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PATENTED DEC. 13, 1904.

H. E. GRABAU.
MACHINE FOR BEATING LEAF METAL.

APPLICATION FILED FEB. 24, 1904.

NO MODEL.

2 SHEETS—SHEET 1.

Fig. 1.

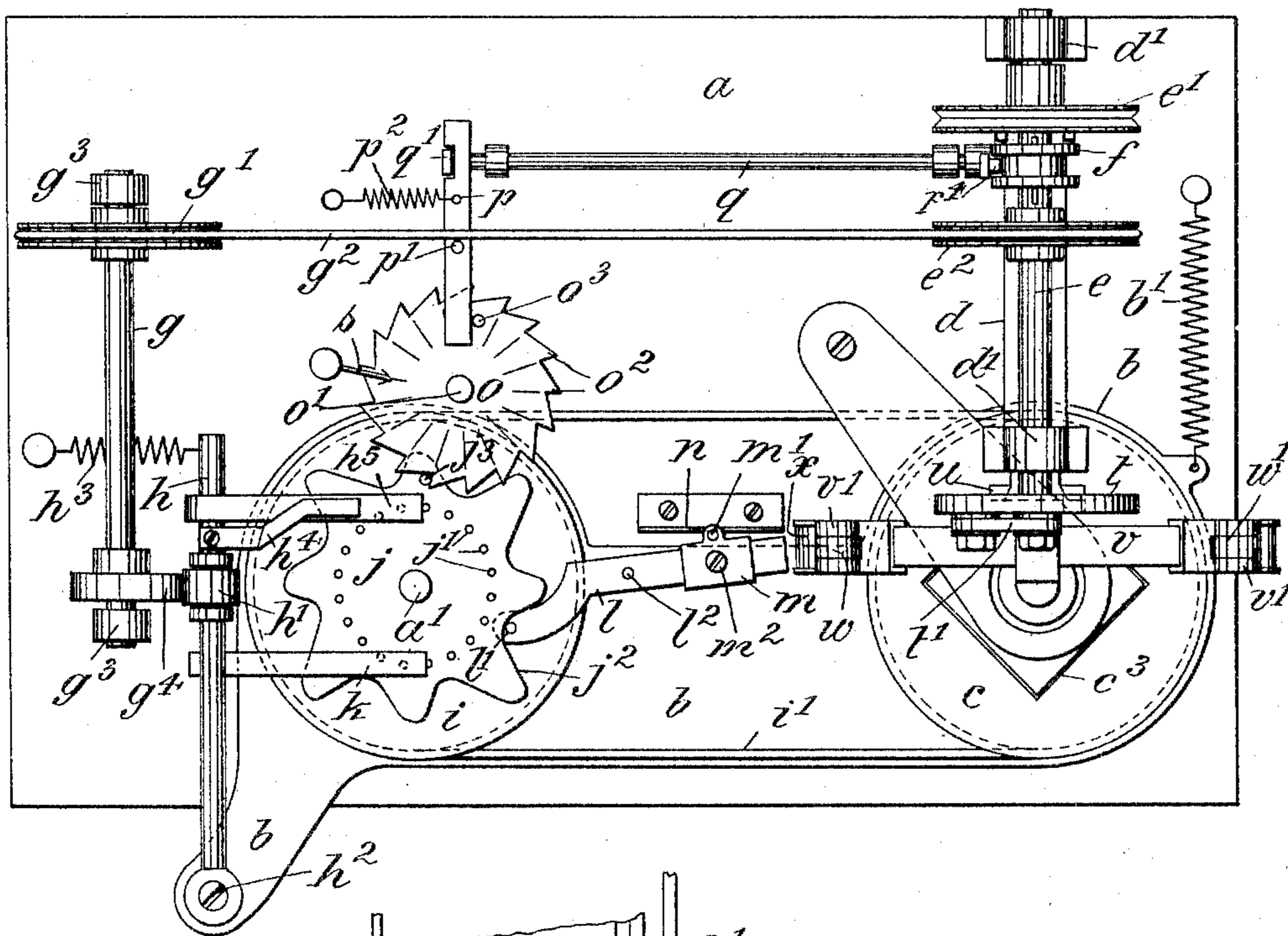


Fig. 3.

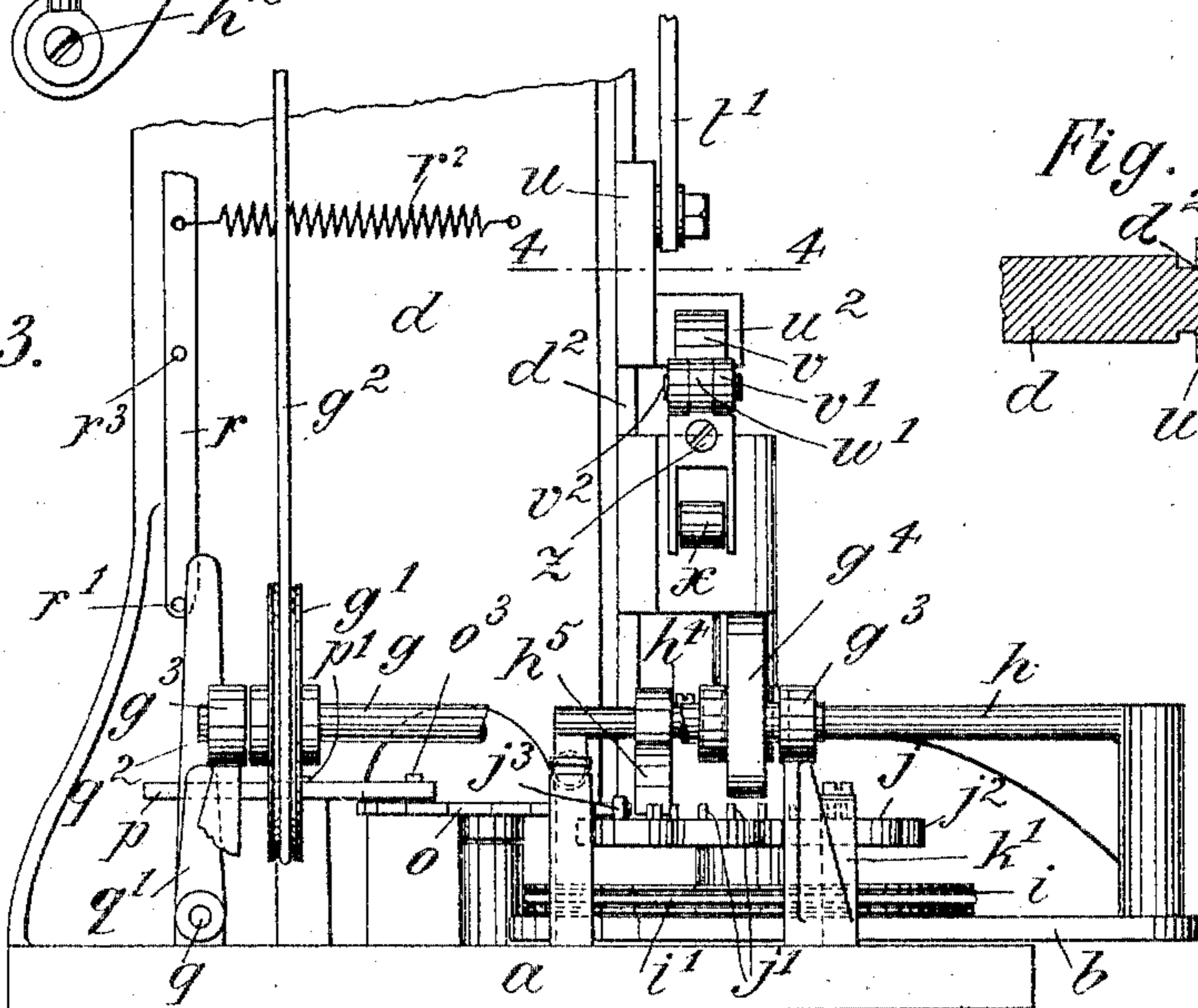
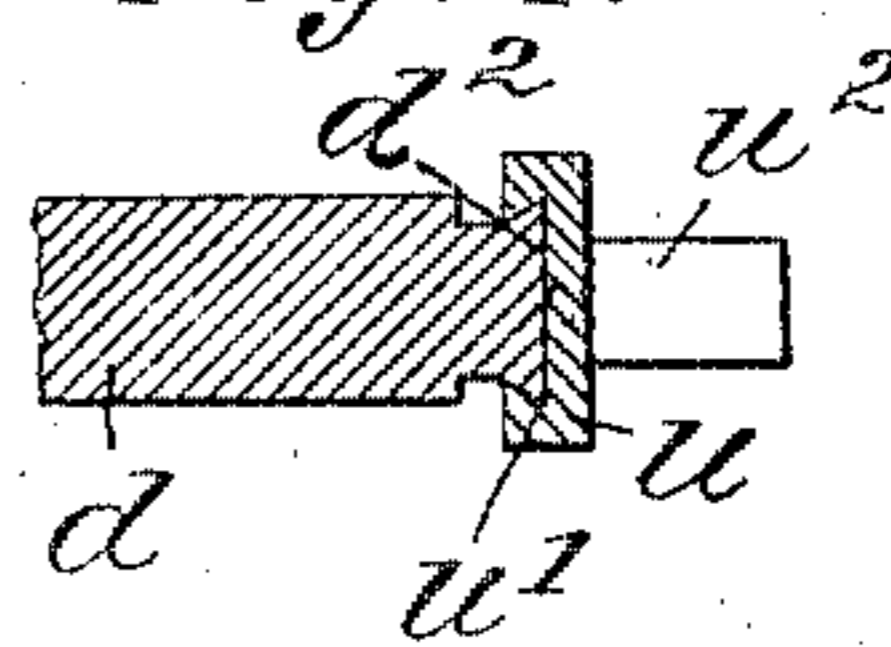


Fig. 4.



Witnesses:
Arthur Zump.
Frederick Unfricht

Inventor:
Hans E. Grabau
By Jacob B. Briesen Atty.

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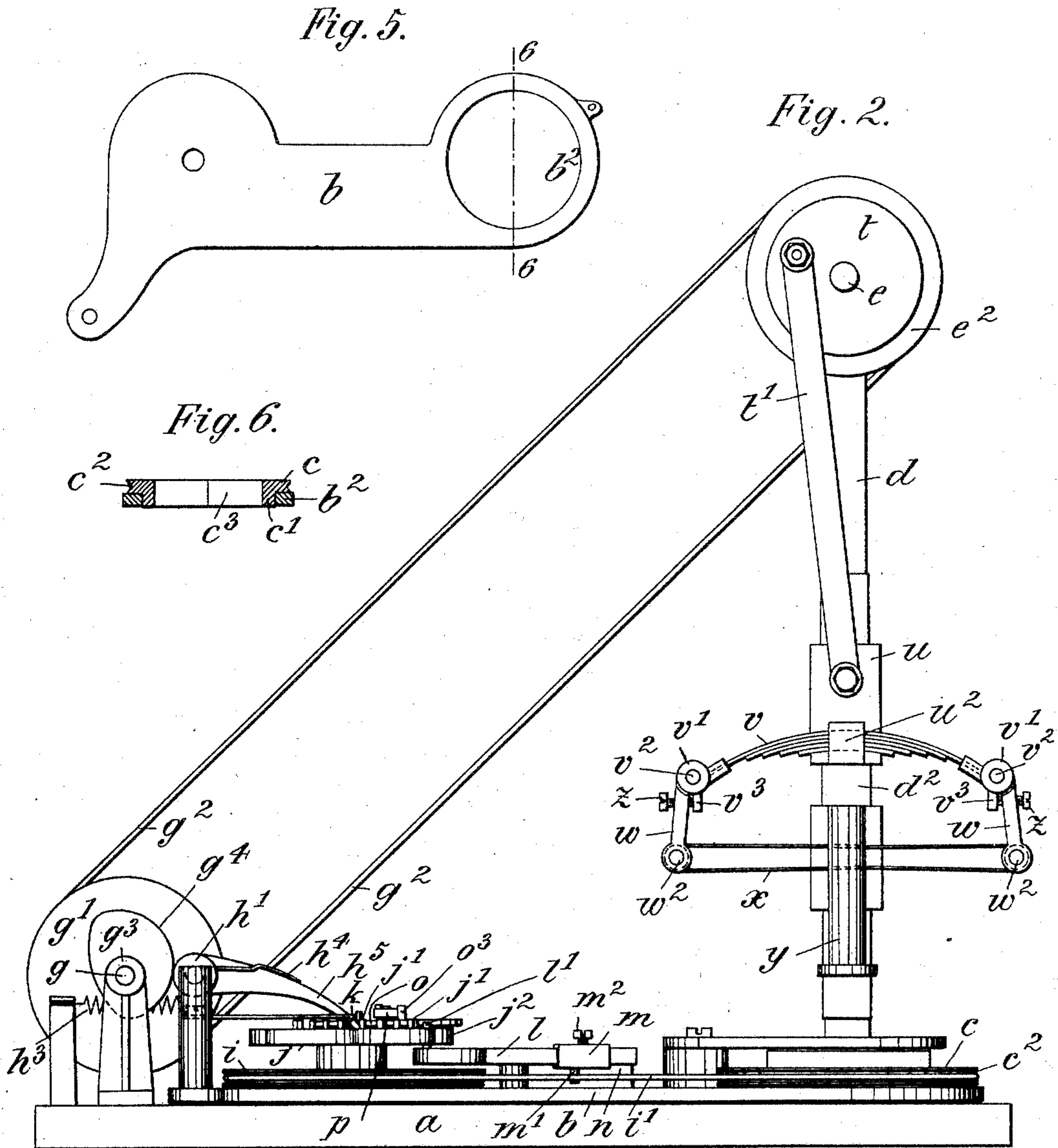
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2 SHEETS—SHEET 2.



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Arthur Zumpfer.
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Inventor:

Haus E. Grabau
by Paul H. Bieser Atty.

UNITED STATES PATENT OFFICE.

HANS E. GRABAU, OF HOBOKEN, NEW JERSEY.

MACHINE FOR BEATING LEAF METAL.

SPECIFICATION forming part of Letters Patent No. 777,626, dated December 13, 1904.

Application filed February 24, 1904. Serial No. 195,024. (No model.)

To all whom it may concern:

Be it known that I, HANS E. GRABAU, a citizen of the United States, residing at Hoboken, Hudson county, State of New Jersey, have invented new and useful Improvements in Machines for Beating Leaf Metal, of which the following is a specification.

This invention relates to a machine for beating leaf metal in such a manner that the pack is not liable to be torn and a superior product is obtained.

The invention comprises various other features of improvements, all as hereinafter more fully pointed out.

In the accompanying drawings, Figure 1 is a plan of my improved machine for beating leaf metal; Fig. 2, a front elevation thereof; Fig. 3, a side elevation of the lower part thereof; Fig. 4, a detail cross-section on line 4 4, Fig. 3; Fig. 5, a plan of the oscillating frame on a reduced scale; and Fig. 6, a cross-section on line 6 6, Fig. 5, showing the work-holder in position.

The letter *a* represents a base-plate having an arbor *a'*, upon which oscillates a frame *b*. This frame is influenced by a spring *b'* and is near its free end provided with an eye *b''*. The eye *b''* is adapted for the reception of a flange *c'*, depending from the rotatable work-holder *c*, such work-holder being supported on frame *b*. The work-holder *c* has a grooved periphery *c''* to constitute a pulley and a central squared opening *c'''* adapted for the reception of the pack of metal to be beaten, the latter being supported upon base-plate *a*.

The machine is so constructed that the frame *b* is intermittently oscillated and that simultaneously the work-holder *c* is intermittently rotated. The timing of the machine is such that when the hammer, hereinafter described, strikes the metal the frame and holder are both at rest, so that the pack is not shifted laterally. Thus the pack is not simultaneously subjected to vertical compression and lateral movement, and any grinding action of the hammer is avoided. The feeding of the pack takes place only while the hammer is raised. The means for obtaining this result are as follows: Upon the base-plate *a* is mount-

ed a standard *d*, having bearings *d'* for the power-shaft *e*. This shaft is provided with a loose driving-pulley *e'*, adapted to be coupled thereto by a clutch *f*. The shaft *e* carries, further, a pulley *e''*, which transmits motion to counter-shaft *g* by pulley *g'* and rope *g''*. The counter-shaft *g* turns in bearings *g'''* of plate *a* and carries a cam *g''''*. This cam engages a roller *h'*, mounted on an oscillating lever *h*, fulcrumed to frame *b* at *h''* and influenced by a spring *h'''*. By the mechanism described the rotation of the work-shaft will cause an oscillation of lever *h* upon its fulcrum *h''*. Above frame *b* there is rotatably mounted upon arbor *a'* a grooved pulley *i*, which is adapted to transmit motion to grooved work-holder *c* by a rope *i'*. To the upper side of pulley *i* is rigidly connected a cam-disk *j*, which also turns on arbor *a'* and is adapted to impart intermittent rotatory motion to the pulley *i*. The cam-disk is provided upon its face with a series of spaced pins *j'*, arranged in a circle. These pins are adapted to be consecutively engaged by a feed-dog *h''''*, influenced by spring *h'''''* and mounted upon lever *h*. The oscillation of lever *h* will therefore cause an intermittent rotatory motion of cam-disk *j* and pulley *i*. A pawl *k*, mounted on a post *k'* of plate *a* and also engaging pins *j'*, constitutes a detent during the return movement of the dog *h''''*.

The cam-disk *j* is provided at its working periphery *j''* with a series of projections which are alternately of increased and reduced length. This working periphery is engaged by a pin *l'*, fitted in the end of a cam-lever *l*, which is pivoted to frame *b* at *l''*. The lever *l* is embraced by a slide *m*, from which depends a pin *m'*, engaging a fixed rail or abutment *n*, against which the pin is held by the action of the spring *b'*. The slide *m* may be clamped in position by a set-screw *m''*, and by properly adjusting the slide the stroke of frame *b* may be changed. Thus at the beginning of the operation the stroke may be minimized and may be subsequently gradually increased as the metal is being expanded. The object of making the cam projections alternately large and small is to move the entire opening of the work-holder *c*, including its

corners, across the hammer, so that all parts of the pack are subjected to the action of the hammer.

As thus far described the operation is briefly as follows: The oscillation of lever h will by dog h^5 impart intermittent rotatory motion to cam-disk j , and consequently to pulley i . The cam-disk j will by lever l impart intermittent oscillating motion to frame b , while the pulley i will by rope i' simultaneously impart intermittent rotatory motion to work-holder c .

In order to automatically arrest the machine when the beating operation is finished, I have devised the following construction: The cam-disk j is slightly overlapped by a toothed wheel o , which is rotatable on an arbor o' . Near its periphery the cam-disk j carries a finger j^3 , arranged in the path of the teeth o^2 of wheel o . Thus every complete rotation of the cam-disk will advance wheel o for the distance of one tooth. From wheel o projects a finger o^3 , adapted to engage a catch p , pivoted at p' and influenced by a spring p^2 . The catch p engages one arm, q' , of a rock-shaft q , the other arm, q^2 , of which engages a pin r' of a shipping-lever r , influenced by a spring r^2 . This lever is fulcrumed at r^3 to standard d and is provided at its upper end with a pin r^4 , that engages a groove of clutch f . The toothed wheel o carries a suitable scale and may be set with the aid of a coacting pointer s . When the wheel o has by the finger j^3 been rotated so far that its finger o^3 strikes catch p , the latter will be tilted against the action of spring p^2 . Thus the rock-shaft q will be released to release shipping-lever r , which will open the clutch f by spring r^2 to uncouple driving-pulley e' from shaft e , and thereby arrest the machine.

Upon the work-shaft e is mounted a crank-disk t , connected by pitman t' to a sliding head u . This head is grooved, as at u' , to engage a corresponding guide-rail d^2 of standard d . The head u is provided with a perforated lug u^2 , within which is fitted a leaf-spring v . The ends of spring v terminate in knuckles v' , adapted to be connected to knuckles w' of links w by pintles v^2 , the whole constituting a hinge connection. The links w are forked at their lower ends and carry pins or rollers w^2 , around which is passed an endless belt x . This belt extends through a slot of the hammer or beater y , so that the hammer is yieldingly suspended from the spring by means of the belt above the work-holder c . Set-screws z , passing through links w and engaging abutments v^3 of spring v , permit the tension of the spring, and consequently the force of the blow, to be adjusted.

What I claim is—

1. In a machine for beating leaf metal, the combination of a pivoted frame with means for imparting intermittent oscillating movement to the frame, a work-holder supported on the

frame, and means for imparting intermittent rotatory movement to the work-holder, substantially as specified.

2. In a machine for beating leaf metal, the combination of an oscillating frame with a cam-disk having a series of pins, a feed-dog adapted to engage the pins, a cam-lever pivoted to the frame and adapted to engage the working periphery of the cam-disk, and an abutment against which the cam-lever is adapted to act, substantially as specified.

3. In a machine for beating leaf metal, the combination of an oscillating frame with a rotatable work-holder supported thereby, a pulley operatively connected to the work-holder, a cam-disk secured to the pulley, pins on the cam-disk, a feed-dog adapted to engage said pins, a cam-lever pivoted to the frame and adapted to engage the working periphery of the cam-disk, and an abutment against which the cam-lever is adapted to act, substantially as specified.

4. In a machine for beating leaf metal, the combination of an oscillating frame with a work-holder arranged at the free end of the frame, a cam-disk, a cam-lever engaging the working periphery of the cam-disk and adapted to oscillate the frame and work-holder, a slide engaging the lever, and a fixed abutment adapted to engage the slide, substantially as specified.

5. In a machine for beating leaf metal, the combination of an oscillating frame with a work-holder arranged at the free end of the frame, a pulley operatively connected to the work-holder, a cam-disk secured to the pulley, a cam-lever engaging the working periphery of the cam-disk and adapted to oscillate the frame and work-holder, a fixed abutment against which the cam-lever is adapted to act, pins on the cam-disk, a feed-dog adapted to engage said pins, a lever carrying the feed-dog, and means for oscillating said lever, substantially as specified.

6. In a machine for beating leaf metal, the combination of an oscillating frame with a cam-disk, a cam-lever pivoted to the frame and adapted to engage the working periphery of the cam-disk, an abutment for said lever, a finger on the cam-disk, a toothed wheel engaged by the finger, a catch engaged by the toothed wheel, a rock-shaft engaged by the catch, a shipping-lever engaged by the rock-shaft, a driving-shaft, a pulley, and a clutch on the driving-shaft engaged by the shipping-lever, substantially as specified.

Signed by me at New York city, (Manhattan,) New York, this 19th day of February, 1904.

HANS E. GRABAU.

Witnesses:

FRANK V. BRIESEN,
WILLIAM SCHULZ.