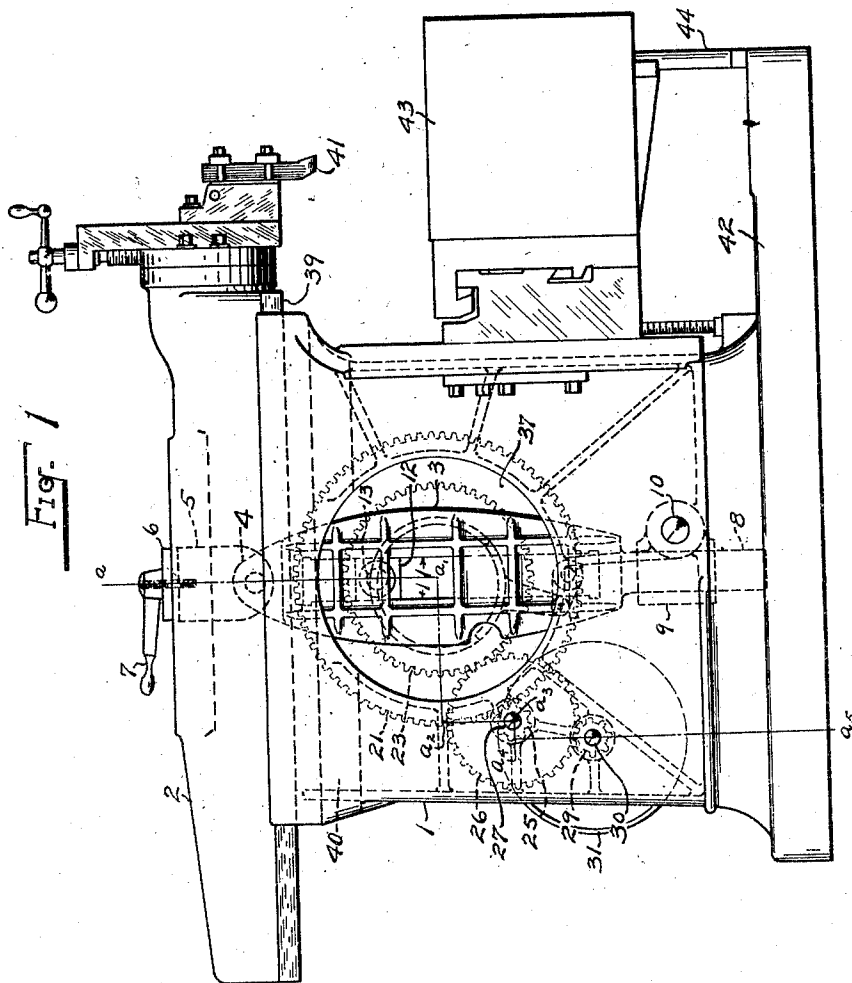


W. F. ZIMMERMANN.
SHAPING MACHINE.
APPLICATION FILED SEPT. 27, 1911.

1,038,259.

Patented Sept. 10, 1912.

2 SHEETS—SHEET 1.



WITNESSES

B. E. Barnes.

H. W. Jacobson

INVENTOR

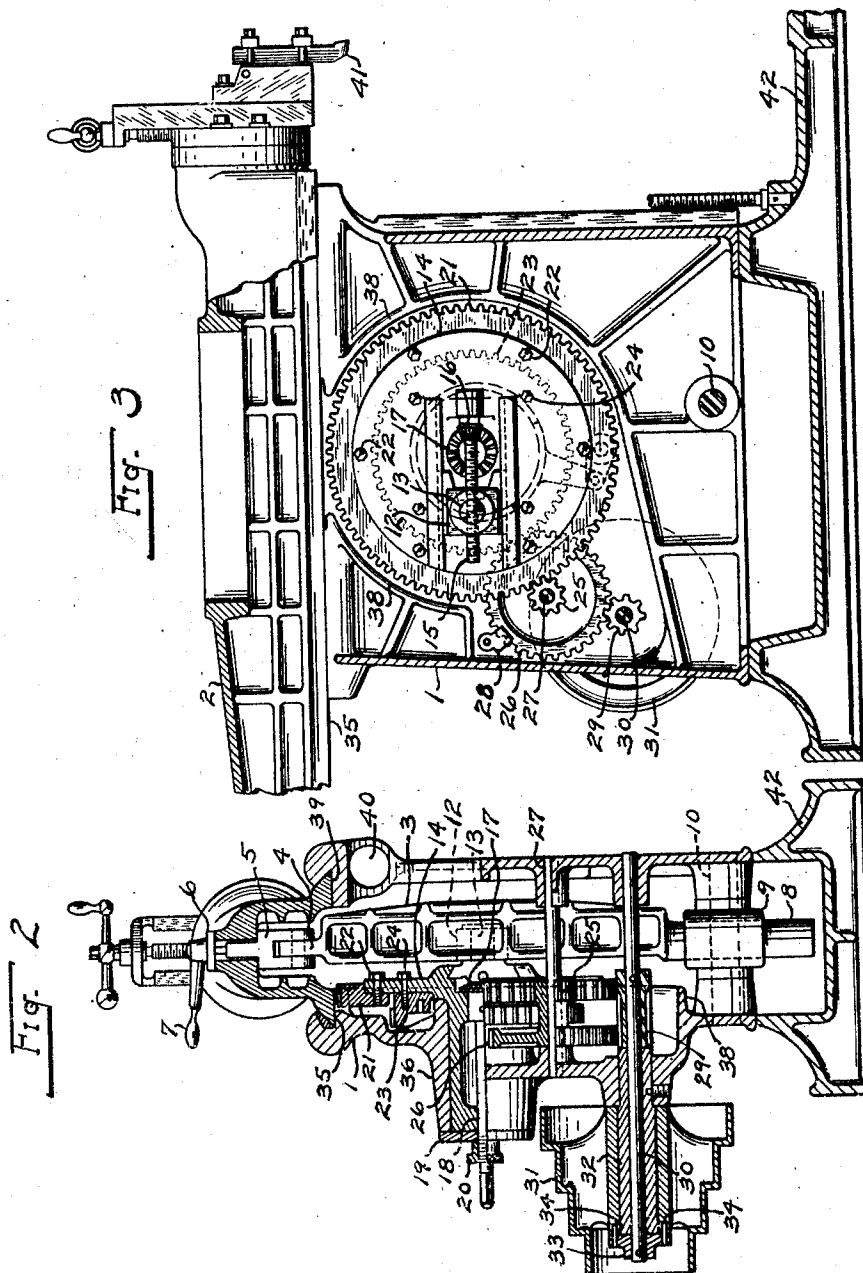
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SHAPING-MACHINE.

1,038,259

Specification of Letters Patent.

Patented Sept. 10, 1912.

Application filed September 27, 1911. Serial No. 651,567.

To all whom it may concern:

Be it known that I, WILLIAM F. ZIMMERMANN, a citizen of the United States, and a resident of Newark, in the county of Essex and State of New Jersey, have invented certain new and useful Improvements in Shaping-Machines, and do hereby declare the following specification, taken in connection with the drawings forming part of same, to be a full, clear, concise, and exact description of the principle of the invention and the best mode contemplated to apply said principle, so as to distinguish it from other inventions and to enable any person skilled in the art to which it appertains or with which it is most nearly connected to make, construct, and use the same.

The invention relates primarily to machines for shaping metal by means of a reciprocating tool, and more particularly to a machine, generally termed a crank shaper, wherein the cutting tool is reciprocated or actuated by means of a crank pin.

The primary object of this invention is to mount a driving or reciprocating mechanism for the cutting tool, in a frame of very rigid construction, in such a manner so as to form a simple and compact arrangement and to materially increase the rigidity, efficiency and mechanical advantage of the entire structure.

One of the features of this invention relates to the arrangement of the bull wheel, whereby the periphery thereof is brought in proximity with the lower surface of the guides on the ram or reciprocating member, thereby materially increasing the mechanical advantage of the pitman or lever for reciprocating the ram. By decreasing the distance between the center of the bull wheel and the lower surface of the ram guideways, the power to actuate the lever and therefore reciprocate the ram is applied farther from the fulcrum and nearer to the load. Or, in other words, the power arm of the lever is increased relatively to the load arm.

Another feature relates to the cylindrical opening provided in the frame and extending parallel with the movement of the ram and beneath the ram guideway, located opposite to the bull wheel supporting wall. This cylindrical opening is provided to allow a long shaft to be located therein when it is desired to keyway same.

It has been customary to provide the cylindrical opening for keywaying shafting, in the pitman or lever directly beneath the guideways of the ram. It is evident that such a construction manifestly impairs the rigidity and lessens the possible mechanical advantage of the lever, which is of the third order, by necessitating the lowering of the crank pin slot provided in said lever and co-operating with a crank pin.

The annexed drawings and description thereof, set forth in detail, certain mechanism embodying means constituting however, but one of the various mechanical forms in which the principle of the invention may be used. The novelty of the invention will be readily understood from the drawings, which show a construction for practising the invention in its preferred form, and from the following description thereof, and is more particularly pointed out and distinctly claimed in the claims annexed to said description.

In the drawings: Figure 1 is a side elevation of a shaping machine embodying the invention. Fig. 2 is a sectional elevation at a_1 , a_2 , a_3 , a_4 and a_5 of Fig. 1, clearly illustrating the construction of the driving mechanism; and Fig. 3 is a side elevation similar to Fig. 1 but with the frame and ram partly in section and the pitman or lever removed.

Referring particularly to Figs. 2 and 3, the upper part of the frame 1 is provided with a reciprocating ram 2 which is actuated by a pitman or lever 3 hinged at its upper end 4 to a block 5. A clamping plate 6 and handle 7 are arranged to secure said block 5 and thereby said lever 3 to said ram 2. The lower end 8 of the lever 3 is slidably arranged in a bearing 9, which is pivotally mounted on the shaft 10, so as to compensate for the oscillatory movement of said lever when the same is actuated, to reciprocate the ram, by mechanism now to be described.

The lever 3 is provided with a slot 11 in which the crank pin block 12 is arranged to slide. A crank pin 13 coöperates with said block 12 and is adjustably arranged in the driving member which is rotatably mounted in the frame. A screw 15 engages a threaded portion of said crank pin 13 and is provided with a bevel gear 16 secured thereto,

and which meshes with a bevel gear 17 secured to and rotatable with the shaft 18 extending through the hub of the driving member 14. The outer end of said shaft 18 is provided with a square to cooperate with a suitable crank handle, whereby the length of stroke of the ram may be adjusted as desired.

A flange 19 is suitably secured to the hub of the driving member 14 to maintain a proper end adjustment, and a clamp nut 20 is arranged on said shaft 18 to prevent the accidental changing of the stroke adjustment.

A gear ring 21 is secured to the driving member 14 by bolts 22 and forms what is generally termed the bull wheel. A second gear 23 is also secured to said driving member by means of the bolts 24. A pinion 25 is shown as meshing with the bull gear 21 and said pinion is preferably integral with an intermediate gear 26, both of which gears are rotatably mounted on the intermediate shaft 27 and arranged to slide thereon by any suitable means, such as a fork 28, whereby the pinion 25 may be disconnected from the bull gear 21 and the intermediate gear 26 be intermeshed with the gear 23 so as to obtain a higher range of crank pin speed.

The intermediate gear 26 is constantly in mesh with the long faced pinion 29 secured to and rotatable with the main driving shaft 30. A cone pulley 31 driven from any suitable source of power is rotatably mounted upon the stationary hub 32 secured to the frame and rotates the main shaft 30 through a flange 33, which is secured to said main shaft 30 and connects with said pulley 31 by means of the driving pins 34.

From the above description of the gear mechanism, it is obvious that for each cone speed, two crank pin speeds may be obtained, to wit: first, one speed through the gears 29, 26, 25 and 21, which speed is generally used for long strokes, through the gears 29, 26, and 23, which speed is used for short and high number of strokes.

Referring particularly to the construction of the bull wheel 21, it will be seen from the drawings and description thereof that the same is separate and apart from the driving member 14. This construction is shown as the preferable arrangement because it results in a more rigid and compact machine than is obtainable if the gear 21 and driving member 14 were integral. The invention, however, is therefore not necessarily limited to a two piece bull wheel construction. The separate construction further enables the hole 37 in the side wall (see Fig. 1) to be made smaller in diameter than the bull gear because it is only necessary to have said hole 37 sufficiently large to permit the passage of the driving member 14. To obtain the

maximum mechanical advantage the center of the bull wheel has been located approximately one half its diameter from the lower surface 35 of the ram guides. This necessitated cutting through the center portion of the ram supporting surface on the frame as seen in Fig. 3. Circular ribs 38 are arranged to connect the edges of said cut-out portion with frame, by a series of radiating ribs thereby forming a very rigid side wall. The circular ribs 38 are sufficiently high to inclose the entire bull gear, thereby preventing the dust from getting into the gear teeth. As a result of decreasing the distance between the center of the bull wheel and the lower surface of the ram guide the power arm of the lever 3 lengthened and the load arm remains the same, thereby increasing the mechanical advantage of the structure.

Beneath the lower surface of the ram guide 39 is an opening 40 cylindrical in form, wherein various sized shafts may be inserted when it is desired to keyway them. This opening has heretofore been located in the lever 3 near its upper end 4. This construction, however, would necessitate lowering the crank pin slot 11 in said lever, which would decrease the mechanical advantage by shortening the power arm relatively to the load arm.

The cutting tool 41 is arranged in a suitable sliding head, similar to the construction now universally used and therefore need not be explained in detail.

The frame 1 and the mechanism carried thereby is supported by a base 42, and the crosshead angle 43 arranged on the frame in the customary manner is additionally supported from said base by an adjustable support 44. These constructions are also similar to those in universal use and need no detailed description, particularly since they do not form a part of this invention.

Having described my invention, I claim as new and desire to secure by Letters Patent:

1. The combination with a frame, of a ram mounted to reciprocate therein, horizontal and lateral guide surfaces on said ram, a pitman to actuate said ram, a bull wheel rotatably mounted in said frame and at a distance from said horizontal guide surfaces, approximating one half the diameter of said bull wheel, a crank pin actuated by said bull wheel and cooperating with said pitman, and means to rotate said bull wheel.

2. The combination with a frame, of a reciprocating ram mounted therein, horizontal and lateral guide surfaces on said ram, a crank pin to cooperate with said pitman, a crank plate therefor, a bull gear secured to said crank plate, said crank plate and bull gear rotatably mounted in said frame at a distance from said horizontal guide surfaces

approximating one half of the diameter of said bull wheel, and means to actuate said bull wheel.

3. The combination with a bull wheel, of means to rotate same, a pitman, a crank pin actuated by said bull wheel and cooperating with said pitman, a ram reciprocally operated by said pitman, horizontal and lateral guide surfaces provided on said ram, and a frame having cooperating horizontal and lateral guiding surfaces, one of which horizontal guiding surfaces is interrupted to enable the bull gear to be rotatably mounted in said frame at a distance from said ram horizontal guide surface approximating one half the diameter of said bull wheel.

4. The combination with a reciprocating ram, of a frame, ram supports arranged on said frame, a bull wheel rotatably mounted

in said frame, so as to intersect one of said ram supports, a pitman to reciprocate said ram, a crank pin actuated by said bull wheel and cooperating with said pitman, and means to rotate said bull wheel.

5. The combination with a bull wheel, of means to rotate same, a pitman, a crank pin actuated by said bull wheel and cooperating with said pitman, a ram reciprocally operated by said pitman, a frame, ram supports arranged on said frame, and one support provided with an opening there beneath to afford a passage for the work to be operated upon.

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Witnesses:

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