

No. 661,618.

Patented Nov. 13, 1900.

F. NUSSER.

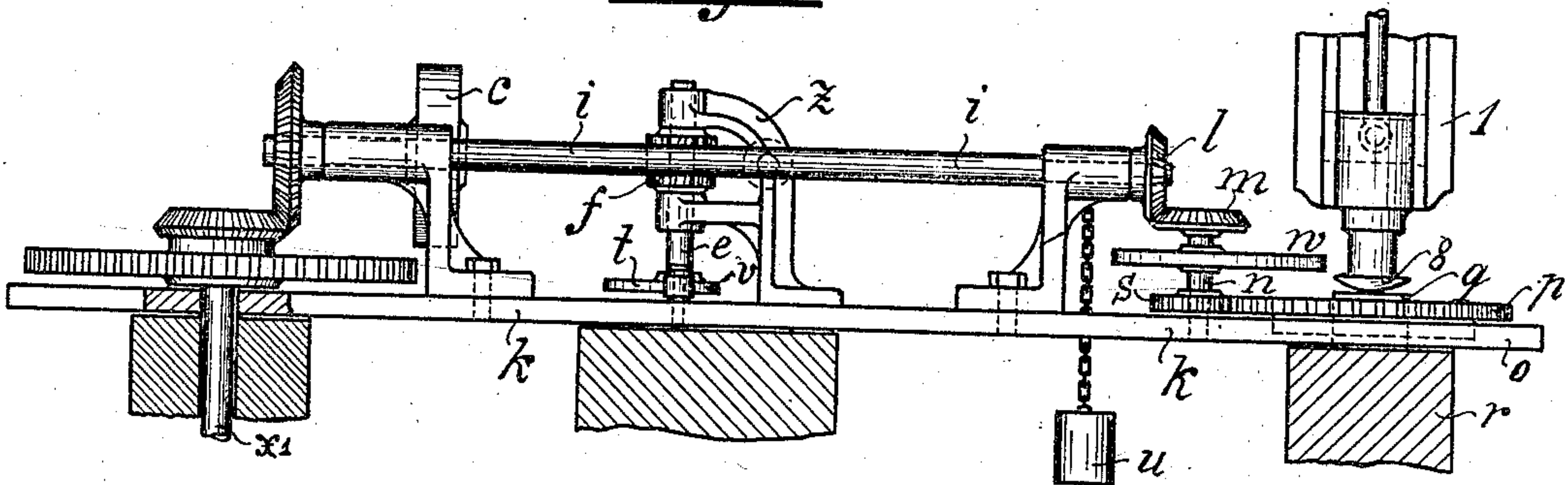
MACHINE FOR BEATING LEAF METAL.

(Application filed Aug. 22, 1900.)

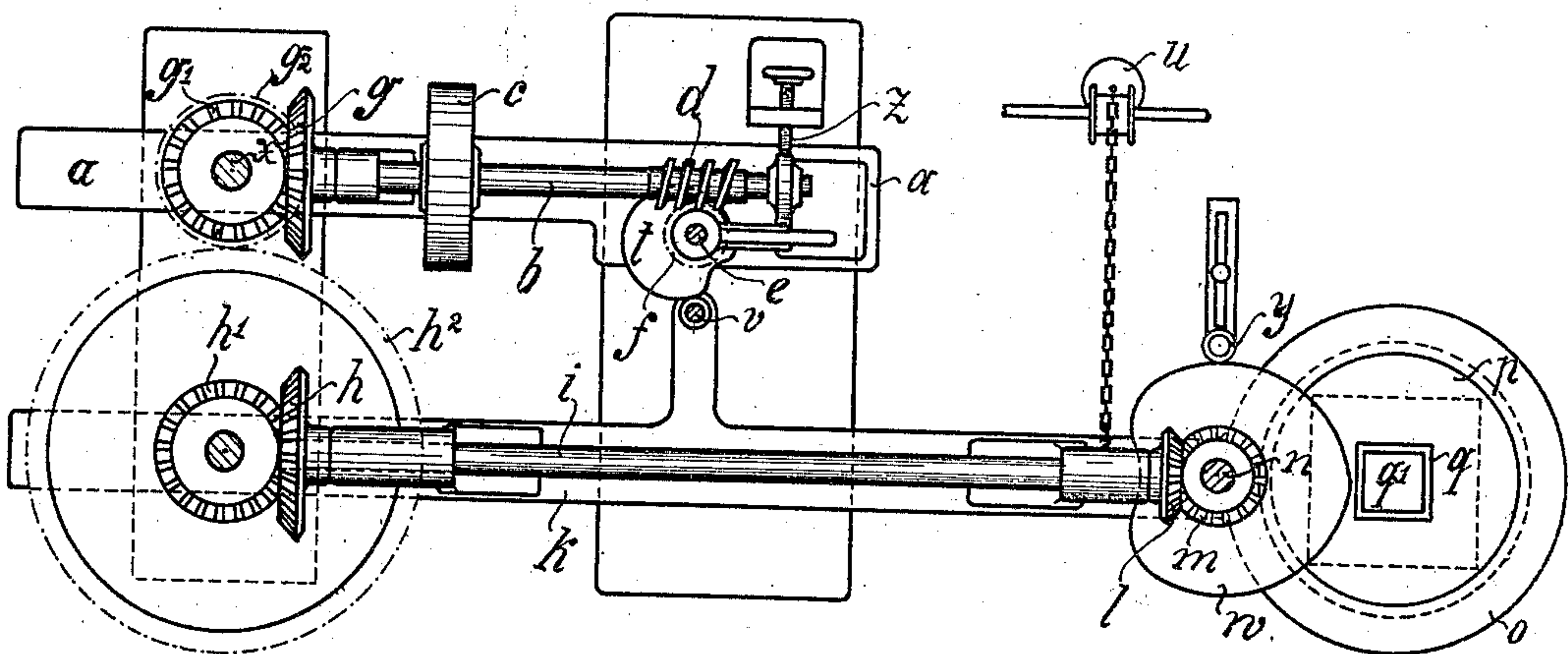
(No Model.)

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*Fig. I*



*Fig. II*



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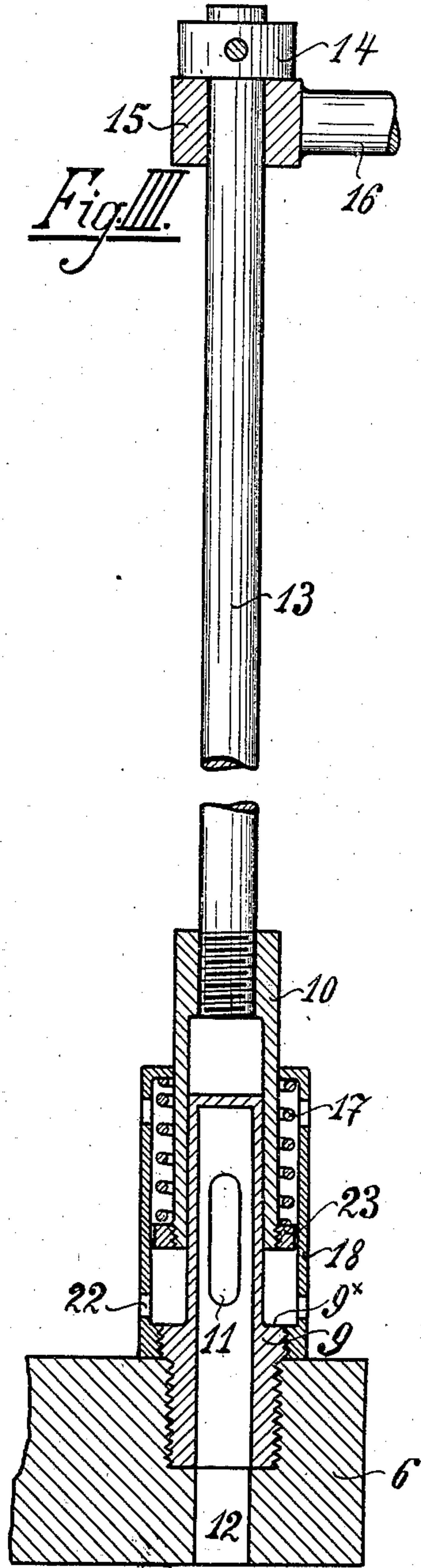
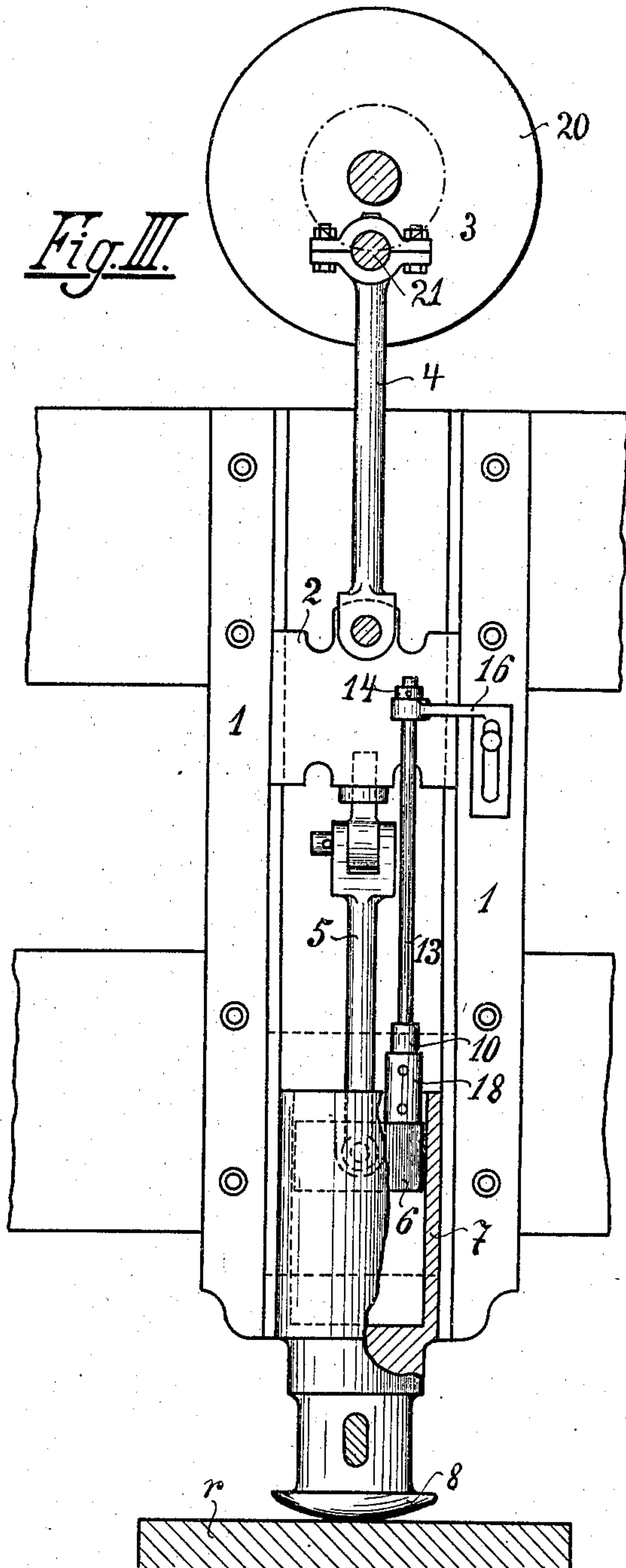
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(Application filed Aug. 22, 1900.)

(No Model.)

2 Sheets—Sheet 2.



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# UNITED STATES PATENT OFFICE.

FRITZ NUSSER, OF FÜRTH, GERMANY.

## MACHINE FOR BEATING LEAF METAL.

SPECIFICATION forming part of Letters Patent No. 661,618, dated November 13, 1900.

Application filed August 22, 1900. Serial No. 27,845. (No model.)

To all whom it may concern:

Be it known that I, FRITZ NUSSER, a subject of the King of Bavaria, residing at Fürth, in the Kingdom of Bavaria, German Empire, have invented certain new and useful Improvements in Machines for Beating Leaf Metal, of which the following is a full, clear, and exact description.

The present invention relates to a machine for beating leaf metal, one object being to perform all operations automatically and in such a manner that the finished work will be of the same quality as that obtained by manual labor.

The machine consists of mechanism for moving the work supported on the anvil so that every part of the leaf metal is brought once beneath the vertically-reciprocating working face of the hammer and the metal thus thoroughly and evenly beaten.

Another object of this invention is to release the hammer at the end of its downward stroke, so that it will spring back a short distance after it has been in contact with the work similarly to the blow of a hand-hammer.

In the accompanying drawings, Figure 1 is a side elevation of the machine, showing the mechanism for feeding the work; Fig. 2, a plan or top view of the same; Fig. 3, an enlarged side elevation of the hammer, partly in section; and Fig. 4, an enlarged vertical section showing the valve for releasing the hammer.

$a$  is a frame which is pivotally connected by a vertical pin  $x$  to the base of the machine. In suitable bearings of this frame  $a$  is mounted a horizontal shaft  $b$ , which has secured to it a pulley  $c$ , to which motion is transmitted from any suitable driving mechanism. Fixed to the shaft  $b$  is a worm  $d$ , engaging a worm-gear  $f$ . The said gear is mounted on the vertical shaft  $e$ . Near the left end of the shaft  $b$  is arranged a bevel-gear  $g$ , which engages the horizontal bevel-gear  $g'$ , loosely mounted on the pin  $x$  and bodily connected to the toothed wheel  $g^2$ .

Parallel to and in the same plane with the frame  $a$  is arranged a second frame  $k$ , rotatably mounted on the vertical pin  $x'$ . This frame  $k$  supports the shaft  $i$ , which is connected by the gears  $h$   $h'$   $h^2$  with the toothed wheel  $g^2$ . In moving the frame  $k$  on its pivot the bevel-gear  $h$  revolves about the bevel-

gear  $h'$ , so that in every position of the frame  $k$  the rotation of the shaft  $b$  is transmitted to the shaft  $i$ .  $l$  is a bevel-gear secured to the shaft  $i$ . The said gear meshes with the bevel-gear  $m$ , fixed to the vertical shaft  $n$ . The frame  $k$  is provided with an annular part  $o$ , inclosing the enlarged hub of a toothed wheel  $p$ . The said wheel may be rotated in the part  $o$ , on which it rests and meshes with a toothed wheel  $s$  of the vertical shaft  $n$ . Thus, as will be seen, the rotation of the shaft  $b$  will impart motion to the wheel  $p$ . The wheel  $p$  is provided with an opening  $q$  to receive the leaf metal  $q'$ , which is supported on an anvil  $r$ . By means of this construction the hammer will not strike the wheel  $p$  at its downward stroke, while the work may be moved about on the anvil by shifting the position of the wheel  $p$  by means of the part  $o$  of the frame  $k$ .

$t$  is a cam-disk secured to the vertical shaft  $e$ . A roller  $v$ , pivoted to a lateral arm of the frame  $k$ , is held in contact with the cam-disk  $t$  by means of a weight  $u$ , secured to one end of a suitably-guided chain, the other end of which is connected to the frame  $k$ .

It will thus be seen that the frame  $k$  will be swung on its pivot when the cam-disk  $t$  is set in motion, whereby the part  $o$  and the wheel  $p$  and the work  $q'$  will be reciprocated. At the same time the gears  $l$   $m$   $s$  transmit motion from the shaft  $i$  to the toothed wheel  $p$ . The cam-disk  $t$  is so timed as to impart, together with the wheel  $p$ , such movement to the work  $q'$  as will cause it to present to the hammer only such part of the surface as is necessary for effecting the preliminary working of the metal.

$w$  is a cam-disk on the vertical shaft  $n$ , which is held in engagement with the roller  $y$  by means of the weight  $u$ . The said roller  $y$  is mounted in a slot of the machine-frame and is secured therein by means of a set-screw, so that it may be adjusted.

For varying the path of movement of the frame  $k$  a set-screw  $z$  is provided which bears against the side of the frame  $a$  and is screwed through a lug secured to the base of the machine.

The operation of these devices is as follows: The work  $q'$  having been placed into the opening of the wheel  $p$ , the machine is started



and the gear  $g$  and worm  $d$  will rotate. The latter drives the cam-disk  $t$ , while the gear  $g$  transmits motion, by means of  $g g' g^2 h^2 h' h l m s$ , to the wheel  $p$  and to the work  $q$ . In the meantime the work is shifted laterally, as the cam  $t$  reciprocates the frame  $k$  with the part  $p$  in accordance with its cam-face. During this movement of the work the hammer 8 is moved up and down, so that the work is beaten in the desired manner. After the metal has been sufficiently prepared the cam-disk  $t$  or the roller  $v$  is removed, so that the frame  $k$  can no longer be reciprocated under the influence of the cam-disk  $t$ . Now the roller  $y$  is brought into contact with the disk  $w$ , and thus the frame is reciprocated in accordance with the working face of this disk  $w$ . By means of this device the work will be moved so that the hammer 8 will strike all those points which have not been under treatment, thus finishing the working of the leaf metal.

Referring now more particularly to the hammer-operating mechanism, (shown in Figs. 3 and 4,) 1 indicates guides in which the cross-head 2 may be reciprocated vertically. 3 is a driving-shaft to which is secured a crank-disk 20. 21 indicates the crank-pin fixed to the said disk, with which the connecting-rod 4 engages, connecting it to the cross-head 2. 5 is a connecting-rod pivoted at one end to the cross-head 2, while the other end is pivotally connected to a plunger 6. The said plunger slides in a cylinder 7, having secured to it a hammer 8 and being guided in suitable vertical guides 11. The plunger fits air-tightly in the cylinder 7, so that the latter and the hammer 8 will follow the movement of the plunger 6, which may be vertically reciprocated by crank-disk 20. At the end of the downward stroke the working face of the hammer is in contact with the work supported on the anvil  $r$ . The plunger 6 is provided with a passage 12, Fig. 4, having interior thread at the upper end. 9 indicates a tube screwed into the passage 12 and closed at its upper end. This tube 9 is provided with a shoulder  $9^x$ , to which is screwed a cylinder 18. On the tube 9 fits telescopically a tube 10, into which is screwed a rod 13. The inner tube 9 is provided with a slot 11, while the cylinder 18 has openings 22 located near the top and bottom ends of the same. To the lower end of the tube 10 is secured a collar 23, against which a spring 17 bears, the other end of which bears against an inwardly-projecting annular flange of the cylinder 18. The said flange serves as a guide for the tube 10. The upper end of the rod 13 is guided in a lug 15 of a vertically-adjustable arm 16, which is secured to the guide 1. The rod 13 has secured to it at its upper end a collar 14, which is held in position by a set-screw. At the downward stroke of the plunger 6 the slot 11 of the tube 9 is closed by the tube 10 until the collar 14 comes in contact with the lug 15, whereby the rod 13 and the tube 10 are retained, while the plun-

ger 6, with the tube 9 and the hammer 8, is forced farther down for a short distance by the crank-disk 20. This lowering of the hammer 8 takes place because the air contained in the cylinder 7 cannot escape. As soon as the tube 10 is arrested the tube 9 will slide out of the said tube 10, whereby the slot 11 will be laid open. The air contained in the cylinder 7 can now escape through the passage 12, tube 9, slot 11, and the openings in the cylinder 18. As the plunger 6 can now no longer compress the air within the cylinder 7 the latter will drop down freely under the influence of gravity and the impetus of its initial movement without being influenced by the positively-moved plunger 6. Since there is no longer an air-cushion in the cylinder 7 to resist a recoil of the hammer, the latter will rise or spring back after the blow has been delivered, in the same manner as if the blow had been struck by hand. At the upward movement of the plunger 6, the slot 11 of the tube 9 is closed, since the spring 17 tends to move the tube 10 downward. When the said tube is completely closed, it is impossible for air to enter the cylinder 7. Thus the latter, and with it the hammer 8, will again follow the movement of the plunger 6.

It will be obvious that the particular construction of the valve might be modified in many respects without departing from the spirit of the present invention.

I claim as my invention—

1. In a machine for working leaf metal, the combination of a driving-shaft and a bed-plate to support the same mounted to swing in a horizontal frame and means for adjusting the position of said plate, a frame also mounted to swing in a horizontal plane, an anvil under the free end of the said frame, a vertically-reciprocating hammer above said anvil, a rotary disk at the free end of said frame having an orifice therein to engage the metal to be worked and move the same under the hammer, a spindle mounted in said frame and means for driving the same from the driving-shaft whatever be the relative positions of frame and bed-plate on their pivots, a cam driven by the driving-shaft and acting against the frame to shift the same on its pivot, a larger cam at the forward end of the frame and a stop against which the same acts to shift the said frame when the smaller cam has been placed out of action and means for rotating the metal-holding disk from the frame-spindle substantially as described.

2. In a machine for working leaf metal the combination of a bed-plate carrying a driving-shaft and a frame-carrying spindle horizontally mounted therein, both the bed-plate and the frame being mounted to swing horizontally on pivots, means for transmitting the motion of the driving-shaft to the spindle of the frame whatever be the relative position of the bed and frame on their pivots, a cam actuated by the driving-shaft to swing the frame and a second cam working against



a stop to swing the frame when the first cam is out of action, means for rotating the said second cam from the frame-spindle, a metal-holding disk having an orifice therethrough  
5 mounted in the end of the frame and means for rotating the same from the frame-spindle, an anvil mounted below the said orifice, a reciprocating hammer above the same and  
o means in connection with the said hammer to relieve it of the actuating force the moment before it touches the metal and thus to allow it to recoil or spring back after the blow has been given substantially as described.

3. The combination of a bed-plate to swing  
15 horizontally and carrying a driving-shaft and a horizontally-swinging frame having a metal-holding disk at its free end and means for rotating the said disk from the driving-shaft and for shifting the position of the said frame

relatively to that of the bed-plate, as speci- 20  
fied, an anvil below the metal-holding disk and a reciprocating hammer above the same, having a cylinder formed in its stem, a plunger working air-tightly in the same, means  
25 for positively reciprocating the said plunger and means for establishing communication between the space in the cylinder below the plunger and the outer air the moment before the hammer touches the metal in the manner  
30 and for the purpose substantially as described.

In witness whereof I have hereunto set my hand in presence of two witnesses:

FRITZ NUSSER

Witnesses:

ANDREAS STICH,  
WILHELM BREHM.