die M the crushing and grinding rollers F are caused to turn by having spindles *e* fixed in them and held with freedom to revolve in boxes *f* upon a revoluble plate or

table *g*. The spindles *e* have collars *s* and *r*, the former adapted to ride upon the edge of table *g* and the latter being placed upon the inner end of the spindle. The plate *g* revolves with the rollers in their circular progression upon die M upon an upright post E, which is held in a hub *k* in the bed-plate of the mortar by means of a key *l*, and also passes through and is held by a spider *i*, secured at the top of the inner wall of the mortar. The drum or pulley C rests upon the rollers F and rotates them by frictional contact, being provided for this purpose with a wearing-plate *c*, bolted to the base D of the drum, as shown at *c'*. The pulley or drum is centered upon the top of post E, and is provided with a cap *q*, from which an oil-tube *p* extends to the top of the drum. A band *b* transmits power to the drum from any suitable source.

Oil-cups *h* may be provided upon the spindle-boxes *f*.

A very important feature of my said improvements is the yielding scraper for keeping the die clean. It has the quality of springing or yielding laterally both inwardly or away from the side of the mortar and outwardly or away from the surface of the conical center of the mortar, and it is capable also of adjustment in several directions, by which it can be set to run more closely to either inclined side of the trough, as well as to have greater or less pressure upon the face of the die. Such action and adjustments are secured by attaching the scraping-blade H to one end of a spring-arm I, which is produced by bending a flat bar in the middle over upon itself and then bending laterally outward the upper member and bending the end of the lower member in a curve downward to take the scraper. The arm I is bolted to the scraper H at its lower end, as shown at *t*, and is provided with an elongated transverse slot at a point above this, through which a bolt *u* is passed to adjust and set the scraper at any inclination upon the arm I. At the upper end the arm I is provided with an opening at *v*, through which a bolt passes, and a slot at *w*, through which another bolt passes for the purpose of adjustment at this

point. The spring arm or strap is set upon blocks *x y* to bring it over the edge *g'* of plate *g*. Under ordinary conditions of work the spring-arm will hold the scraper down to the die and in position over it; but when large pieces of ore get in between the upright edge of the scraper and the side of the trough the arm will spring and allow the scraper to pass the obstruction. By bearing with suitable pressure upon the face of the die the bottom edges of the scrapers keep the die continually clean, and consequently no pulp will adhere to the rollers as they travel around the die. The scrapers serve also to facilitate the discharge of the pulp through the screens, and they operate to distribute the ore coming in from the feeder and to equalize it upon and around the annular die.

In the operation of the mill the pulp runs around the mortar next to the screens in a rapid current, while toward the center the movement is much less rapid, and the gold liberated from the matrix by the crushing operation tends to fall to the eddy side of the current and to settle to the bottom of the trough around the center conical portion of the mortar, where it escapes the continuous grinding action of the rollers. Nearly all the gold contained in the ore will

be found to be retained in the mortar, and owing to the simple construction and arrangement of the parts free access is had to the trough for cleaning up. The water for the mortar is brought through supply-pipe *a* and conducted into the mortar at different points by the branch pipes *a'*.

I do not claim the scrapers, broadly, in this application, having made them the subject-matter of a separate application for patent filed on the 31st day of July, 1890, Serial No. 360,605.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

In a quartz-mill, the combination of mortar *J*, openings *n*, die *M*, post *E*, table *g*, centered thereon and provided with boxes, rollers *F*, journaled in said boxes, scrapers *H*, spring-arms *I*, bent as described and provided with openings *t v* and slots *u w*, so that they may be adjustably secured to the table and the scrapers adjustably secured to the arms, and drum *C*, centered on post *E* and resting on rollers *F*, substantially as described.

JOHN M. BRYAN. [L. s.]

Witnesses:

ALPHONSO B. SMITH,
FERDINAND IMHORST.