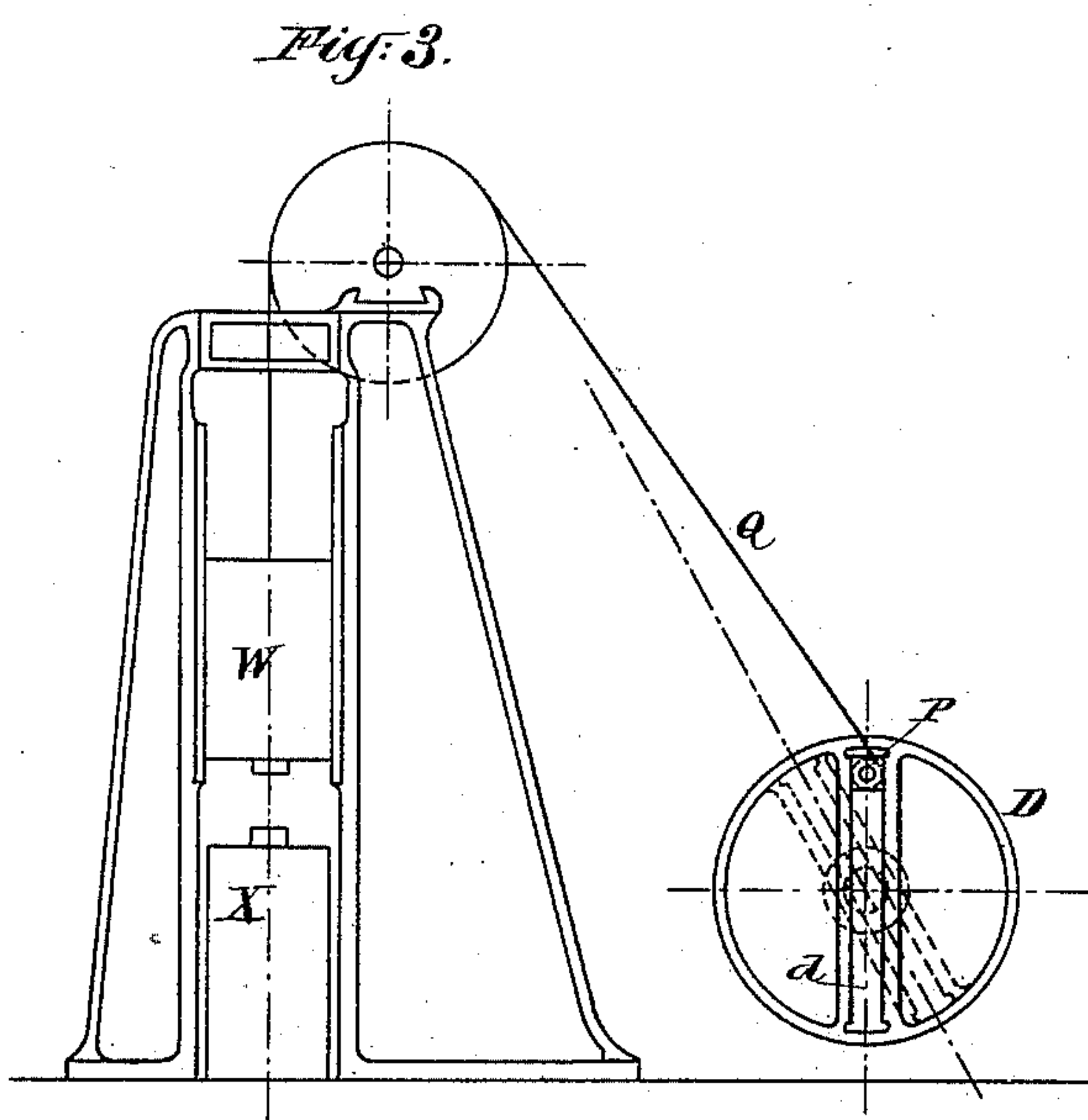
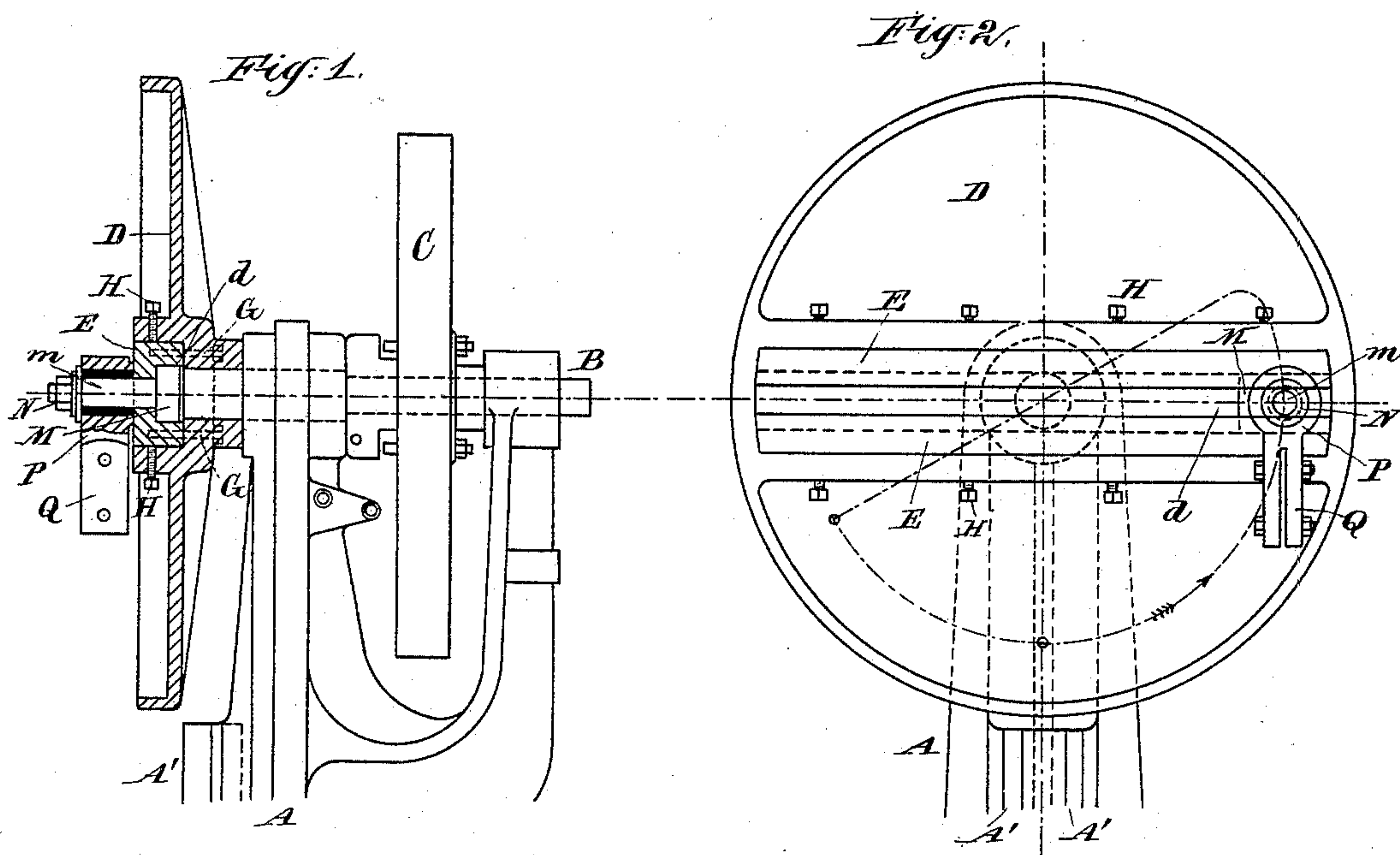


(No Model.)

E. HAMMESFAHR.  
DROP HAMMER.

No. 409,836.

Patented Aug. 27, 1889.



Witnesses:

Chas. J. Barter.

Charles R. Searle.

Inventor:

Ernst Hammesfahr  
by his attorney  
Thomas Drew Peterson

# UNITED STATES PATENT OFFICE.

ERNST HAMMESFAHR, OF SOLINGEN, PRUSSIA, GERMANY.

## DROP-HAMMER.

SPECIFICATION forming part of Letters Patent No. 409,836, dated August 27, 1889.

Application filed May 14, 1889. Serial No. 310,743. (No model.) Patented in Germany May 13, 1887, No. 43,744.

*To all whom it may concern:*

Be it known that I, ERNST HAMMESFAHR, a subject of the Emperor of Germany, residing at Solingen, in the country of the Rhine, Prussia, Germany, have invented a certain Improvement relating to Hammers, of which the following is a specification.

It is the subject of a German patent, No. 43,744, dated May 13, 1887.

10 The hammer may be of any weight and allowed to drop any distance. I will describe it as a heavy hammer guided in vertical ways and lifted through the medium of a flexible strap. I lift the hammer and liberate it, and  
15 allow it to fall so as to make two blows for each revolution of a constantly-revolving shaft. The shaft carries a wheel, across which is a slot, in which a block can slide, and the block carries a pin, which carries an eye, attached to the hammer by means of the strap.  
20 During a portion of each revolution the block lies in one end of the slot and works like a crank-pin, lifting the hammer in the same manner as if it were a permanent crank. But  
25 when the revolving motion carries it about two-thirds of the way to the highest point the block commences to slide across and shift its position to the other end of the slot. It slides free across, allowing the hammer to drop.  
30 The revolution of the shaft and its attachments continues during the period while the block is thus sliding across, and immediately after the hammer has struck its heavy blow on the hot iron or other object being treated  
35 the continued revolution again commences to lift the block. Consequently the hammer and the operation is repeated, the hammer being lifted first by one end of the slot and then by the other end, so that it is lifted and allowed  
40 to fall twice for each revolution of the shaft. I provide the slot with adjustable side pieces, by which the fit on the sliding block may be tightened and relaxed at will, so as to modify the action within wide limits.

45 The accompanying drawings form a part of this specification, and represent what I consider the best means of carrying out the invention.

Figure 1 is a central vertical section partly  
50 in elevation. Fig. 2 is an elevation at right

angles to the view in Fig. 1. Fig. 3 is on a smaller scale and represents a modification. It is a front view, corresponding to Fig. 2.

The drawings show the novel parts, with so much of the ordinary parts as is necessary  
55 to indicate their relation thereto.

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

A is a fixed frame-work provided with parallel guides A' A' for a hammer and with bearings for a revolving shaft B, which latter is rotated by a belt from a steam-engine or other power not shown, running upon a pulley C, which is connected with the shaft B either  
60 permanently, as by a key, or at will, as by a friction-clutch or other clutch not shown.

D is a wheel of sufficient size fixed on the overhung end of the shaft B. A slot *d* extends across this wheel. The sides of this slot  
70 are equipped with ledges E, which are held by stout screw-bolts G, extending in the direction parallel to the shaft B. The ledges are pressed together by screws H.

M is a stout block or carriage fitted in the  
75 slot *d*, and which is allowed to slide therein, as will presently appear. It carries a stout pin *m*, on which is fitted one or more collars and a nut N, which serve to retain an easily-fitting eye P, to which the hammer W is attached by a strap Q. Supposing the wheel D to be slowly revolved, the block M, lying in one end of the slot *d*, the end which is lowest, is carried by the revolving motion gradually  
80 upward to the level of the center of the shaft and a little higher; then it yields to the force impressed by its own gravity and that of the heavy hammer W, acting through the strap Q, and slides across through the slot *d* to the other side of the wheel, allowing the strap Q  
85 to be thereby slacked and hammer W to drop. While the block M and its attachments are moving across, the continued revolution of the wheel D brings the slot *d* into a more and more vertical position, so that by the time  
90 the block is quite across and the hammer has struck the anvil X or whatever is being treated thereon the wheel is in position to again commence to lift the block M and its attachments, which it does. The shaft B  
100



should be revolved at such rate as to promptly lift the hammer after each blow, especially in hammering thin hot metal.

The adjustable ledges E afford facilities for  
5 modifying the action. When adjusted to simply guide the block M, the latter is free to commence to slide across so soon as it has been lifted to any extent above the center of the wheel, but if it is set by the screws, so as  
10 to nip the block M with force at and near the ends of the slot, it may still move freely across the middle part of the wheel, so as to strike with the full force of the hammer, but will be obstructed in its starting, so that it  
15 will not start until it has been lifted higher. Under such adjustment the hammer will strike harder blows. If there are means not shown for varying the time of revolution of the shaft B and its connections, the revolutions should be retarded when the hammer is  
20 thus lifted higher; but this is not absolutely essential. It is sufficient under all conditions if the revolution is sufficiently rapid to allow the hammer to fall and strike a blow at about  
25 the period when the block M has completed its traverse across the whole diameter of the wheel D, and to lift it again in time to prevent its again descending after its natural rebound.

Modifications may be made by any good  
30 mechanic without departing from the principle or sacrificing the advantages of the invention.

Fig. 3 shows the invention carried out by operating the shaft B at a low point alongside  
35 of the hammer, the latter being lifted by leading the strap over a pulley. In such case the eye P on the end of the strap Q is pulled down, instead of up, to raise the hammer, but the action is the same.

Parts of the invention can be used without  
40 the whole. I can dispense with the means for adjusting the ledges at the sides of the slot *d* and can work the hammers uniformly, varied only by the rate of speed of the revolution of the shaft, or varied not at all. For  
45 some work there is little need of varying the action.

I term the revolving part D, carrying the slot *d* a "wheel," but it is evidently not essential that it be round.  
50

I term the transverse track or guideway *d* a "slot," but it is not necessary that it be sunk completely through the whole thickness of the wheel. The functions of compelling the  
55 block or equivalent carriage M to travel with it in lifting the hammer and guiding the block across as it slides are alone important for this feature.

I claim as my invention—

1. The revolving wheel D, having a slot or  
60 guideway *d* across its outer face, in combination with the block M and connection therefrom to a hammer W, as herein specified.

2. The wheel D and means for revolving it, carrying adjustable ledges E and means H  
65 for setting the latter at will, in combination with each other and with the block or carriage M, eye P, connection Q, and hammer W, arranged for joint operation, substantially as  
70 herein specified.

In testimony whereof I have hereunto set my hand at Solingen, this 29th day of March, 1889, in the presence of two subscribing witnesses.

ERNST HAMMESFAHR.

Witnesses:

LUDWIG AX,  
JOSEPH OMMER.