Aug. 23, 1927.

1,639,692

E. GAUTHIER

BEARING

Filed Sept. 27, 1922

Fig. 1.

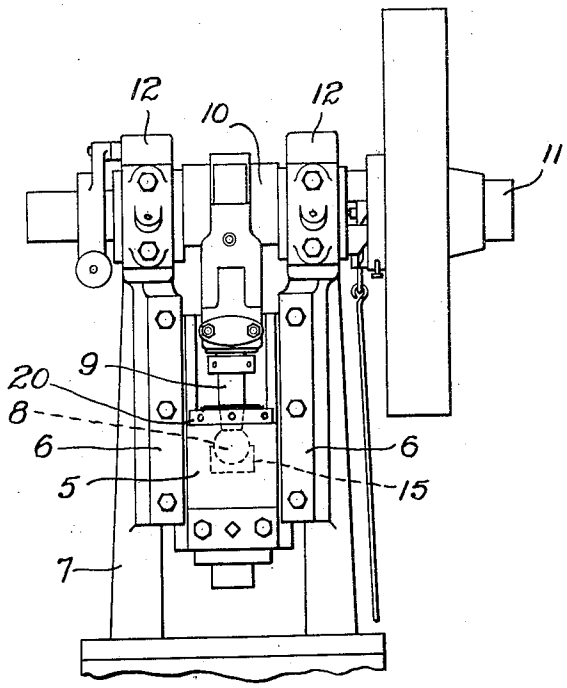


Fig. 2.

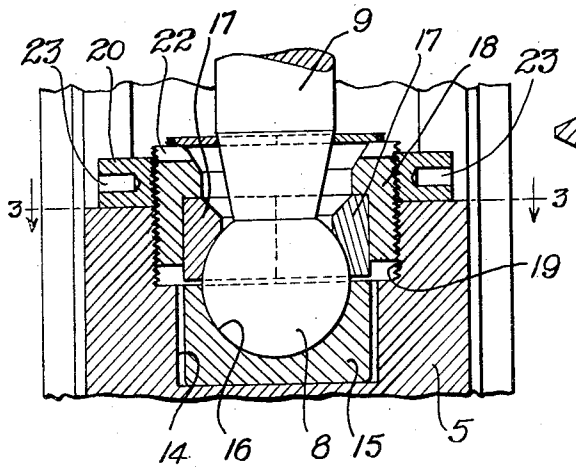
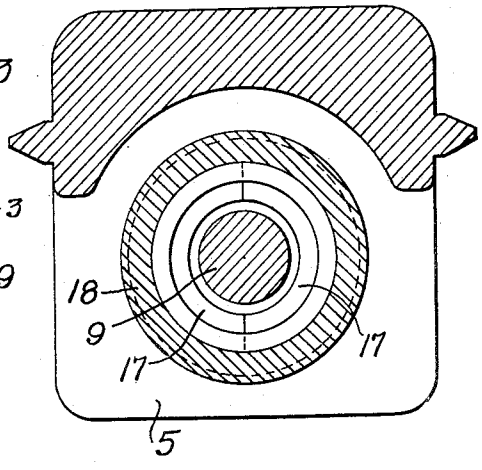


Fig. 3.



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Patented Aug. 23, 1927. 1,639,692

UNITED STATES PATENT OFFICE.

ERNEST GAUTHIER, OF CHICAGO, ILLINOIS, ASSIGNOR TO WESTERN ELECTRIC COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW YORK.

BEARING.

Application filed September 27, 1922. Serial No. 590,758.

This invention relates to improvements in bearings, and more particularly to bearings for the connection between the pitman and slide of a punch press or similar reciprocating mechanism.

An object of the invention is to produce a bearing of this type so designed that it renders the length of stroke of the slide accurate over a long period of time, whereby the wear on the punches and dies used with the press is reduced to a minimum.

Another object of the invention is to provide such a bearing which will automatically aline the pitman and slide and thus compensate for various manufacturing inaccuracies in the reciprocating parts which might tend to position the pitman and slide out of alinement.

A further object of the invention is to provide such a bearing which is easy to install, inexpensive, and has long life.

Other objects and advantages of the present invention will more fully appear from the following description and will be more particularly pointed out in the appended claims.

In the accompanying drawings:

Fig. 1 is a front elevation of a punch press equipped with the improved form of bearing;

Fig. 2 is an enlarged vertical sectional view showing the improved bearing in detail, and

Fig. 3 is a horizontal sectional view taken on the line 3—3 of Fig. 2.

The drawings illustrate the improved bearing as applied to the connection between the slide of a punch press and a pitman having a ball end but it is to be understood that this bearing may be shaped to receive a pitman having an end shaped other than spherical, and the bearing may be used for other forms of reciprocating mechanisms without departing from the spirit and scope of the invention.

Referring now to the drawings in detail, 5 represents the slide or reciprocating head of a punch press. The slide 5 is reciprocably mounted in parallel gibs or guideways 6 carried by a framework 7. Connected with the slide 5 by the improved form of bearing, hereinafter to be described, is the ball end 8 of a pitman 9, the upper end of which is connected to an eccentric wrist 10 of a main shaft 11 between bearings 12 which are supported at the upper end of the frame 7.

It has heretofore been the practice to provide the end of the slide 5 adjacent the ball end of the pitman with a semi-spherical depression to receive the said ball. The ball was held in the depression by a suitable retaining means. For the sake of cheapness it has always been the universal practice in punch press designs to construct the slide out of cast iron and to cast therein the depression to receive the ball end of the pitman. During the operation of the press the ball end of the pitman is forced against the depression in the slide with great pressure, and due both to the softness of the metal constituting the slide and to its porosity, inevitable in casting, the depression was soon worn deep enough to permit lost motion between the pitman and slide, allowing the slide to have a greater length of reciprocation, than it was designed to have. As a consequence of this increased length of reciprocation of the slide, a similar increase in the downward movement of the punches within their co-operating dies resulted, which burred and abraded them to such an extent that they either performed inferior work or were rendered unfit for use.

The present improved bearing overcomes these difficulties. This bearing comprises a recess 14 cast in the end of the slide adjacent to the pitman, this recess being preferably circular but may be given any other suitable shape provided that its bottom is approximately flat. Mounted within the recess 14 is a block 15 having the same shape as the recess, but slightly smaller as shown in Fig. 2, so to provide a slight clearance between the walls of the block and the recess, the purpose of which will be hereinafter described. The block 15 is provided with a semi-spherical depression 16 to receive the ball 8 of the pitman. The block 15 is made of hardened tool steel and the depression 16 is carefully ground to accurately fit the ball 8 of the pitman. By making the block out of hardened steel with an accurately ground surface to receive the ball of the pitman it will withstand wearing action of the said ball and will resist to a great extent any tendency of the ball to deepen the depression. As a consequence the length of reciprocations

of the slide will be accurate over a long period of time resulting in long life of the punches and dies used with the press.

The ball 8 of the pitman 9 and block 15 are held in place by means of a split ring 17 having a curved surface to fit the ball 8, the ring being clamped against the ball by a take-up nut 18 threaded within an annular recess 19 formed in the slide 5.

Both the slide 5 and take-up nut 18 are of cast iron and a relatively loose fit is provided between their meshing screw-threads to prevent them from binding, due to their rough cast surfaces.

In order to prevent the take-up nut from becoming loose a jam-nut 20 is provided. The nut 20 is threaded on the take-up nut 18 and binds against the adjacent surface of the slide 5, serving to hold the take-up nut in its adjusted position. The take-up nut 18 and jam-nut 20 are provided with apertures 22 and 23 respectively, to receive a suitable spanner wrench.

Due to inaccuracies in manufacture, the fit of the nuts 18 and 20, and the ring 17 may not be absolutely accurate nor the depression 16 in exact alinement with the pitman 9. In prior constructions where the end of the slide 5 adjacent the ball end of the pitman was provided with a semi-spherical depression to receive the said ball it was found that in securing the retaining means in position to hold the ball end in the depression, due to inaccuracies in manufacture of the retaining means, the ring 17 was pressed laterally to one side or the other, tending to move the ball end of the pitman out of axial alinement with the depression formed in the slide to receive it. As a consequence during the operation of the press the ball end would incorrectly fit the depression in the slide and would tend to reseat itself. The reseating of the ball end of the pitman was facilitated due to the fact that the metal constituting the curved bearing surfaces in the slide was more or less porous and so soft that it did not adequately resist the thrusts of the pitman. Within a relatively short time the fit between the ball of the pitman and the depression in the slide became so loose that lost motion occurred between the pitman and slide. In the improved form of bearing these inaccuracies are compensated for by providing a loose fit between the block 15 and depression 16 so that in assembling the bearing, the block 15 will automatically accurately aline itself with the pitman.

What is claimed is:

1. The combination with a pitman and the co-operating reciprocating slide of a punch press or similar reciprocating mechanism, of a self aligning bearing member carried by the slide so disposed as to have free movement only in planes at right angles to the movement of the reciprocating slide.

2. The combination with a pitman and the co-operating reciprocating slide of a punch press or similar reciprocating mechanism, said slide provided with a depression, of a self aligning bearing member so mounted therein as to have free movement only in planes at right angles to the movement of the reciprocating slide.

3. The combination with a pitman and the co-operating reciprocating slide of a punch press or similar reciprocating mechanism, said slide provided with a depression having a flat bottom, of a self aligning bearing member mounted in said depression and resting on the flat bottom thereof, said bearing member being smaller than said depression to afford a clearance between the side of the bearing member and the side of the depression.

4. The combination with a pitman and the co-operating reciprocating slide of a punch press or similar reciprocating mechanism, of a self aligning bearing member carried by the slide so as to have free movement only in planes at right angles to the movement of the reciprocating slide and clamping means for holding the end of the pitman against said bearing member.

5. The combination with a pitman and the co-operating reciprocating slide of a punch press or similar reciprocating mechanism, of a self aligning bearing member carried by the slide so as to have free movement only in planes at right angles to the movement of the reciprocating slide, said member shaped to receive the end of the pitman, and clamping means for holding the end of the pitman against said bearing member.

6. The combination with a pitman and the co-operating reciprocating slide of a punch press or similar reciprocating mechanism, of a bearing comprising a self-aligning block carried by said slide and having a substantially flat surface in engagement with said slide, said block being formed of metal harder than the metal comprising the adjacent portions of the slide, said block shaped to receive the end of the pitman, and clamping means for holding said pitman end against said block.

7. The combination with a pitman and the co-operating reciprocating slide of a punch press or similar reciprocating mechanism, said slide provided with a flat surface, of a self aligning bearing member mounted in contact with said flat surface and slidable thereon, said bearing member shaped to receive the end of the pitman, adjustable clamping means for holding the said pitman against said bearing member and means for locking said adjustable clamping means.

In witness whereof, I hereunto subscribe my name this 13 day of September, A. D., 1922.

ERNEST GAUTHIER.