No. 637,492. Patented Nov. 21, 1899.

J. H. WILSON.

MACHINE FOR MAKING TOE CALKS.

(Application filed Apr. 10, 1899.)

(No Model.) 3 Sheets—Sheet 1.

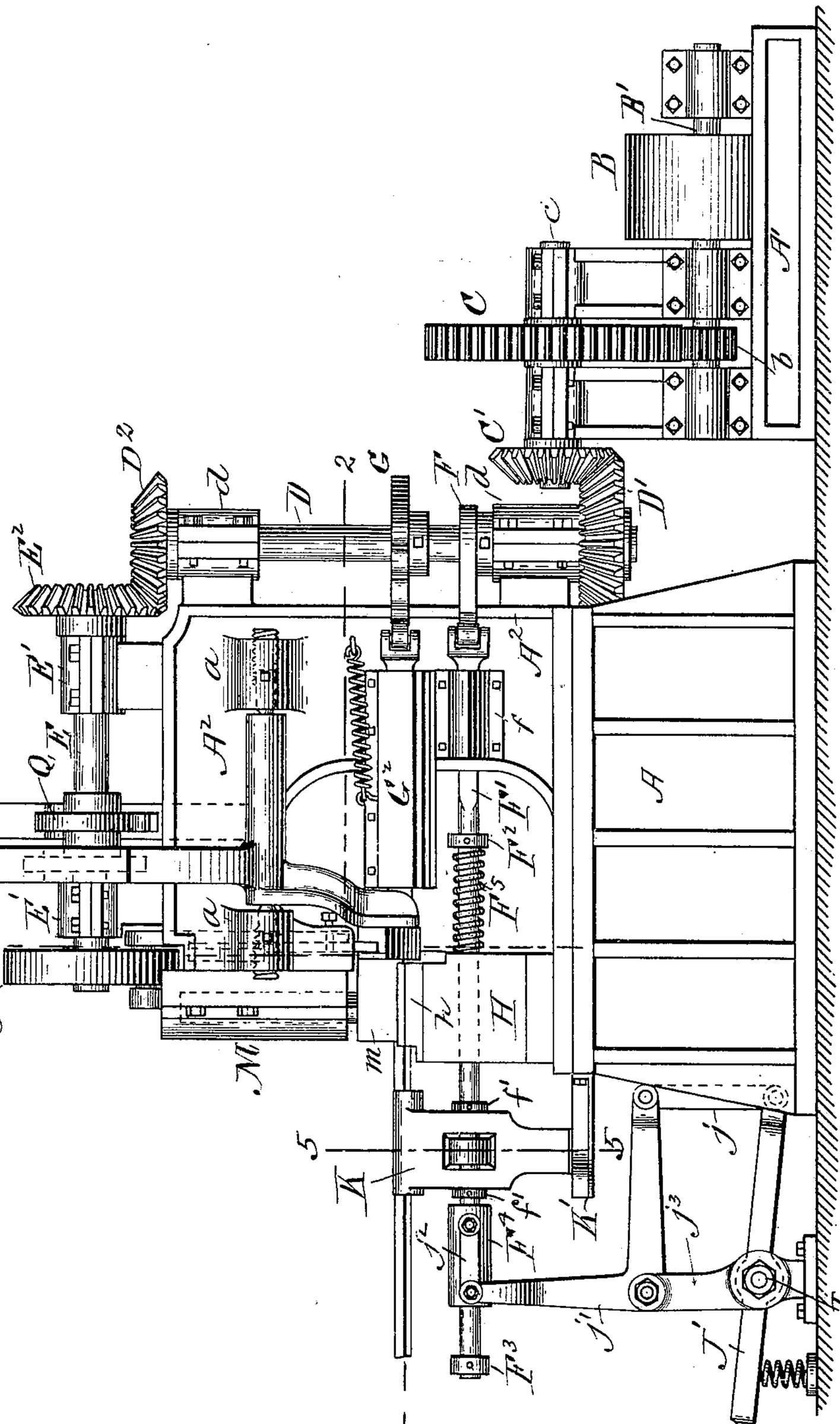

Fig. 1.

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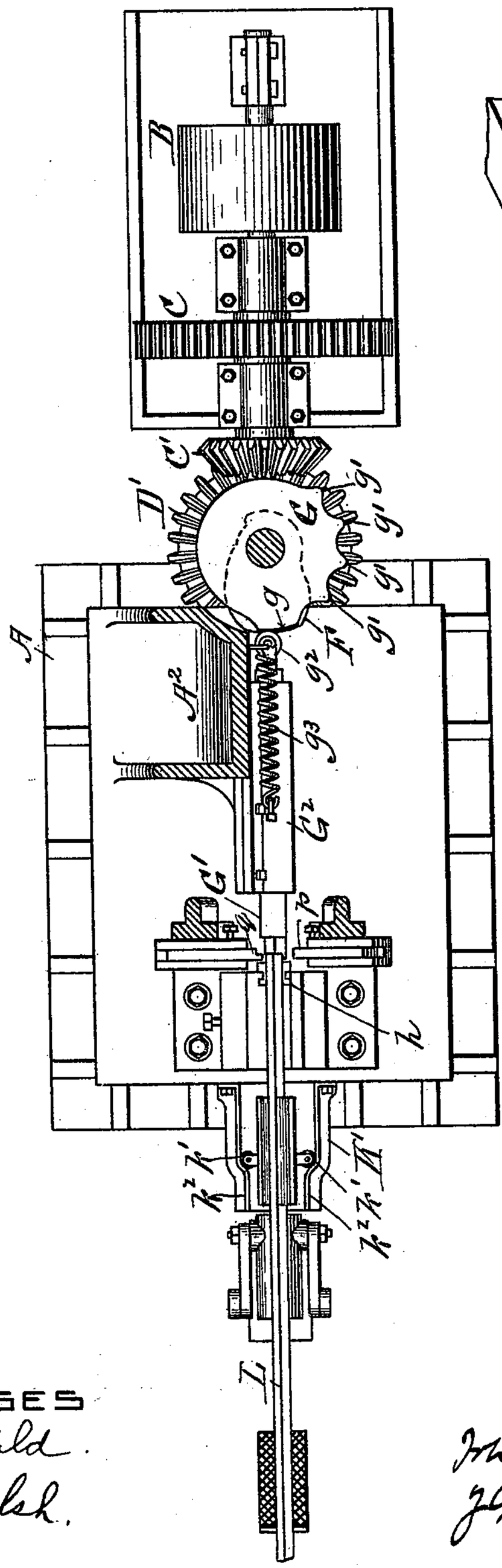

FIG. 2.

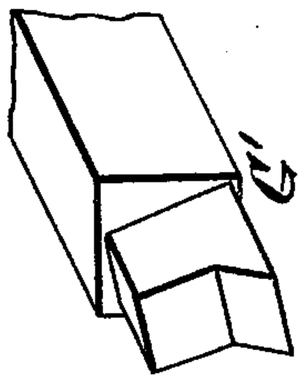

FIG. 6.

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MACHINE FOR MAKING TOE CALKS.

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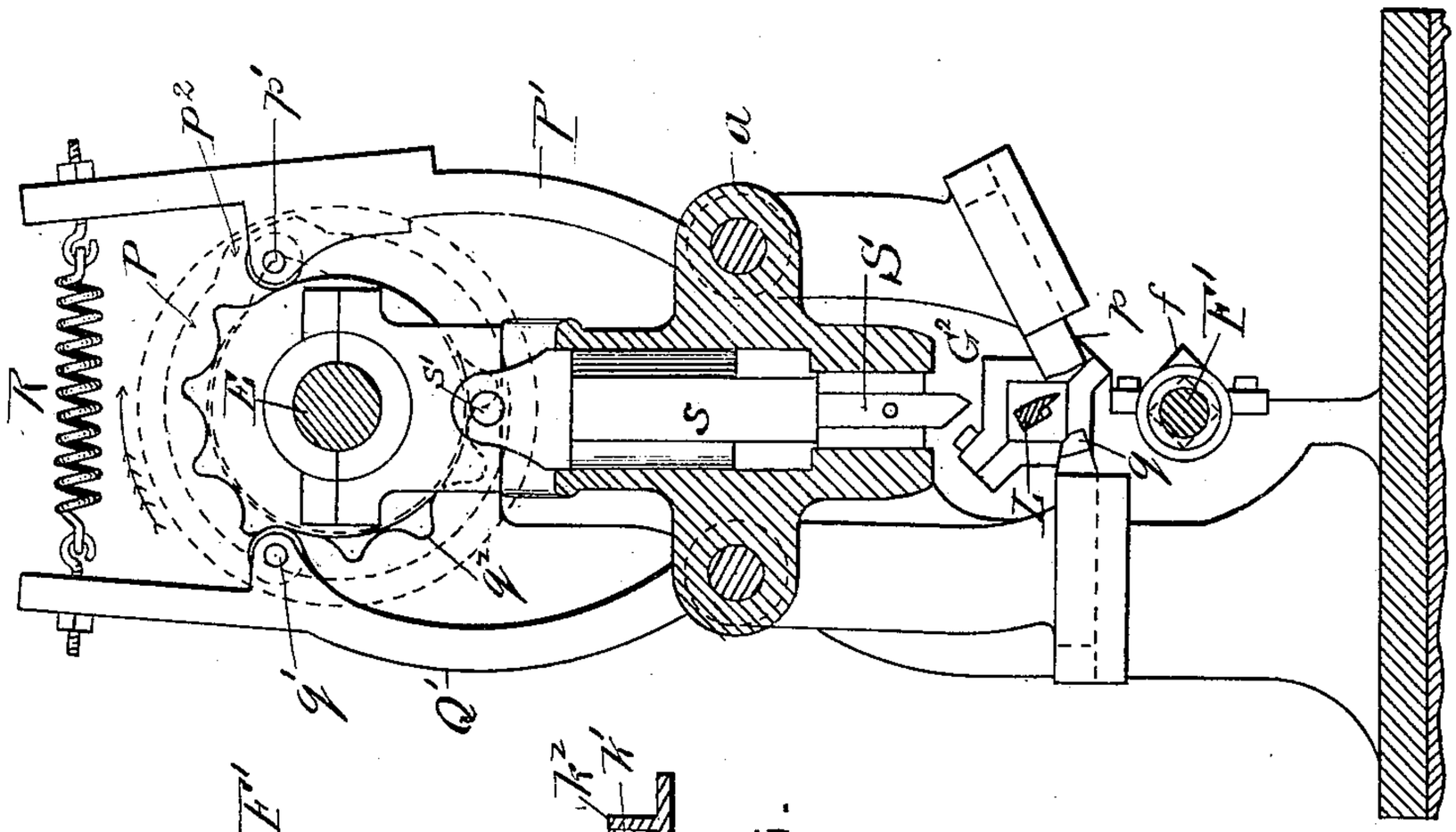

Fig. 4.

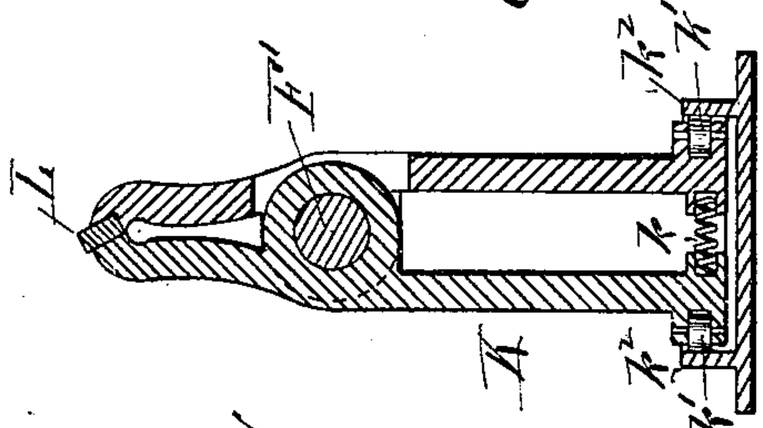

Fig. 5.

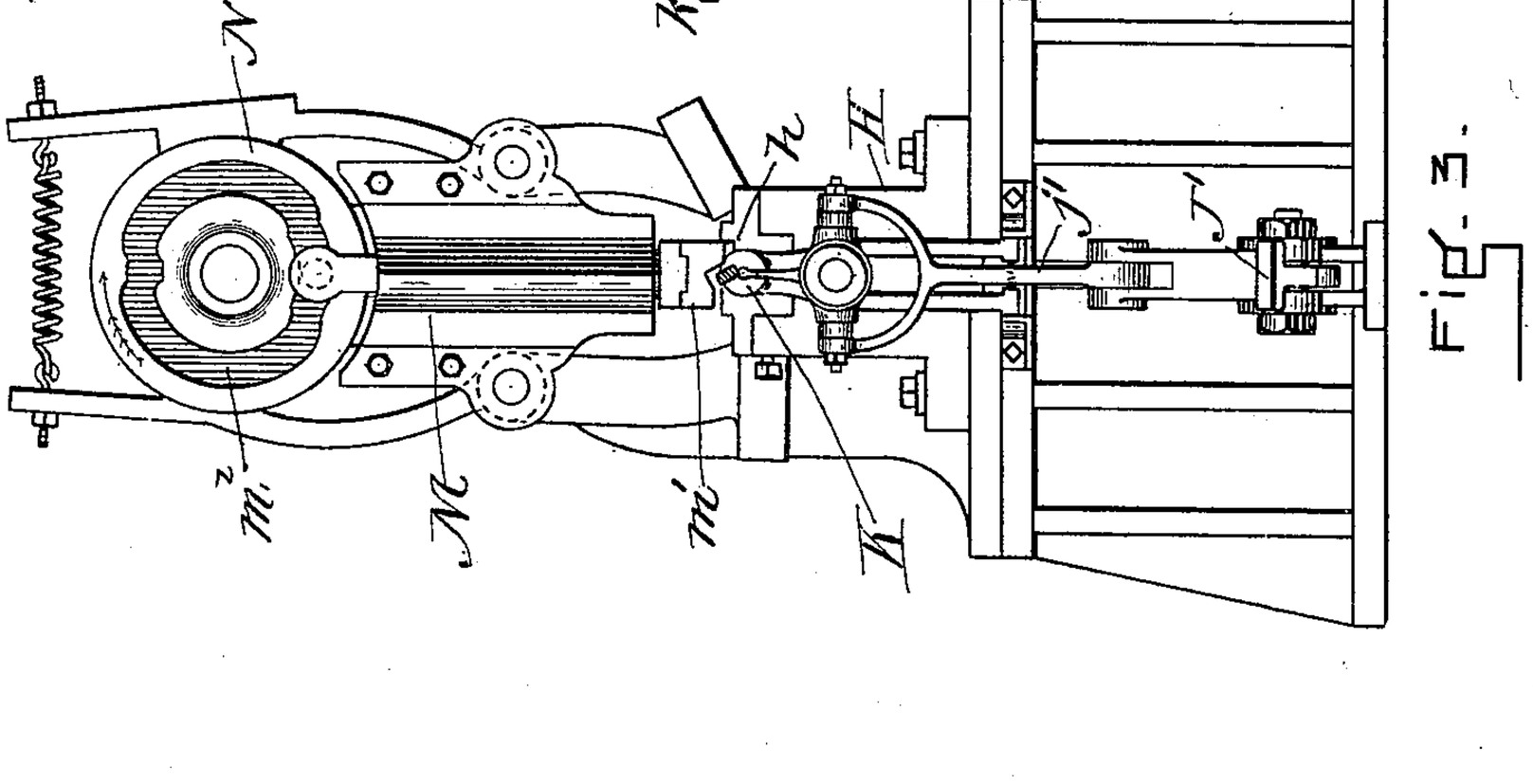

Fig. 3.

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UNITED STATES PATENT OFFICE.

JOHN H. WILSON, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO GEORGE C. BUTTS, OF NORWICH, CONNECTICUT.

MACHINE FOR MAKING TOE-CALKS.

SPECIFICATION forming part of Letters Patent No. 637,492, dated November 21, 1899.

Application filed April 10, 1899. Serial No. 712,363. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. WILSON, of Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Machines for Making Toe-Calks, of which the following is a specification.

In the manufacture of toe-calks by machinery one great difficulty in the machines of which I have knowledge has been that the parts by which the blank was handled while in the machine were overheated by the blank itself, which was fed into the machine at a very high temperature. After such a machine had been run for a time all the working parts became heated, so that it was necessary to shut down to allow them to cool off. In my machine now to be described the essential parts have been rearranged and their mode of operation has been very much simplified, so that the anvil is the only part which is liable to become very hot, and, if necessary, this can be readily kept cool by the application of water. The cutter, from which the temper is easily drawn, is supported and operated in such a way that it is only subject to heat while it is in actual contact with the hot iron of the blank.

My invention therefore consists in such a rearrangement of the hammers and dies as will obviate this difficulty and in certain details of construction described below, which render the machine a vast improvement practically over machines heretofore built.

My invention will be understood by reference to the drawings, which show its embodiment in the best form now known to me.

Figure 1 is a side elevation of such a machine as is above referred to, Fig. 2 being a horizontal section on line 2 2 of Fig. 1; Fig. 3, a front elevation; Fig. 4, a vertical section (omitting the base) on line 4 4 of Fig. 1 on an enlarged scale; and Fig. 5 is a section on line 5 5 of Fig. 1, also on an enlarged scale. Fig. 6 is a detail showing the end of the ram.

A is the base, supporting the frame A^2, on which the parts of the machine are supported, A′ being a platform extending to one side and carrying the drum or pulley B. This pulley is mounted on a shaft B′, carrying a pinion *b*, meshing with the driving-gear C, mounted on a shaft *c* in suitable bearings also carried by the platform A′.

C′ is a bevel-gear on one end of the shaft *c*, meshing with the bevel-gear D′ on the shaft D, which runs in bearings *d d*, projecting from the side of the frame A^2. The upper end of the shaft D carries a bevel-gear D^2, meshing with the bevel-gear E^2 on one end of the cam-shaft E. The cam-shaft E is supported in bearings E′ E′ on top of the frame A^2.

The shaft D carries two cams F and G. The cam F serves to operate the grip mechanism, which will now be described. It consists of a rod F′, passing through a guide-section *f* on the side of the frame A^2 and also through the anvil-support H, which is also mounted on the frame A^2. A spring F^5 lies about the rod F′ and is compressed between the collar F^2 and the anvil-support H, so as to throw the rod F′ against the cam F. Upon the outer end of the rod F′ is attached a collar F^3, and upon the rod is carried also a sleeve F^4 to coöperate therewith. This sleeve is loose upon the shaft and is moved to engage with the collar F^3 and withdraw the rod from engagement with the cam F by an angle-lever *j*′, supported on an arm j^3, mounted on the floor at J. This lever is connected to the treadle J′ by means of connecting-rod *j*. The upper end of this lever is connected by links j^2 with the sleeve F^4, this arrangement being such that depressing the treadle J′ throws the sleeve F^4 out against the collar F^3, so as to pull the rod F′ against the force of the spring F^5 and withdraw the rod away from the cam F for the purpose described below.

The feed itself consists of a pair of gripping-jaws K, (shown especially in Fig. 5,) which are also mounted on the rod F′, being held in place between collars *f*′ *f*′ on the shaft F′. The lower ends of these jaws are held apart by a light spring *k*, so that they have light contact with the blank rod L, sufficient merely to move the rod forward at the proper time and light enough to allow them to slide back upon the rod in order to take a fresh hold preparatory to the next feeding step. The lower ends of these grips are provided with rolls *k*′, (see Figs. 2 and 5,) which travel in a cam-plate K′, projecting from the side of the base A. This cam-plate has up-

wardly-projecting walls k^2, which provide cam-surfaces to operate the jaws. For, say, the two-thirds of their length nearest the frame A they are straight and then they approach slightly and again become straight, as will be understood from Fig. 2. In the normal reciprocation of this grip the rolls k' travel along the straight portions of these cam-walls nearest the frame A^2; but when it is desired to insert a new blank rod between the grips by depressing the lever J' the rod F' is withdrawn a sufficient distance to carry the rolls k' on the lower ends of the jaws onto the approaching portions of these walls k^2, thus bringing the lower ends of the jaws together and opening their upper ends.

The cam F is constructed to give two forward and allow one rearward movement to the rod F' at times and for the purposes to be hereinafter described.

Before describing the cam G the clamping mechanism will be described. This consists of a long housing M, attached to the side of the machine and in which slides the reciprocating clamp m, having the shoe m' at its lower end. I prefer that this shoe be removable, so that it may be changed to conform to the different sizes of blank rod. With this clamp coöperates the anvil h, mounted upon the upper end of the anvil-support H, the anvil being stationary, but being also removable, so that it may be changed to conform to different sized and shaped rods. The clamp m is provided with a cam-pin at its upper end, which fits into a groove m^2 in the face of the cam-wheel N, the cam-groove being shaped as shown in Fig. 3. The purpose of this clamp is to hold the blank rod while the calk is being made and also while the calk is being cut off and to release it when the blank rod is to be moved. The cam is so timed as to hold the clamp down while the dies are at work upon the blank, then lift it so that the feed may move the blank rod a step farther forward after the calk is finished to bring the proper point under the cutter, and then to cause it to descend again and clamp the blank rod on the anvil during the cutting operation, and then to lift it to release the rod, so that it may be fed forward to supply stock for the next calk.

The calk is made from the blank by the alternate action of a ram and an oscillating hammer, which strikes a little deeper into the blank at each blow, the blank being supported by a second oscillating hammer, which acts as an anvil. The ram is operated by the cam G on a shaft D, and it serves not only as a ram, but also as a feeding-stop to determine the forward feed of the blank rod L. For this purpose the cam G is provided with a projection g to move the ram forward into position to stop the feed of the blank and a series of projections g', by means of which the ram is reciprocated successively and rapidly to shape the front of the spur.

The ram itself, G', consists of a long bar carrying at its rear end a cam-roll g^2, which is held against the cam-surface by means of the spring g^3. The ram G' slides in a housing G^2, mounted on the frame A^2. The face of the ram is approximately the reverse shape of the front face of the calk. (See Fig. 6.) That portion of the ram which is opposite to the end of the blank acts to preserve its flat face, as well as to control the length of the feed, and the angular portion below it shapes the front of the spur. The forming operation of the ram will be described in connection with the operation of the hammers.

The hammers are shown particularly in Fig. 4. They are operated by two cams P and Q, mounted on the shaft E. Each hammer consists of a lever P' Q', fulcrumed in the frame A^2. As shown in Fig. 1, the fulcrum of each lever is a rock-shaft supported between tapered centers carried in bosses a on the frame A^2, each center being held in place by a set-screw a' and also by a screw-plug and jam-nut, which is screwed into the opening in the boss behind the center. This is a well-known manner of supporting a rock-shaft. Each hammer carries a hammer-surface p q, the upper ends of the hammers being connected together by a spring R, by means of which their cam-rolls p' q' are held against their cams P Q. The cam P is provided with a series of projections p^2 of equal height, so that as the cam rotates the hammer p is moved a fixed distance by each projection, and this movement is timed slightly in advance of the movement given to the hammer q. The cam Q is provided with a series of projections each a little higher than the one in front of it, so that as it rotates it throws the hammer q a little farther each time, so that it will strike at each blow a little deeper into the stock, and these movements of the hammers alternate with the movements of the ram G', so that the blank is first struck by the hammers and flattened on its sides and then by the ram to flatten the metal forced forward by the hammers to point it as required for the spur of the calk.

The cutter is mounted on the end of a rod S, which slides in a bearing s, mounted on the frame A^2. Its upper end is provided with a cam-roll s', carried in a groove on that face of the cam-wheel N opposite to the face which carries the cam-groove m^2, and this groove is so shaped as to give the cutter one vertically-reciprocating movement timed to be made when the hammers and rams have ceased their operation. I prefer to provide this cutter with an angular edge, as shown in Fig. 4, and to shape the surface of the anvil and its clamp in such a manner that the blank will lie therein, as shown in Fig. 4, in order that the cutter may strike the blank rod and cut it by a shear sliding cut.

The operation of the machine is as follows: The treadle J' being depressed to open and withdraw the grips K, the rod, which has been heated to a proper temperature, is placed with one end in the anvil, the ram being pref-

erably in its most forward position to serve as a stop against which the rod shall be pushed. The machine being in motion, the treadle is then released, and the grips seize the rod and move it forward, if it is capable of movement, until its end strikes the ram. When the rod strikes the ram, if the grips have not reached their forward position or if the rod is already against the ram the spring *k*, being light, allows the grips to slide along the surface of the rod until the cam-roll on the end of the rod F′ strikes its cam F. The ram is then withdrawn, and simultaneously the clamp *m* comes down and clamps the rod against the anvil. The hammer *p* comes up against the side of the end of the rod L which projects beyond the anvil. Then the hammer *q* strikes its blow, mashing the end of the rod against the hammer *p* to make the spur. The hammers are then withdrawn, and the ram comes forward, beating down the part which the hammers have squeezed out, the portion of the ram which has formed a stop closing the space in front of the end of the rod, thus causing the stock to be forced down by the blow of the ram, after which the ram is withdrawn and the hammers act again, the hammer *q* advancing slightly to give a little deeper blow into the metal. This series of operations is repeated, say, four times, when both hammers and ram are withdrawn, and during this time the grip recedes to take fresh hold of the rod. Then the feed moves the rod a distance equal to the length of the toe-calk, the clamp being lifted momentarily to allow this feed to take place. When the clamp descends again, the cutter descends, cutting off the finished toe-calk. As the cutter rises the clamp also rises, and the grips advance again to feed the rod. The ram at the same time advances, reaching its forward or stop position just ahead of the advance of the feed, and a second calk is manufactured in the same manner, the grip again receding, as above described.

It will be seen that the ram performs two functions—viz., that of a striking-die to shape the spur of the calk and at the same time keep the metal on which it is acting from crowding upward and spoiling the shape of the end of the blank and also that of controlling the length of the feed of the blank rod, and hence the length of the blank which shall project beyond the edge of the anvil. It is obvious that by changing its cam the length of the feed may be changed.

I prefer to lay the blank in the anvil in the manner shown, so that one corner is presented to the cutter, and also to give the cutter a cutting edge at an angle to its line of motion, so that it shall give a shear sliding cut.

It is obvious that other means may be employed for giving the necessary operations to the various parts, but the above are the simplest means now known to me. The advantage of the general arrangement above described lies in the fact that the heat of the blank will not be readily transmitted to the cutter and other working parts of the machine to heat and scale them, for the reason that those parts and parts which operate them are located at a distance from the anvil on which the blank is supported.

What I claim as my invention is—

1. The toe-calk machine above described consisting of an anvil, means for feeding the blank and clamping it on said anvil, means for squeezing the end of the blank laterally to form a spur and a reciprocating ram adapted to shape the front of the spur against the face of the anvil, and also to determine the length of feed of the blank rod, and means whereby said ram is reciprocated, in combination with a cutter located to reciprocate in a plane between said clamp and the spur-forming mechanism and means whereby it is reciprocated, as set forth.

2. In a toe-calk machine, in combination, means for supporting and clamping a blank rod, means for squeezing the end thereof to form a spur, a reciprocating ram located in line with said blank rod, the working face of said ram being provided with a projection to form a die the converse of the shape of a toe-calk spur, and having a portion adjacent to said projection to close against the end of said blank and prevent the spreading of the metal upward when squeezed by said projection, and means whereby said ram is reciprocated, in combination with a cutter located to reciprocate in a plane between said clamp and the spur-forming mechanism, and means whereby it is reciprocated, as set forth.

3. In a toe-calk machine, in combination with mechanism for clamping the blank rod and mechanism for shaping the spur of the toe-calk, a cutting mechanism and a feeding mechanism and means whereby said feeding mechanism is operated to feed the rod forward to the spur-forming mechanism and after the spur is formed to feed it forward again to the cutting mechanism, whereby the blank is fed to said clamping and shaping mechanism and when shaped, is fed to the cutting mechanism, as set forth.

4. In a toe-calk machine, in combination, a blank-feed, an anvil and a clamp adapted to hold the blank thereon, a pair of squeezing-hammers located to squeeze the blank between them to form the spur of the toe-calk, and means whereby they are operated, and a reciprocating ram adapted to shape the front of the spur and means whereby said ram is reciprocated, the plane of motion of its reciprocation being substantially coincident with the plane of motion of the blank-feed, in combination with a reciprocating cutter located to reciprocate in a plane between the clamp and the spur-forming mechanism, and means whereby it is reciprocated, as set forth.

5. In a toe-calk machine, an anvil and clamp adapted to clamp the blank thereon and a die to shape the front of the toe-calk spur, two squeezing-hammers each mounted at the lower

end of a lever having its fulcrum located above said anvil, and means whereby the upper ends of said lever are operated to cause the hammers to squeeze the blank, as and for the purposes set forth.

6. In a toe-calk machine, in combination with means for supporting and clamping the blank rod and means for forming the spur upon the calk and cutting the calk from the blank rod, means for advancing said blank rod to the spur-forming mechanism and again advancing the blank rod to the cutter mechanism, said means consisting of a pair of grips adapted to loosely grip said rod, means whereby said grips may be reciprocated to feed the rod and a stop located to control the length of the feed, as and for the purposes set forth.

7. In a toe-calk machine, the feeding mechanism above described consisting of a rod suitably supported and means whereby it is reciprocated, said rod having a pair of gripping-jaws mounted thereon and held together by a light spring and adapted to lightly grip the rod to be fed, in combination with a releasing mechanism consisting of a plate provided with cam-surfaces to act on said jaws and open them during a portion of the rearward movement of said jaws, as set forth.

8. In a toe-calk machine, the two-motion clamp whereby the blank is held during the forming and cutting operations, and a two-motion feed whereby said blank is fed forward to the forming mechanism and again is fed forward to the cutting mechanism and then returned to its rearward position, in combination with means whereby the spur of the toe-calk is formed and a reciprocating cutter located to reciprocate in a plane between said clamp and said spur-forming mechanism, as and for the purposes set forth.

9. In a toe-calk machine, a pair of feeding-grips mounted on a rod, means whereby said rod may be reciprocated and means such as a treadle mechanism, whereby said rod may be withdrawn from said reciprocating mechanism, in combination with mechanism whereby said grips may be opened, located to act on said grips only when said rod is withdrawn from said reciprocating mechanism, all as set forth.

10. In a toe-calk machine, an anvil provided with a groove to receive the blank rod and hold it with one of its edges upward, a reciprocating clamp provided with a groove adapted to receive said edge and to bind said rod against said anvil and a reciprocating cutter located in line with the front of said anvil and provided with an angular edge, and located to reciprocate against the upward edge of said blank rod, whereby said blank may be cut off by a shear and sliding cut, and means whereby said clamp and said cutter are reciprocated, as and for the purposes set forth.

In testimony whereof I have set my name this 6th day of April, 1899.

JOHN H. WILSON.

Witnesses:
GEORGE O. G. COALE,
EVA A. GUILD.