June 5, 1934. H. SCHWOB 1,961,458

MECHANICAL POWER HAMMER LINK MOVING MEANS

Filed Dec. 16, 1933

Fig. 1.

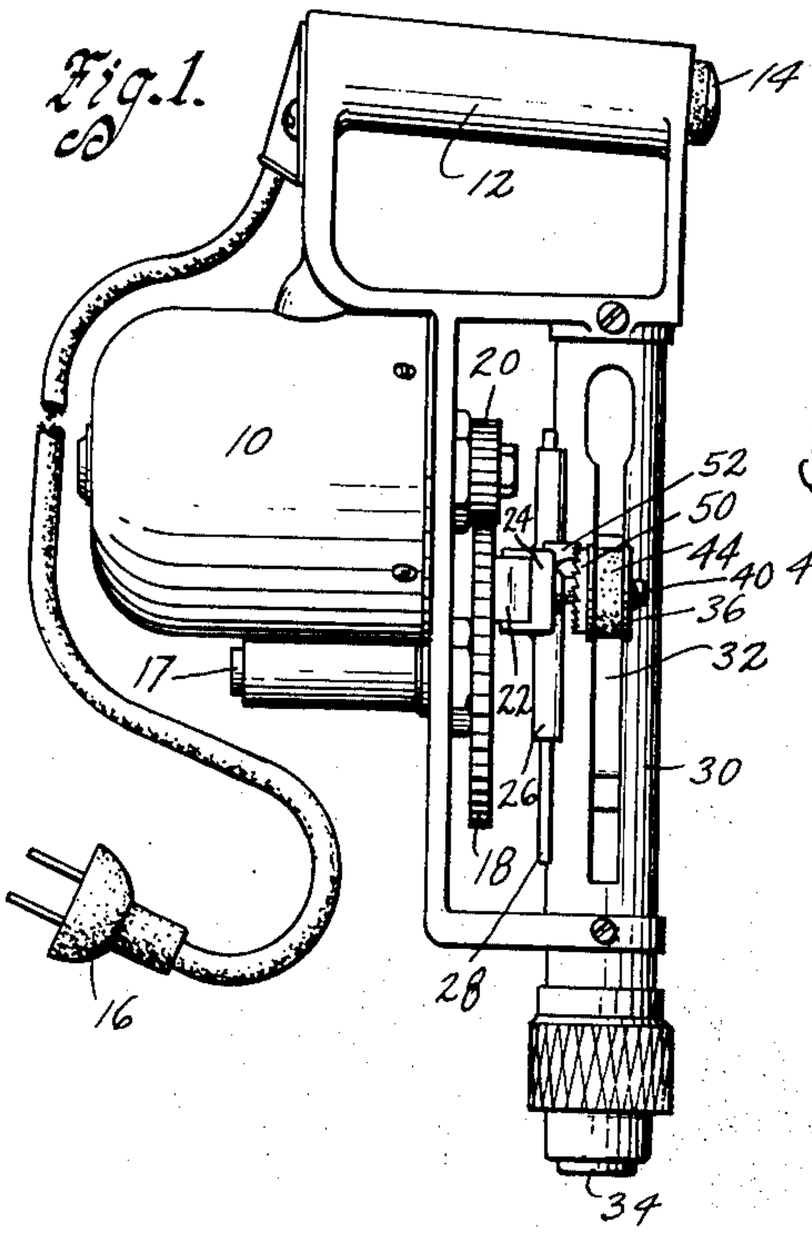


Fig. 2.

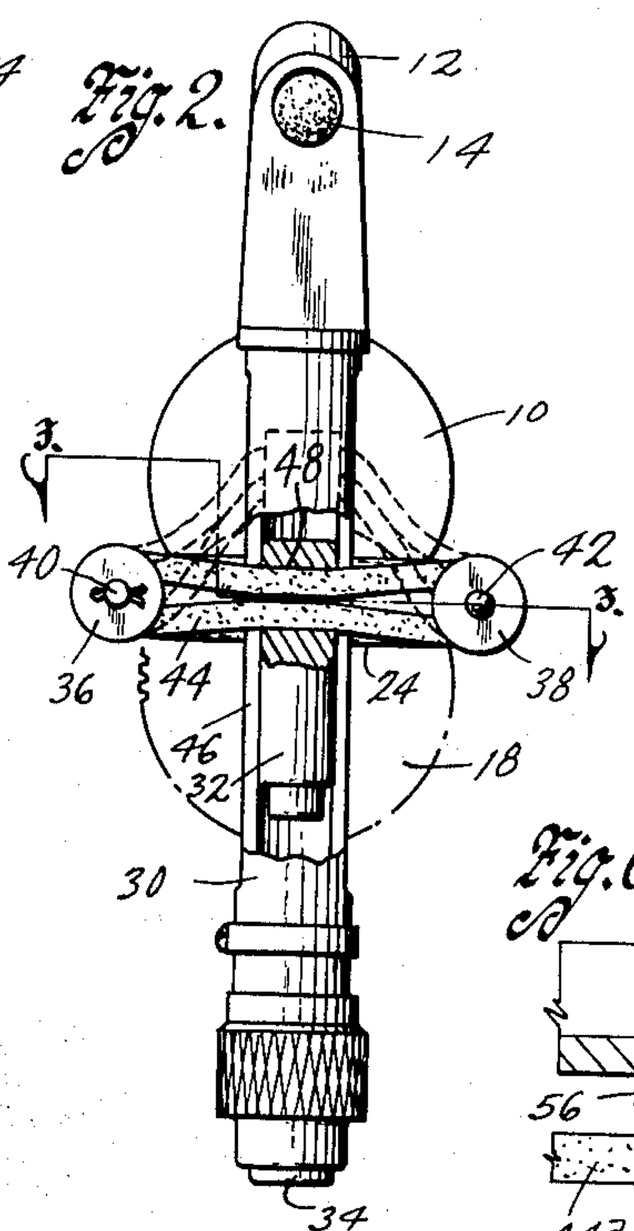


Fig. 6.

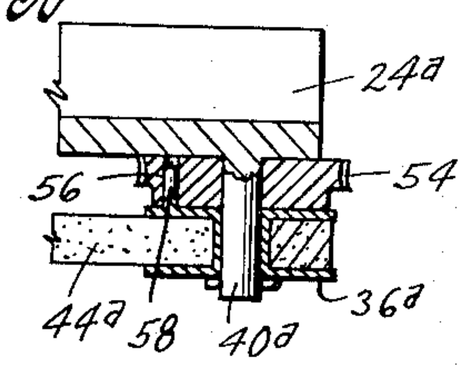


Fig. 3.

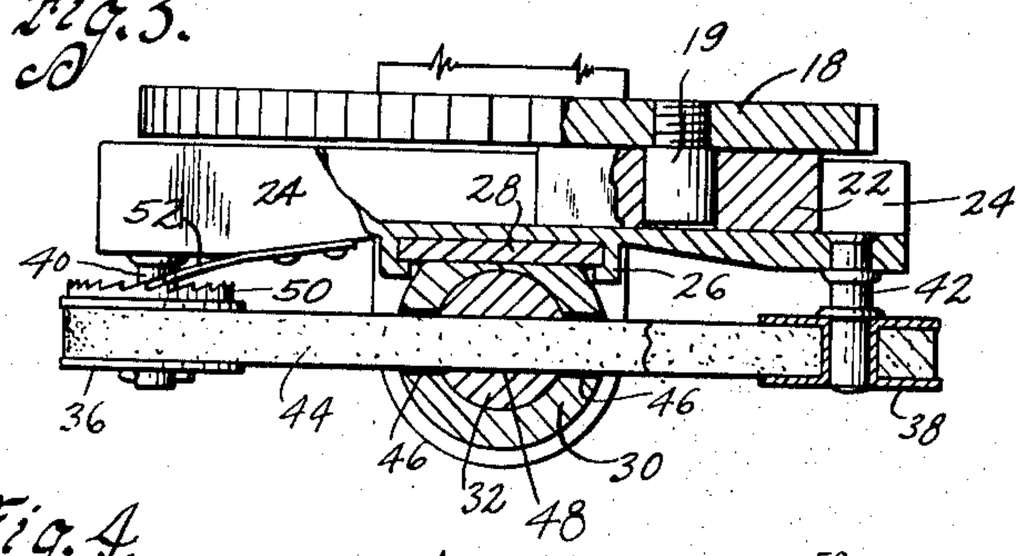


Fig. 4.

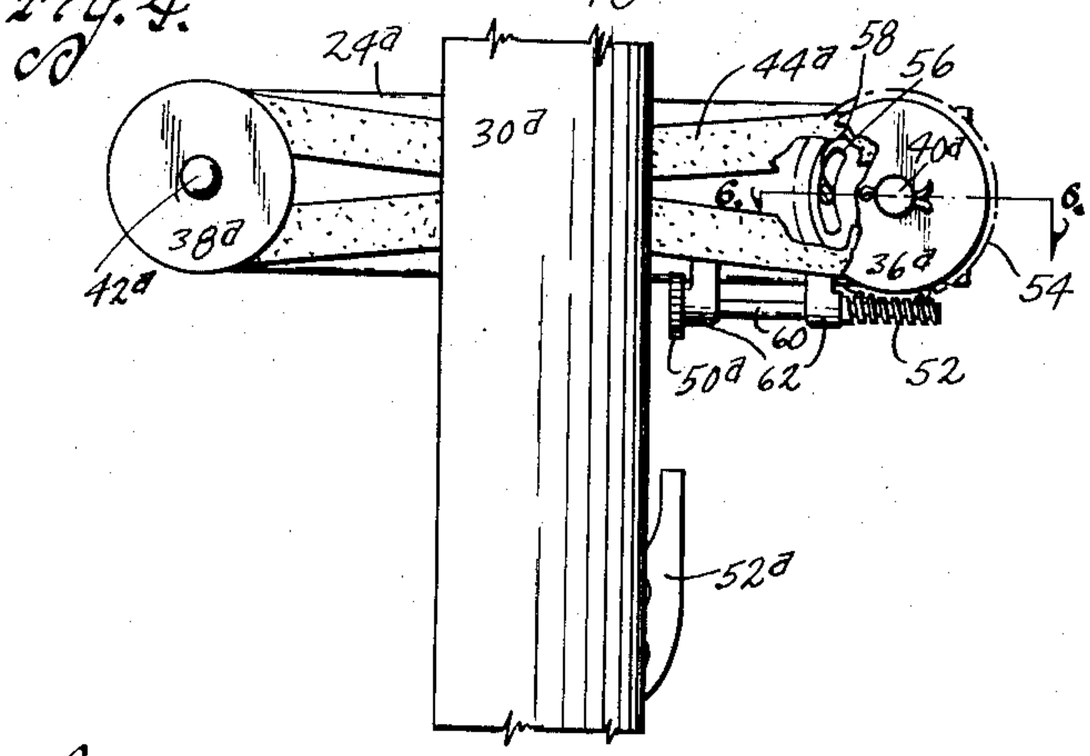
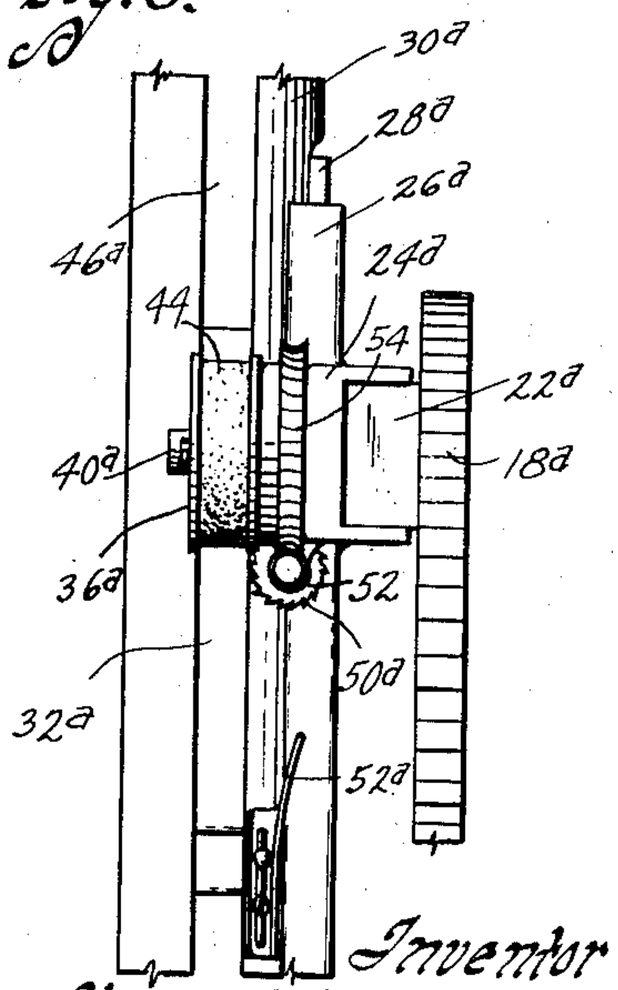


Fig. 5.



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UNITED STATES PATENT OFFICE

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MECHANICAL POWER HAMMER LINK MOVING MEANS

Henry Schwob, Wapello, Iowa

Application December 16, 1933, Serial No. 702,752

18 Claims. (Cl. 125—33)

An object of my present invention is to provide means for moving the connecting link of a power hammer such as shown in my Patent No. 1,951,-170, the means being comparatively simple, durable and inexpensive to associate with the hammer.

A further object is to provide in connection with a moving element and a moved element having an elastic loop-like link connection between them, a means for moving the link slightly each reciprocation of one of the elements so that the same portion of the link is not always in contact with a part of the mechanism and thus the wear is distributed throughout the length of the link and its life considerably increased.

A further object is to provide a simple ratchet and pawl mechanism including a worm gear reduction, if desired, for moving the link automatically each reciprocation of an impact element.

With these and other objects in view my invention consists in the construction, arrangement and combination of the various parts of my device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawing, in which:

Figure 1 is a side elevation of a mechanical power hammer including my link moving means.

Figure 2 is a front elevation partly in section of the same.

Figure 3 is an enlarged sectional view on the line 3—3 of Figure 2.

Figure 4 is an enlarged front elevation showing a modified form of the invention.

Figure 5 is a side elevation of Figure 4; and

Figure 6 is a detailed sectional view on the line 6—6 of Figure 4.

On the accompanying drawing, I have used the reference numeral 10 to indicate an electric motor. It is supported on a framework including a handle 12 in which is incorporated a push button 14 for controlling the supply of electric current from a connector 16 to the motor 10.

A gear 18 meshes with a pinion 20 on the shaft of the motor 10 and rotatably carries on a crank pin 19 thereof a rectangular block 22. The block 22 therefore has a circular path of rotation (whenever the motor operates), its axis being a shaft 17 for the gear 18.

The block 22 is reciprocable horizontally in a channel-shaped cross head 24. The cross head 24 is secured to a sliding plate 26 travelling on a guide bar 28. The guide bar 28 is secured to a hammer barrel 30. The barrel 30 is supported by the framework which includes the handle 12.

From the foregoing description, it will be obvious that energization of the motor 10 causes vertical reciprocations of the cross head 24, all of which is more clearly set forth in my patent previously mentioned.

Slidable in the barrel 30 is an impact element 32. It is adapted to strike an anvil 34 held in the lower end of the barrel, or any tool such as a chisel or the like as ordinarily used in pneumatic hammers.

For imparting reciprocations to the impact element 32, spools 36 and 38 are rotatably carried on studs 40 and 42 extending from the cross head 24. An elastic loop-like link 44 extends around the spools loosely through slots 46 in the sides of the barrel 30 and through an eye 48 in the impact element 32. It will now be obvious that reciprocations of the cross head 24 will also reciprocate the impact element 32 in the barrel 30.

The foregoing description is merely introductory to my present invention which comprises a means for moving the link 44. I have found by considerable experimentation that during the operation of the hammer, the spools 36 oscillate due to the fact that the impact element 32 overruns the stroke of the cross head 24, such for instance as indicated by dotted lines in Figure 2.

These overruns cause the link 44 to bend at the edges of the eye 48, causing wear at this point since the tension of the link varies during each stroke because of the increased length when the link is in the position shown by dotted lines in Figure 2 as compared to its normal length as shown by full lines. This constant bending and changing of the tension chafes the link at the edges of the eye 48, causing it to soon break at this point.

To eliminate such breakage, I have found that if the link is shifted slightly at intervals, this wear becomes distributed throughout the length of the link and its life is increased many fold.

In Figure 3, I show one type of moving means which consists of a ratchet wheel 50 on the spool 36 and a coacting pawl 52 carried by the cross head 24. When the spool rotates to the position corresponding to the dotted lines of Figure 2, for instance, the pawl will snap back of the next tooth on the ratchet wheel so that when the link straightens up again, as shown by solid lines, the spool will not return to its solid line position and will therefore have a tendency to shift the link in a counterclockwise direction. This will present a new portion of the link to the edge of the eye 48 and during the rapid reciprocations of the impact element, the link will be gradually shifted

so that the wear is equally distributed throughout its length.

The speed of shifting being about one tooth per reciprocation of the impact element is in some instances faster than desired. This can be remedied by the construction shown in Figures 4, 5 and 6 wherein similar parts bear similar reference numerals with the addition of the distinguishing characteristic *a*.

In these figures, a worm wheel 54 and a worm 52 are interposed between the ratchet wheel 50*a* and the spool 36*a*. Oscillation of the spool is permitted by reason of a lost motion connection between the worm gear and the spool comprising for instance a radial slot 56 in the worm gear and a pin 58 in the spool. The worm 52 is mounted on a shaft 60 which is suitably supported by bearings 62 extending from the cross head 24*a*. The pawl 52*a* is carried on the barrel 30*a* and may be adjusted so as to rotate the ratchet wheel 50*a* either one or more teeth per reciprocation of the impact element, as desired.

Some changes may be made in the construction and arrangement of the parts of my device without departing from the real spirit and purpose of my invention, and it is my intention to cover by my claims, any modified forms of structure or use of mechanical equivalents, which may be reasonably included within their scope.

I claim as my invention:

1. The combination with a hammer construction including a pair of movable elements, one having spools mounted thereon and an elastic loop-like link extending around said spools and through the other movable element, of means for moving said link comprising a ratchet wheel on one of said spools and a pawl carried by the first mentioned movable element and coacting therewith.

2. The combination with a hammer construction including a pair of movable elements, one having spools mounted thereon and an elastic loop-like link extending around said spools and through the other movable element, of means for moving said link comprising a ratchet wheel and a coacting pawl connection between one of said spools and said first mentioned movable element.

3. The combination with a hammer construction including a pair of movable elements, one having spools mounted thereon and an elastic loop-like link extending around said spools and through the other movable element, of means for moving said link comprising ratchet wheel and coacting pawl means for causing rotation of one of said spools in one direction only relative to the first mentioned movable element.

4. The combination with a hammer construction including a pair of movable elements, one having spools mounted thereon and an elastic loop-like link extending around said spools and through the other movable element, one of said elements being movable relative to the other to a position causing said link to bend and thereby said spools to rotate relative to said first mentioned movable element, of means for moving said link comprising a ratchet wheel on one of said spools and a pawl carried by the first mentioned movable element and coacting therewith.

5. The combination with a hammer construction including a pair of movable elements, one having spools mounted thereon and an elastic loop-like link extending around said spools and through the other movable element, one of said elements being movable relative to the other to a position causing said link to bend and thereby said spools to rotate relative to said first mentioned movable element, of means for moving said link comprising a ratchet wheel and a coacting pawl connection between one of said spools and said first mentioned movable element.

6. The combination with a hammer construction including a pair of movable elements, one having spools mounted thereon and an elastic looplike link extending around said spools and through the other movable element, one of said elements being movable relative to the other to a position causing said link to bend and thereby said spools to rotate relative to said first mentioned movable element, of means for moving said link comprising ratchet wheel and coacting pawl means for causing rotation of one of said spools in one direction only relative to the first mentioned movable element.

7. The combination with a hammer construction including a pair of movable elements, one having spools mounted thereon and an elastic loop-like link extending around said spools and through the other movable element, of means for moving said link comprising a ratchet wheel carried by said first mentioned movable element, a coacting pawl carried by said second mentioned movable element and reducing gearing connecting said ratchet wheel with one of said spools.

8. The combination with a hammer construction including a pair of movable elements, one having spools mounted thereon and an elastic loop-like link extending around said spools and through the other movable element, of means for moving said link comprisng ratchet wheel, coacting pawl and reduction gearing means for causing rotation of one of said spools in one direction only relative to said first mentioned movable element.

9. The combination with a hammer construction including a pair of movable elements, one having spools mounted thereon and an elastic loop-like link extending around said spools and through the other movable element, of means for moving said link comprising a ratchet wheel, a coacting pawl and a reduction gearing connection between one of said spools and the first mentioned movable element.

10. The combination with a hammer construction including a pair of movable elements, one having spools mounted thereon and an elastic loop-like link extending around said spools and through the other movable element, of means for moving said link comprising a ratchet wheel and a coacting pawl connection between one of said spools and the first mentioned movable element and a worm gear reduction means interposed between said ratchet wheel and said spool.

11. The combination with a hammer construction including a pair of movable elements, one having spools mounted thereon and an elastic loop-like link extending around said spools and through the other movable element, of means for moving said link comprising ratchet wheel and coacting pawl means for causing rotation of one of said spools in one direction only relative to the first mentioned movable element and a worm gear reduction means interposed between said ratchet wheel and said spool.

12. The combination with a hammer construction including a pair of movable elements, one having spools mounted thereon and an elastic loop-like link extending around said spools and through the other movable element, of means for moving said link comprising a ratchet wheel

carried by said first mentioned movable element, a coacting pawl carried by said second mentioned movable element and reducing gearing connecting said ratchet wheel with one of said spools, said reducing gearing including a lost motion connection with the spool.

13. The combination with a hammer construction including a pair of movable elements, one having spools mounted thereon and an elastic loop-like link extending around said spools and through the other movable element, of means for moving said link comprising ratchet wheel, coacting pawl, reduction gearing and a lost motion connection means for causing rotation of one of said spools in one direction only relative to said first mentioned movable element.

14. The combination with a hammer construction including a pair of movable elements, one having spools mounted thereon and an elastic loop-like link extending around said spools and through the other movable element, of means for moving said link comprising a ratchet wheel, a coacting pawl and a reduction gearing and lost motion connection between one of said spools and the first mentioned movable element.

15. A mechanical power hammer construction including an elastic loop-like link connecting a driving element and an impact element together and means for moving said link relative to the parts with which it coacts.

16. A mechanical power hammer construction including an elastic loop-like link connecting a driving element and an impact element together and means for slightly moving said link each reciprocation of the impact element.

17. The combination with a moving element and a moved element having an elastic loop-like link connecting them together, of means for moving said link comprising coacting ratchet wheel and pawl mechanism.

18. The combination with a moving element and a moved element having an elastic loop-like link connecting them together, of means for moving said link comprising coacting ratchet wheel and pawl mechanism and a lost motion connection.

HENRY SCHWOB.