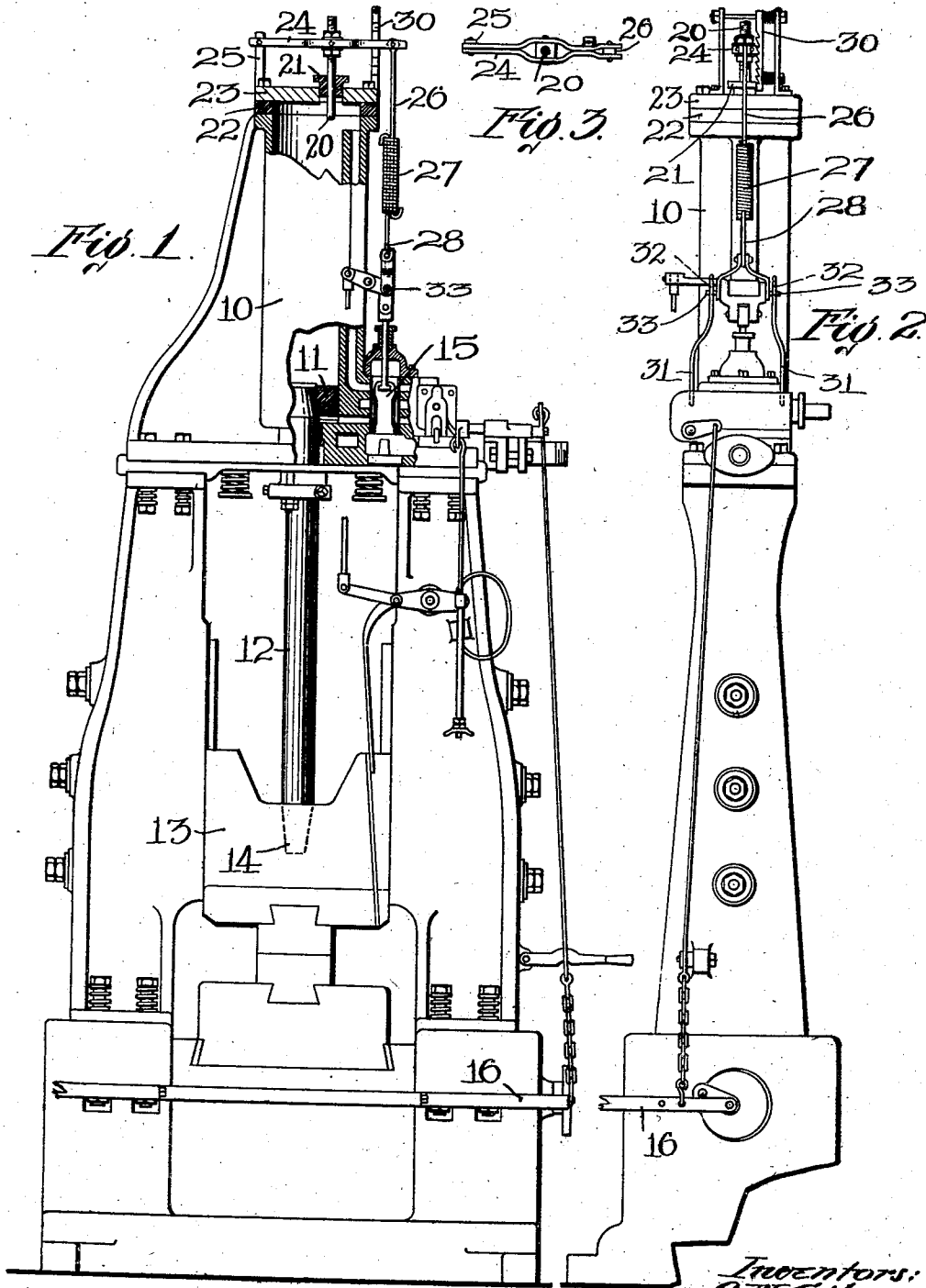


C. W. GILMAN & A. L. WELCH.
ATTACHMENT FOR POWER OPERATED HAMMERS.
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UNITED STATES PATENT OFFICE.

CHARLES W. GILMAN AND ANIS L. WELCH, OF WORCESTER, MASSACHUSETTS.

ATTACHMENT FOR POWER-OPERATED HAMMERS.

1,008,026.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, CHARLES W. GILMAN and ANIS L. WELCH, citizens of the United States, both residing at Worcester, in the county of Worcester and State of Massachusetts, have invented a new and useful Attachment for Power-Operated Hammers, of which the following is a specification.

10 This invention is designed for the purpose of obviating certain difficulties met with in operating power operated hammers used largely for forging and similar purposes. It is applicable to hammers driven
15 by steam or compressed air. As is well understood the piston rod which is connected with the hammer head of this type of hammer is subjected to extremely rough usage and if it is grooved or scored in order
20 to attach the hammer by means of a pin or the like the metal will soon crystallize at this point and the piston rod will break after a comparatively short life. It has been attempted to overcome this difficulty by
25 making the end of the piston rod conical and driving it into an opening of the same shape in the hammer head. This does overcome this difficulty, but it introduces another, namely, that occasionally the piston
30 rod gets loose from the hammer head and then the steam entering under the piston drives the same up against the head of the cylinder either cracking the head or in some cases breaking the cylinder itself. This obviously, is a rather expensive accident even
35 when only the head is cracked, but when the cylinder is broken it is much more so, and in either case the time that the hammer is out of commission is lost, thus adding
40 very materially to the expense.

This invention is designed for the purpose of permitting the use of the conical ended piston rod without other fastening means and yet preventing the breaking of
45 the cylinder or cap thereon; to provide for accomplishing these results in an exceedingly simple manner without really reconstructing the hammer in any way or adding greatly to the expense of the machine, and
50 to provide for driving the rod back into the head when it becomes loose, and automatically stopping the machine. The in-

vention also involves details of construction as will appear hereinafter.

Reference is to be had to the accompanying drawings, in which—

Figure 1 is a front elevation of a steam hammer of well-known type with a preferred embodiment of this invention applied thereto; Fig. 2 is a side view of the same; 60 and Fig. 3 is a plan of a portion of the attachment.

The steam hammer itself need not be described in detail as one of ordinary form is shown. It is shown as provided with the 65 usual cylinder 10, piston 11, piston rod 12, and hammer head 13. The piston rod is provided with a conical end 14 driven into a similar shaped opening in the hammer head as has been stated. A valve 15 70 designed to be operated by a treadle 16 or the like is employed for controlling the hammer. It will be understood, of course, that when the rod 12 gets loose from the hammer head the steam entering under the piston 11 will raise the rod much more rapidly 75 than it would with the heavy weight of the hammer thereon. In order to prevent the piston from going too high and to drive the rod back into the head, a movable pin 80 20 is introduced into the top of the cylinder through a stuffing box 21. For this purpose a ring 22 is placed on top of the cylinder and a cap 23 is secured to it so as to allow a little more steam space at this point than 85 is customary. The pin 20 is adjustably mounted on a lever 24, pivoted on a stationary member 25 on the cylinder. The lever is provided with a downwardly extending hook 26 connected by a spring 27 under 90 compression with an upwardly extending hook 28 from the stem of the valve 15. A rack 30 is located adjacent to the lever 24 and the construction is such that this lever normally presses against the rack and when 95 it moves up in a manner to be described hereinafter it will stay at whatever elevation it reaches. Stops 31 are secured into the base of the cylinder and have eyes 32 at the top which receive a pin 33 on the 100 valve stem.

In the operation of the device, if the rod 12 gets loose the entrance of steam under the piston 11 will drive the piston upwardly

at a high rate of speed until it strikes the pin 20. This results in reversing the valve 15 through the action of the hooks 26 and 28, but on account of the stop the valves 5 are moved only so far as necessary even though the piston may rise to an unprecedented height. The springs relieve the jar at both ends of the movement. Having raised the valve the lever 24 is held up by 10 the rack and the valve is simply changed to cut off steam from below the piston 11, open the exhaust on that side, and allow steam to enter through the upper port to the space above the piston. The effect of 15 this obviously is to drive the piston and rod downwardly with great rapidity and to leave it in that position until the operator releases the lever 24 from the rack 30, and then reverses the valve in the usual manner. 20 In addition to the fact that this simple operation prevents the breaking of the upper part of the cylinder or cap it has another important effect. On account of the rapidity with which the piston and rod are 25 driven downward, the conical end of the rod is forcibly driven into the hammer head and it has been found in practice that this results in securely fastening these two elements so that upon the subsequent operation of the device the hammer will be 30 moved with the piston rod and it will be as firmly attached as it usually is in this class of machines.

While we have illustrated and described 35 a preferred form of the invention and shown it as applied to a particular type of steam hammer, we are aware that the invention can be carried out in other forms and can be applied to all types of power operated 40 hammers without departing from the scope of this invention as expressed in the claims. Therefore we do not wish to be limited to the details of construction shown or the particular type of hammer, but

45 What we do claim is:—

1. In a power hammer, the combination with a cylinder, piston, valve for controlling the admission of steam or the like to the cylinder, and manually operated means for 50 controlling the admission of steam through said valve, of independent means connected with said valve for moving it to admit steam on one side of the piston and exhaust it from the other when the piston moves beyond its usual travel in one direction, said 55 means being located in position in the cylinder to be engaged by the piston only when it moves beyond its usual travel.

2. In a power operated hammer, the combination with a cylinder, piston, and valve 60 for controlling the operation of the cylinder, of means connected with said valve for moving it to admit pressure on one side of the piston and exhaust it from the other 65 when the piston moves beyond its usual

travel in one direction, and means for automatically holding the valve in that position, whereby the piston will be driven back to the other end of the cylinder and remain there until said valve operating means is returned to normal position. 70.

3. In a power operated hammer, the combination with the piston, cylinder, and valve for controlling the admission and exhaust of power, with a plunger extending into the 75 cylinder through the end thereof, means yieldingly connected with said plunger for operating said valve to admit power to one side of the cylinder when the plunger is operated and exhaust the other, and means 80 whereby when said plunger has been operated it and the valve will be retained in the position in which they are left by the operation of the piston.

4. In a device of the character described, 85 the combination with a cylinder and piston, of a valve for controlling the operation of the piston in the cylinder, a plunger extending into the cylinder in position to be forced outwardly by the piston if the piston moves 90 beyond its normal path of travel, a lever on which said plunger is adjustably mounted, yielding means for connecting said lever with the valve, whereby when said plunger is forced out by the piston the valve will be 95 moved to its limit in one direction, and a toothed rack located adjacent to said lever and in position to engage the lever and hold it in any position to which it is pushed by the piston, whereby the valve will also be 100 held in its limited position.

5. In a device of the character described, the combination with a cylinder and piston, of a valve for controlling the operation of 105 the piston in the cylinder, an adjustable plunger extending into the cylinder to a point beyond the limit of the normal path of travel of the piston in position to be forced longitudinally of the cylinder by the piston only if the piston moves beyond its 110 normal path of travel, a lever which said plunger engages, and means for connecting said lever with the valve, whereby when said plunger is forced out by the piston the valve will be moved in one direction. 115

6. In a device of the character described, the combination with a cylinder and piston, of a valve for controlling the operation of the piston in the cylinder, a plunger extending into the cylinder in position to be engaged and operated by the piston if the piston moves beyond its normal path of travel, and a connection between the plunger and valve for operating the valve, said connection comprising two hooks, one extending in each direction, said hooks projecting beyond each other, and a spring mounted between the hooks so as to be compressed by the operation of the plunger. 125

7. In a steam engine cylinder having 130

steam-channels connecting its opposite ends,
and a controlling valve for the steam-channels;
the combination of a tappet extending into the cylinder,
a lever supported by the
5 cylinder adapted to engage the tappet,
means connecting the lever and valve, and
other means for holding the lever in a set
position.

In testimony whereof we have hereunto
set our hands, in the presence of two sub- 10
scribing witnesses.

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