(No Model.)

J. M. ANDERSEN.

POWER HAMMER.

No. 522,701. Patented July 10, 1894.

Fig. 1.

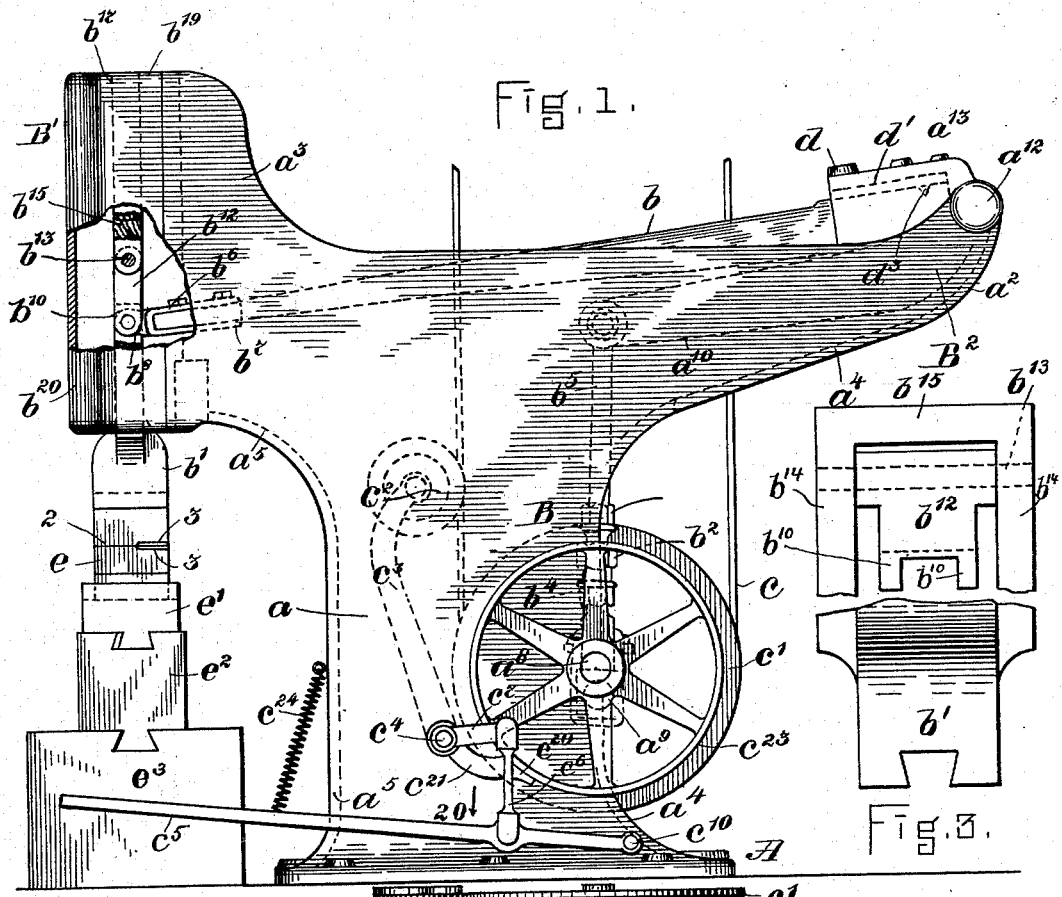

Fig. 3.

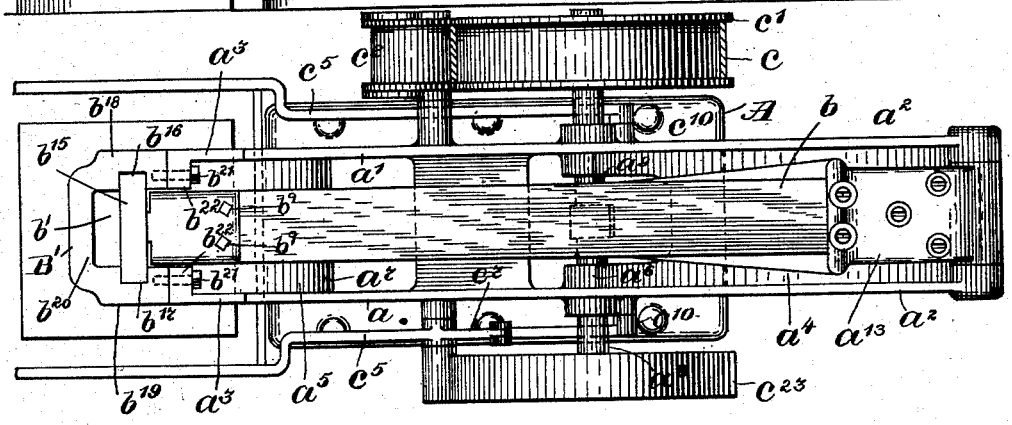

Fig. 2

WITNESSES.

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JOHAN M. ANDERSEN, OF BOSTON, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO ALBERT ANDERSON, OF SAME PLACE.

POWER-HAMMER.

SPECIFICATION forming part of Letters Patent No. 522,701, dated July 10, 1894.

Application filed March 10, 1892. Serial No. 424,363. (No model.)

To all whom it may concern:

Be it known that I, JOHAN M. ANDERSEN, a subject of the King of Sweden and Norway, residing in Boston, county of Suffolk, and State of Massachusetts, have invented an Improvement in Power-Hammers, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to power hammers and has for its object to provide a novel and efficient hammer of simple construction, as will be described.

One feature of my present invention consists in constructing the hammer as will be described, whereby the hammer arm may be made of sufficient length to enable it to be rigidly fastened to its carrier, and yet obtain the desired spring action to give an elastic blow without the use of auxiliary means, such for instance, as springs, rubber buffers, leather straps, &c.

Another feature of my invention consists in providing the hammer with a novel construction of guides for the hammer ram, whereby substantially long guides for the hammer ram may be obtained in a substantially compact machine, and whereby the spring arm may have a free and unobstructed range of movement, thereby enabling the said spring arm to be joined by a substantially short connection to the hammer ram below the top of the said guides.

The particular features of my invention will be pointed out in the claims at the end of this specification.

Figure 1 is a side elevation of a power hammer embodying my invention; Fig. 2, a top or plan view of the hammer shown in Fig. 1, and Fig. 3, a detail of the hammer ram to be referred to.

Referring to the drawings, the main or supporting frame of the hammer, which is preferably made as a single casting, is herein shown as composed of upright side portions a a' bolted or otherwise suitably secured to a base plate A, and having extended front and rear portions or arms a^2 a^3 respectively joined on their under sides to the side portions a a', by connecting webs a^4 a^5, the said side portions being also joined together near their lower portions by the said connecting webs.

The sides a a' of the frame form bearings for a main or crank shaft a^8, provided with a crank a^9, joined by a connecting rod B to the long arm a^{10} of a curved lever B^2, pivoted as at a^{12} between the extended arms a^2 and having its short arm a^{13} preferably extended in the same direction as the arm a^{10} above the same, the said short arm being preferably made hollów to receive the enlarged end of a spring or hammer arm b to which the hammer ram b' is connected, as will be described, the said lever forming a carrier for the said spring arm.

The connecting rod B is preferably made adjustable or extensible by means of adjusting nuts b^2 b^3, into which the parts b^4 b^5 of the connecting rods are extended.

The spring arm b is preferably made of wood, but it may be made of any desired material, such for instance, as steel, the said spring arm being made tapering from its rear portion toward its front, as clearly shown in Fig. 1.

The spring arm b has secured to its front end a metal tip, preferably consisting of an upper plate b^6 and lower plate b^7, and a projecting nose or lug b^8, the front end of the spring arm being inserted between the plates b^6 b^7 and secured thereto in any suitable manner, as by bolts b^9. The nose or lug b^8 of the metal tip is preferably extended between ears b^{10} on the lower end of a substantially short upright link or bar b^{12}, pivotally connected by pin b^{13} to upright arms b^{14}, secured to or forming part of the hammer ram b', the said arms, as shown, being joined by a cross-bar b^{15} integral with them. The upright arms b^{14} of the ram b' are vertically movable in guiding grooves or slots b^{16} b^{17} in the sides of a guide-block or casting B', the said sides being joined together at their front or outer ends by a connecting web b^{20} preferably cast integral with them.

The guide-block or casting B' may and preferably will be secured to the extended arms of the main frame, as herein shown, by

threaded bolts b^{21} extended through lugs or ears b^{22}, on the inner side of the arms a^3, as clearly shown in Fig. 2.

The crank shaft a^8 may be rotated, as herein shown, to produce reciprocations of the ram b', by means of a belt c passed about a pulley c' fast on the crank shaft. The belt c normally stands away from or out of contact with the belt pulley c', and at such time, the crank shaft is at rest. The belt c may be brought into contact with the pulley c' to produce rotation of the crank shaft, by means of a weight c^2 on an arm c^3 of a rock-shaft c^4 extended through the sides of the frame of the machine, and herein shown as connected to a treadle c^5 by a link c^6 joined to the said treadle, which is made as a yoke to embrace both sides of the machine, and has its arms pivoted as at c^{10} to both sides of the main casting or frame. The crank-shaft may be positively held at rest preferably by a brake-shoe c^{20}, secured to or forming part of an arm c^{21} fast on the rock-shaft c^4, the said brake-shoe being brought into engagement with a brake-wheel or disk c^{23} fast on the crank-shaft, when the treadle is elevated into its normal position, which is accomplished, as herein shown, by a spring c^{24} attached to the said treadle and to the main frame or casting.

The tapering spring arm b is rigidly secured in the hollow arm a^{13}, as herein shown, by set screws d, which preferably engage a metal plate d' inserted into the said hollow arm above the spring arm b, the said metal plate preferably having on its under side a projection d^3, fitting into a groove or recess in the upper face of the spring arm b, by which the latter is more securely fastened to the arm a^{13}.

By connecting the crank-shaft to the long arm a^{10} of the lever, rather than to the spring arm b, I am enabled to make the said spring arm substantially long, and thereby obtain sufficient elasticity to permit the said arm to be rigidly fastened to the said lever and obtain the desired or required elastic blow, without the use of auxiliary means, such as elastic cushions, rubber buffers, springs or leather straps. So also by connecting the side pieces of the guide-block at the front, as described, the said guides may be made of the required rigidity or strength, and the spring arm may be joined to the hammer-ram below the top of the guides and between the same, by a substantially short and durable connection or link, and have a free or unobstructed range or path of movement between the sides of the casting, thereby enabling the guiding grooves or slots to extend substantially the length of the guide-block, and thus obtain an increased movement of the hammer ram away from its co-operating anvil e.

The anvil e is preferably dove-tailed into a block e' which is itself dove-tailed into a second block e^2, the latter being dove-tailed into a foundation e^3, whereby the anvil may be adjusted in two directions with relation to the ram, and the height of the anvil may be regulated by moving either or both of the said blocks to permit work of different sizes to be acted upon.

When it is desired to operate the hammer, the operator depresses the foot treadle, thereby moving the link c^6 downward in the direction of arrow 20, Fig. 1, and rocking the shaft c^4, so as to remove the brake-shoe c^{20} from the brake-wheel c^{23}, and bringing the weight c^2 against the belt c, thus causing the latter to engage the belt pulley c' and rotate the shaft a^8. The rotation of the shaft a^8 produces reciprocation of the connecting rod B and rocks the bent lever B^2 on its pivot, thereby producing a reciprocation of the ram b'. The pressure of the weight c^2 upon the belt c' may be controlled by regulating the pressure upon the foot treadle, and in this way, the force of the blow struck by the ram b' may be regulated as desired.

The webs a^4 a^5, substantially on a line with the anvil, are and may be provided with suitable openings, not shown, through which substantially long pieces of work may be inserted when desired.

By the construction herein shown and described, I am enabled to produce a strong, simple and effective power hammer of substantially large capacity.

I have herein shown the crank shaft as operated from the loose belt, but I do not desire to limit myself in this respect, as the said shaft may be driven in any suitable or well-known manner, as for instance, by an electric motor.

I claim—

1. In a power hammer, the combination of the following instrumentalities, viz:—a supporting frame provided with upright sides, a main or crank shaft having bearings in said frame, a ram, a spring hammer arm connected at one end to the said ram and fulcrumed at its opposite end, and a guide block for said ram consisting of side pieces connected together at their front sides and open at their rear sides to permit of movement of the spring hammer arm between them, the said sides being secured to or forming part of the supporting frame, substantially as described.

2. In a power hammer, the combination of the following instrumentalities, viz.—a main frame or casting consisting of uprights having extended arms a^2 a^3, a guide-block attached to the arms a^3 and consisting of side pieces b^{18} b^{19} and a connecting web b^{20}, a main or crank-shaft having bearings in the main frame or casting, a bent lever B^2 pivoted in the extended arms a^2 and having its arms a^{10} a^{13} extended in substantially the same direction, a connecting rod joining one of the lever arms to the crank-shaft, a spring arm secured to the other arm of the lever, and a ram reciprocating in the guide-block and connected to the spring arm, substantially as described.

3. In a power-hammer, the combination of

the following instrumentalities, viz.—a main frame or casting consisting of uprights, having extended arms a^2 a^3, a guide-block B′ attached to the arms and consisting of side pieces and a connecting web, a main or crank shaft having bearings in the main frame or casting, a bent lever B^2 pivoted in the extended arms a^2, and having its arms a^{10} a^{13} extended in substantially the same direction, a connecting rod joining the lever arm a^{10} to the crank-shaft, a spring arm b secured to the arm a^{13} of the lever, a ram reciprocating in the said guide-block and connected to the spring arm, a pulley on the main shaft, a belt loosely passed about said pulley, a rock-shaft, an arm on said rock-shaft adapted to be brought against the loose belt to engage it with the belt pulley, and a brake mechanism operated by said rock-shaft, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHAN M. ANDERSEN.

Witnesses:
JAS. H. CHURCHILL,
SADIE C. FEARING.