BEST AVAILABLE COPY

Feb. 5, 1929. 1,700,967

H. BAERBALCK

METAL WORKING MACHINERY

Filed Dec. 20, 1926 2 Sheets-Sheet 1

Fig. 1.

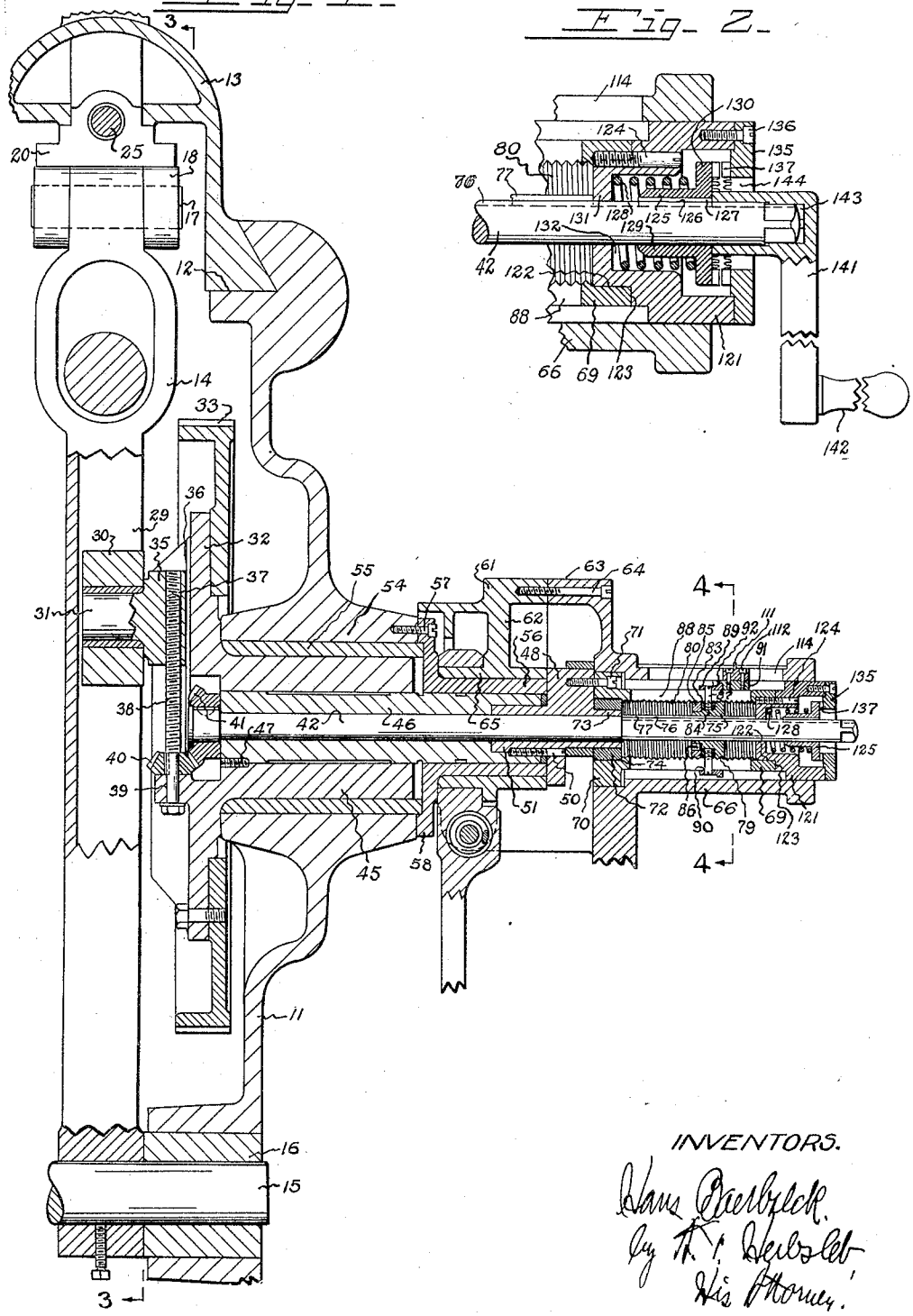


Fig. 2.

INVENTORS.

Hans Baerbalck.

By H. J. Baerbalck

His Attorney.

Feb. 5, 1929. 1,700,967

H. BAERBALCK

METAL WORKING MACHINERY

Filed Dec. 20, 1926 2 Sheets-Sheet 2

Fig. 3.

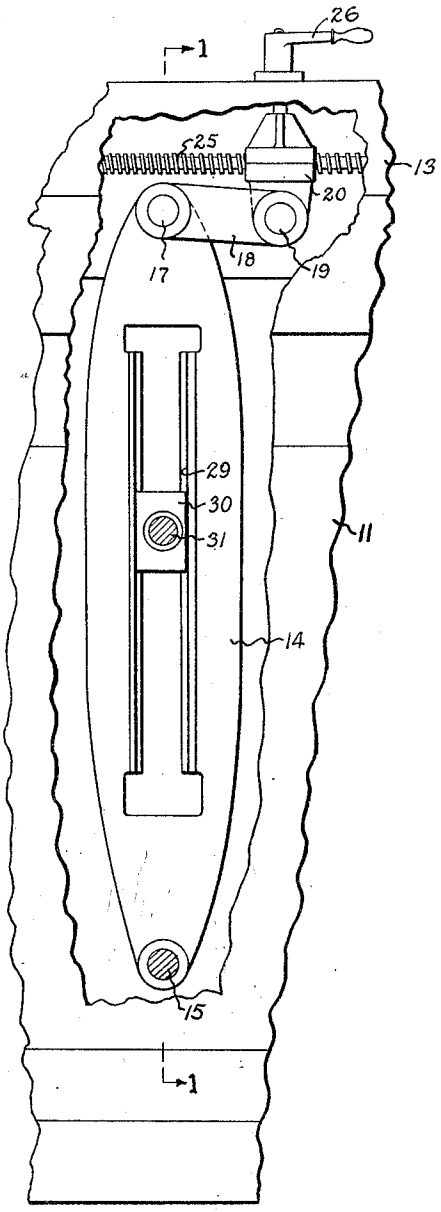
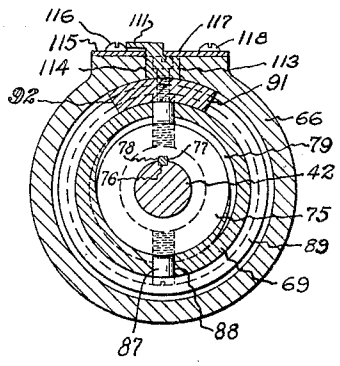


Fig. 4.



INVENTORS.

Hans Baerbalck

by T. F. Berkeley

His Attorney.

Patented Feb. 5, 1929. 1,700,967

UNITED STATES PATENT OFFICE.

HANS BAERBALCK, OF CINCINNATI, OHIO, ASSIGNOR TO THE AMERICAN TOOL WORKS COMPANY, OF CINCINNATI, OHIO, A CORPORATION OF OHIO.

METAL-WORKING MACHINERY.

Application filed December 20, 1926. Serial No. 155,965.

My invention relates to metal working machinery, especially to such machinery employing an adjustable crank for operating a reciprocating element, such as the tool-ram of a metal shaping machine, and my invention is exemplified as employed in connection with such use. In such machinery the crank of the power transmitting crank member is adjustable toward and from the axis of rotation of the crank member in order to adjust the stroke of reciprocation of the tool-ram.

It is the object of my invention to provide novel means for maintaining such adjustments during operation of the machine, and to provide novel means for readily releasing such maintaining means by manipulation of an adjusting tool or wrench for effecting such adjustment.

The invention will be further readily understood from the following description and claims, and from the drawings, in which latter:

Fig. 1 is a vertical axial section of my improved device, taken in the plane of the line 1—1 of Fig. 3, and partly broken away.

Fig. 2 is an enlarged axial section of a detail of my improved device, showing the operating tool and release of the maintaining clutch thereby.

Fig. 3 is a cross-section taken in the plane of the line 3—3 of Fig. 1, partly broken away.

Fig. 4 is a cross-section of the same, taken in the plane of the line 4—4 of Fig. 1.

The shaping machine exemplified comprises a usual frame 11, on which there is an upper guideway 12. A tool-ram 13 is reciprocated lengthwise in the guideway, and is arranged to carry a usual tool-holder at its end for receiving the tools. The ram is reciprocated by a usual rocker-arm 14, pivoted at its lower end on a shaft 15, supported in bearings 16 in the frame. The upper end of the rocker-arm is articulated at 17 with a link 18, which latter is articulated at 19 with a nut-block 20.

The nut-block is adjustable lengthwise of the ram by means of a screw-rod 25, threaded in the nut-block, the nut-block being clamped in adjusted positions to the ram by means of a handle 26, in usual manner, for positioning the path of stroke of the tool-ram.

The rocker-arm is provided with a usual longitudinal guideway 29, in which there is a slide-block 30, which forms a bearing for the crank-pin 31 journaled therein. The crank-pin is on a bull-wheel 32, suitably rotated at selective speeds, as by having a suitable drive pinion driven at selective speeds meshing with the gear teeth 33 thereon.

The stroke of the tool, that is, the distance which the tool moves at each reciprocation of the rocker-arm 14, is governed by the position of the crank-pin 31 with relation to the axis of rotation of the bull-wheel. The adjustment of the crank-pin is effected by mounting the crank-pin on a slide-block 35, which is adjustable lengthwise in a guideway 36 in the bull-wheel. The block 35 has a threaded bearing 37, an adjusting screw 38 being threaded therethrough.

The adjusting screw is journaled and held endwise in a bearing 39 on the bull-wheel, and is rotated by a bevel pinion 40 fixed thereon, with which a bevel pinion 41 meshes. The bevel pinion 41 is fixed on an adjusting shaft 42.

The hub 45 of the bull-wheel has a bushing 46 therein, which is fixed to the bull-wheel by a screw 47, so as to rotate with the bull-wheel. A block 48 is fixed to this bushing, as by a positioning screw 50, between a hub 51 of the block and the bushing.

The hub of the bull-wheel is rotatable in a bearing 54 of the frame of the machine, in which a bushing 55 is located. A bearing-sleeve 56 is fixed to the bearing 54 by screws 57, the bearing-sleeve having an annular flange 58 through which the screws are received. The flange spans the outer end of the hub of the bull-wheel, and the bearing-sleeve forms a bearing for the outer end of the bushing 46 fixed to the bull-wheel. The bull-wheel is held endwise in the bearing 54.

A housing 61 comprises an inner section 62 and an outer section 63 connected by screws 64. It has a bearing 65 about the bearing-sleeve 56 and a sleeve extension 66, which latter forms a housing for the indicating means to be presently described, which indicating means are, however, not part of the present application, the same being shown, described and claimed in a separate application filed by me in the United States Patent Office December 20th, 1926, the same being Serial No. 155,964.

A shell 69 has a flange 70, by means of which it is secured, as by bolts 71, to the block 48, so as to rotate with the bull-wheel. A bushing 72 is received about a hub 73 on the block 48 about the shaft 42, and is located

endwise between the block 48 and an inner annular shoulder 74 on the shell 69. The shell is positioned concentrically about the axis of the adjusting shaft 42, and the adjusting shaft is held endwise with relation to the bevel pinions 40, 41.

A collar 75 is connected with the adjusting shaft so as to rotate therewith. This is effected in the present instance by providing the outer end portion of the adjusting shaft with a longitudinal spline groove 76, in which a key 77 is received, the collar being provided with a complemental groove 78 for receiving the key.

The outer periphery of the collar 75 is provided with screw threads 79, and the inner periphery of the shell 69 is provided with internal threads 80 complemental to the threads 79. When the adjusting shaft is rotated, the collar 75 rotates therewith, and, by means of a threaded connection of the inner periphery of the relatively stationary shell 69, the collar 75 is also moved endwise along the adjusting shaft.

A ring 83 is connected with said collar and moves endwise with said collar. This ring is shown received in an annular groove 84 in the collar. The collar is provided with a removable section 85, which forms one wall of said groove, so that the ring may be received in the groove and the removable section be fixed in place, as by screws 86.

Pins 87 extend radially from the ring, and extend through longitudinal slots 88, in the shell 69. A collar 89 is located about the shell and moves lengthwise along its outer periphery, and is connected with said pins so as to be moved lengthwise by said pins, said pins being shown received through holes 90 in said collar.

A block 91, shown as a segment block, is received about the outer periphery of the shell, and has connection, shown as a segmental tongue and groove connection 92, with the collar 89, so as to transmit the axial movements of the collar 89 to said block 91, and permit rotative movements of the housing 66 about the shell.

The block 91 is provided with an indicating finger 111, which is shown fixed to said block by screws 112, the indicating finger being provided with a shank 113 received through a slot 114 extending lengthwise through the housing 66.

The indicating finger is arranged to register with the markings of a scale 115, to indicate the adjustments of length of stroke of the tool-ram made by the adjusting shaft 42, when adjusting the distance of the crank-pin 31 from the axis of rotation of the bull-wheel.

A socket-piece 121 is secured to the outer end of the shell 69, and forms an extension of the same. The socket-piece is provided with a rabbet 122, in which the outer end of the shell is received, a shoulder 123 at the end of the rabbet mating with the outer end of the shell. Screws 124 secure said socket-piece and the outer end of the shell together.

A plunger 125 is received about the outer end of the adjusting shaft 42, and is rotatively held thereto, as by means of a key 126 received in a key-way 127 in said plunger and in the spline-groove 76. A spring 128 is received about the hub 129 of said plunger and is located between the flange 130 of said plunger and the bottom wall 131 of the socket 132 in the socket-piece, for normally urging the plunger outwardly. The hub of the plunger and the spring are arranged to be received in said socket to desirable extent.

A cap 135 is received crosswise of the outer end of the socket-piece, being secured thereto by screws 136, and forms an inwardly extending flange for the outer end of the socket-piece.

A clutch 137, shown as a tooth clutch, has its teeth located respectively on the plunger and the cap, so as to hold said plunger in angular position with relation to the socket-piece when the clutch is engaged, for fixing the shell 69 and the adjusting shaft 42 in rotative relation when said clutch is engaged, and permitting rotation of the adjusting shaft 42 with relation to the shell when said clutch it disengaged.

The teeth of the clutch are preferably fine teeth so that upon minute rotative adjustments of the adjusting shaft 42 with relation to the shell, and consequently with relation to the bull-wheel, being made, the teeth of the clutch will be reengaged in new relations after such adjustments are completed.

The outer end of the shaft is formed to receive a suitable wrench, and the wrench is so formed and it and the clutch-collar or plunger are so related that when the wrench is connected with the adjusting shaft 42 for making an adjustment, it also releases the clutch 137 by moving the clutch-collar 125 endwise and disengaging the teeth thereon from the teeth at the outer end of the shell, in order to permit the desired relative rotation between the operating shaft and the shell.

Thus a wrench 141 is provided with a handle 142 and with a socket-piece 143, arranged to be received about the outer end of the adjusting shaft to sufficient extent to push the plunger 125 inwardly, and thereby disengage the clutch, the wrench being received through a hole 144 in the cap 135. The outer end of the adjusting shaft is shown as square-ended, the bottom end of the socket of the wrench being complementally formed to coact therewith for turning the adjusting shaft.

In operation, the bull-wheel rotates and carries the crank-pin with it in its rotations for rocking the rocker-arm, and consequently reciprocating the tool-ram. The length of stroke of the tool-ram is determined by the distance of the crank-pin from the axis

of rotation of the bull-wheel. During rotation of the bull-wheel, the hub 45 thereof and the bushing 46, as well as the shell 69, the socket-piece 121 thereof, the clutch 137, the plunger 125, the adjusting shaft 42, and the threaded collar 75, rotate with the bull-wheel, the ring 83 remaining non-rotative in its annular groove in the threaded collar.

When it is desired to adjust the stroke of the tool-ram, which may be effected while the tool-ram is reciprocating or at rest, the wrench is pushed inwardly about the outer end of the adjusting shaft for contacting the plunger 125 and pushing the plunger inwardly and disengaging the clutch 137, and engaging the complemental faces of the wrench and adjusting shaft, whereupon rotation is imparted to the adjusting shaft 42 by means of the wrench, in either direction, relatively to the shell 69, for rotating the screw-rod 38, and moving the crank-pin toward or from the axis of rotation of the bull-wheel, in order to cause a shorter or longer stroke of the tool-ram.

Such rotation of the adjusting shaft 42 rotates the threaded collar 75 with relation to the shell, thereby effecting axial movement of the threaded collar in desired direction along the adjusting shaft 42, by reason of the connection of the threaded outer periphery of said collar with the threaded inner periphery of the shell, the extent of such adjustment being indicated simultaneously by movement of the indicating finger 111 lengthwise of the scale 115, the adjustment being continued until the desired length of stroke of the tool-ram is indicated by the position of the indicating finger on the scale, whereupon the wrench is withdrawn, and the clutch is automatically reengaged in the new relation between the adjusting shaft, the crank-pin and the bull-wheel.

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

1. In mechanism of the character described, the combination with a rotative power transmitting member and an adjustable power transmitting part thereon adjustable toward and from the axis of rotation of said power transmitting member, of an adjusting shaft for adjusting said power transmitting part, said power transmitting member and said adjusting shaft normally rotating together, and means automatically maintaining said power transmitting member and said adjusting shaft in connected relations comprising a clutch including a clutch-collar having operative connection with said adjusting shaft for rotating with and for moving lengthwise of said adjusting shaft and a coacting clutch-member having operative connection with said power transmitting member so as to rotate with said power transmitting member, means resiliently urging said clutch-collar toward its coacting clutch member for clutch engagement, a turning wrench, said turning wrench and said adjusting shaft having complemental parts for combined rotation of the same, and said turning wrench and said clutch-collar provided with parts coacting with each other for release of said clutch upon engagement of said complemental means and for engagement of said clutch upon release of said complemental means.

2. In mechanism of the character described, the combination of a rotative power transmitting member, a power transmitting part on said power transmitting member, means for adjusting the distance of said power transmitting part from the axis of rotation of said power transmitting member comprising an adjusting shaft, a shell extending from and rotatable with said power transmitting member, said adjusting shaft concentrically located in said shell, said shell provided with a flange extending toward said shaft, clutch-teeth on said flange, a clutch-collar having operative connection with said shaft so as to be slidable axially along said shaft and to rotate with said shaft throughout its various axial positions along said shaft, said clutch-collar provided with clutch-teeth complemental to said first-named clutch-teeth, resilient means causing movement of said clutch-collar in one direction toward said flange for engagement of the clutch, and a rotating tool for said adjusting shaft, said clutch-collar arranged to be moved into disengaged relation by said rotating tool.

3. In mechanism of the character described, the combination of a rotative power transmitting member, a power transmitting part on said power transmitting member, and means for adjusting the distance of said power transmitting part from the axis of rotation of said power transmitting member comprising an adjusting shaft whose axis of rotation is coincident with said first-named axis, a shell thereabout rotatable with said power transmitting member, said shell provided with a socket-piece at its outer end, said socket-piece provided with an inwardly extending flange at the outer end of the socket therein, said flange provided with clutch-teeth and a complemental clutch collar in said socket having operative connection with said adjusting shaft so as to rotate with and be movable axially along said adjusting shaft, resilient means in said socket normally urging engagement of said clutch collar with said toothed flange, and a wrench for rotating said adjusting shaft, said wrench arranged to move said clutch collar into release relation.

In testimony whereof, I have hereunto signed my name.

HANS BAERBALCK.