July 9, 1929. W. H. J. FITZGERALD 1,720,592

DROP HAMMER

Filed April 15, 1925

Fig. 1.

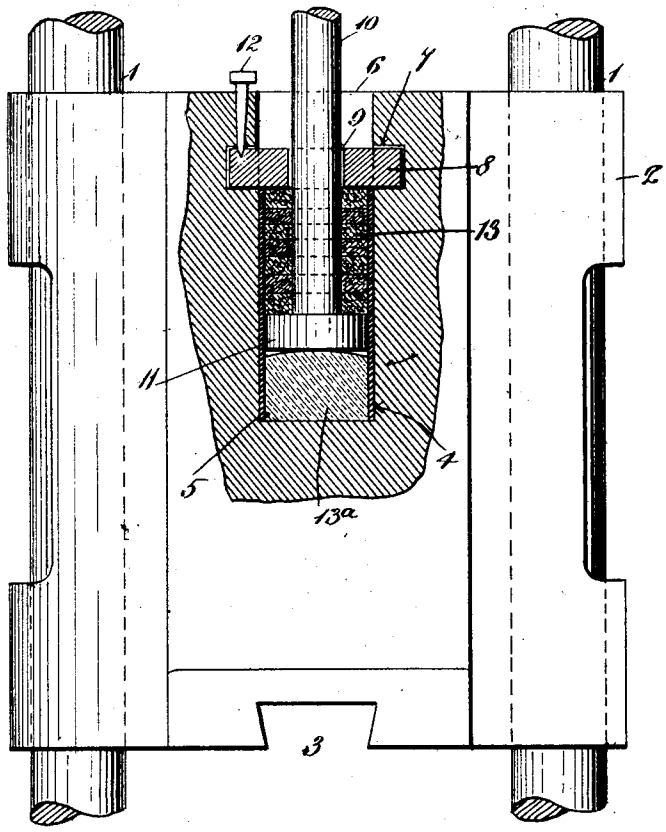


Fig. 2.

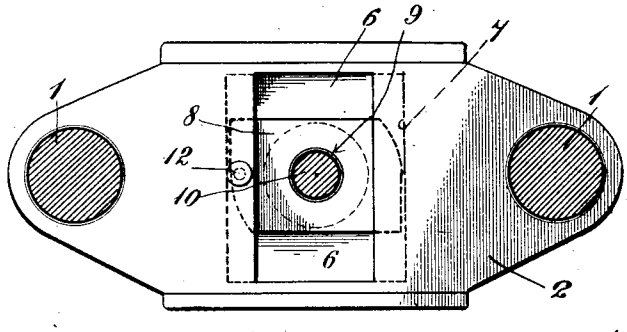
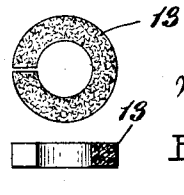


Fig. 3.



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DROP HAMMER.

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The invention relates to drop hammers or those having a gravity drop. Usually such hammers are more or less positively and rigidly attached to the lower end of a rod by means of which upon suitable application of power the hammer is lifted. When the hammer falls and strikes the work it is suddenly stopped and this sudden stoppage jars the structure and it has been proved by long experience that the metal of the rod or parts which may form connection between the rod and the hammer are apt to crystallize in time and the rod break away from the hammer oftentimes causing injury due to the premature dropping of the hammer, to say nothing of loss of time and expense of repair.

Even in cases where the rod does not break away from the hammer oftentimes the connection between the rod and the hammer becomes disarranged or broken so as to produce excessive play or lost motion between the rod and the hammer and this also is a source of trouble and should be prevented.

The object of my invention is to overcome the difficulties above referred to.

The invention can best be understood by reference to the drawings in which it is shown in its preferred form.

Fig. 1 is a front elevation of the hammer and the rod, a portion of the hammer being broken away to show the connection between the hammer and the rod.

Fig. 2 is a plan of the structure shown in Fig. 1, and

Fig. 3 is a plan and cross section of a packing washer below described.

Referring to the drawings 1—1 are the guides on which the hammer 2 runs. The hammer as a whole is of ordinary construction carrying at the bottom means 3 for attaching the jack or die-carrier (not shown) to it.

The hammer is provided with a cavity 4 opening into it from the top. This cavity is preferably, though not necessarily, lined with a tubular lining 5 which extends from the bottom of the cavity to a point somewhat near its top. The upper portion of the cavity is enlarged to form an opening 6 which is somewhat longer in horizontal section than it is wide and just above the tubular lining 4 there is a grooved portion 7 extending into the body of the hammer, this construction being such that a heavy breech block 8 which is longer than it is wide being shaped approximately like the mouth of the opening 6, may be slipped down into this enlarged portion 6 of the cavity and turned so that its ends will lie in the grooves 7 and it thus will be retained in place. A taper pin 12 which is driven down through a suitable opening in the hammer and into a spot in the breech block will keep it from retracting. Extending through a central opening 9 in the breech block when positioned as aforesaid is a lifting rod 10 for the hammer. This rod is provided with an enlargement or head 11 at its lower end which lies within the cavity of the hammer below the breech block and is movable within the cavity.

Arranged upon this rod and between its head 11 and the breech block are washers 13. These washers are preferably made as shown in Fig. 3, that is, split through so that they may be easily slipped onto the rod 10. The washers are preferably made of leather.

Arranged in the cavity of the hammer between the head of the lifting rod and the bottom of said cavity is a rubber cushion 13^a. The normal arrangement of the parts is such, as shown in Fig. 1, that the head of the lifting rod has snug bearing against the elastic cushion 13^a when the washers 13 are snugly filling the space between the head of the lifting rod and the breech block, a plurality of washers being employed in such connection. It will also be observed, in the normal arrangement of the parts as shown in Fig. 1, that the rubber cushion 13^a does not entirely fill the space between the head of the lifting rod and the bottom of the cavity, being less in volume than said space.

In the operation of the hammer, when the hammer falls and engages the work with accompanying rebound, the lifting rod is quickly brought to a stop and reverse movement thereof effected by the elastic cushion 13^a. In other words, this elastic or rubber cushion presents an elastic mass which will quickly break the fall of the lifting rod and effect a reverse movement thereof, and at the same time will impart such yielding resistance as will eliminate shock upon the lifting rod. This is due to the fact that while a mass of rubber is employed as a cushion, yet this mass does not entirely fill the cavity left between the head of the lifting rod and the bottom of the cavity. Consequently while the elastic

mass is capable of yielding and its elasticity availed of until it substantially fills the cavity within which it is contained, it then becomes capable of very little, if any, further compression, and accordingly acts to positively stop the movement of the lifting rod and then effects a reverse movement thereof as the elastic cushion resumes its normal shape so that the movement of the lifting rod will substantially synchronize with the movement of the hammer. The washers assist in this operation to a certain extent on account of the fact that they assist in initially positioning the head of the lifting rod with relation to the cushion so that very little, if any, lost motion is obtained. The hammer and lifting rod having thus been reversed in their movement the hammer is lifted by force applied to the rod raising it when the same operation substantially takes place after the lifting of the hammer by the lifting rod. The lifting rod is stopped and the momentum of the hammer thereby carries it on when the head of the lifting rod engaging the cushion stops further movement of the hammer and reverses its movement, the operation being substantially the same as that just described.

I have referred to the spacers as being made of leather. Other materials, however, will answer this purpose, the main necessity being to prevent any harsh metal to metal contact between the rod and the hammer at the beginning of its lifting or at the end of its falling stroke. It will be seen therefore that any other yieldable or compressible material may be used for the washers or spacers.

While rubber is preferably used to form the cushion beneath the head of the lifting rod, yet other materials having rubberlike characteristics are known and in some cases might be substituted. Accordingly the term "rubber" is used in a descriptive rather than in a limiting sense.

What I claim as my invention is:—

In a device of the kind described, a hammer having a cavity therein sunk from its top end with lateral recesses extending from said cavity intermediate its depth, a lifting rod for the hammer extending into said cavity, said rod having a head at its lower end lying within the cavity and movable therein, a removable breech block arranged upon the lifting rod above the head thereof and socketed in said lateral recesses of the hammer, washers of some non-metallic compressible material interposed between the breech block and the head of the lifting rod, and a rubber cushion interposed between the head of the lifting rod and the bottom of the cavity against which the head of the lifting rod has snug bearing when said washers are snugly filling the space between the head of the lifting rod and the breech block, said cushion then occupying a space less in volume than the volume of the space then left between the head of the lifting rod and the bottom of said cavity.

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