J. HARTNESS.

CHIP CONTROLLER FOR METAL TURNING TOOLS.

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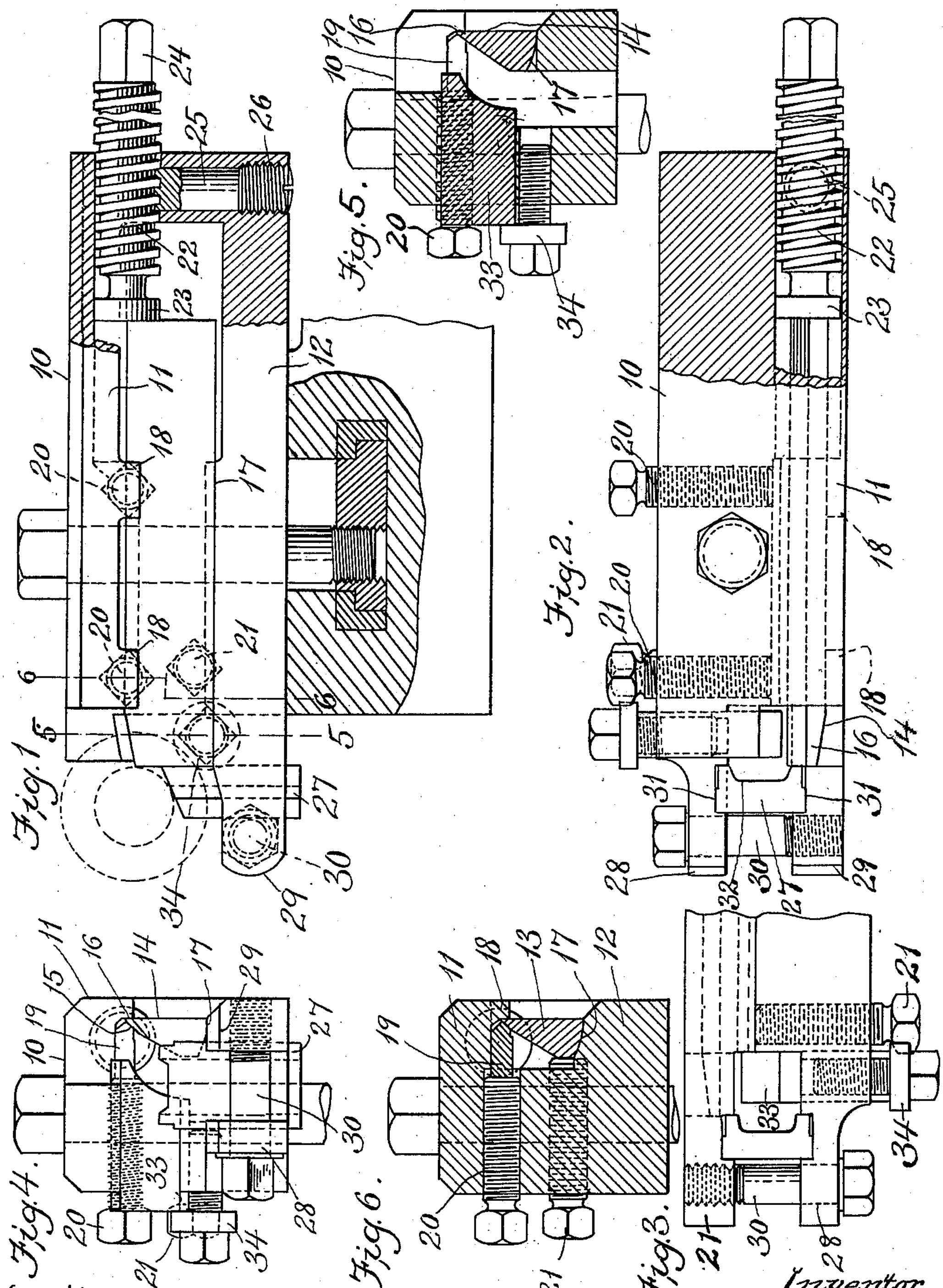
1,036,103. Patented Aug. 20, 1912.



Witnesses.
F. R. Roulstone.
P. W. Pezzetti

Inventor.
James Hartness
by Wright Brown Quinby & May

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JAMES HARTNESS, OF SPRINGFIELD, VERMONT.

CHIP-CONTROLLER FOR METAL-TURNING TOOLS.

1,036,103. Specification of Letters Patent. Patented Aug. 20, 1912.

Application filed September 17, 1908. Serial No. 453,384.

To all whom it may concern:

Be it known that I, JAMES HARTNESS, of Springfield, in the county of Windsor and State of Vermont, have invented certain new and useful Improvements in Chip-Controllers for Metal-Turning Tools, of which the following is a specification.

This invention has relation to the art of cutting metal.

In my applications for Letters Patent, Serial No. 406,588, filed December 16, 1907, and Serial No. 410,786, filed January 14, 1908, I have disclosed machine-controlled turning tools by which I am able to remove masses of metal from the work without materially changing the molecular structure of the removed metal. This is accomplished by means of a wedge-shaped cutter which operates, speaking roughly, to split off the chip instead of crowding, crushing or scraping it off, as has been done with tools as previously constructed and held. The metal is thus removed in a substantially continuous tough band instead of in a series of chunks of compressed metal more or less firmly united. I have found that it is desirable in the use of cutters such as set forth in my said applications, to control the chip so as to govern its path, and if necessary, to effect its fracture into relatively small sections. In my copending application, Serial No. 453,383, filed September 17, 1908, I have illustrated and described turning tools provided with deflectors by which the chip may be bent flatwise from the shoulder on the work, that is, longitudinally of the axis of the work at an angle sufficiently abrupt as to cause it to break.

The present invention contemplates the provision of means by which the chip may be broken edgewise since I find that this is desirable in some cases.

On the accompanying drawings, Figure 1 represents in side elevation, a tool equipped with my invention. Fig. 2 represents a plan view of the same. Fig. 3 represents a view looking at the bottom side of the front portion of the tool. Fig. 4 represents a front end elevation of the tool. Figs. 5 and 6 respectively represent sections on the lines 5—5 and 6—6 of Fig. 1.

Referring to the drawings, the tool which is adapted to be mounted on the ordinary lathe slide and fed longitudinally of the rotating work is illustrated as consisting of an oblong holder 10 having in its front face a groove formed by two flanges 11 and 12 which are parallel as shown. The cutter, which is indicated at 13, is substantially triangular in section, having an inner face 14 and an outer face or top slope 15. These two faces are at an acute angle to form a cutting edge 16. As explained in my previous applications hereinbefore identified, the inner face is held flat against the work without clearance, so that the outer face or top slope splits the chip from the face of the metal. The under face or bottom of the cutter is cylindrically convex, that is, substantially concentric with the cutting edge. The cutter is seated upon a concave seat 17 formed on the upper face of the flange 12, and the upper edge of the inner face of the cutter rests against lips 18 which project downwardly from the front portion of the flange 11. In order to hold the cutter in place, I employ a flat plate or strip 19 which is located in a socket in the holder. The front edge of this plate has a double bevel, and one of its beveled faces rests against the outer face of the cutter as shown in Fig. 6. Adjusting screws 20 pass laterally into the holder and bear against the inner edge of the plate, and may be screwed inward so as to force the plate against the cutter. The faces of the cutter and the plate 19 are at such an angle that the outward movement of the plate tends to force the cutter against the lips 18 and down against its seat 17. The degree of oscillation of the cutter is regulated by an abutment screw 21 passed laterally into the holder.

For the purpose of adjusting the cutter and also holding it against end thrust, I employ a screw bar 22 having a head 23 bearing against the end of the cutter, and an angular head 24 by which it may be rotated. This bar is passed into an aperture in the end of the holder, and its threaded portion is engaged by a nut section 25 placed in a socket in the holder and secured against dislocation by a screw 26.

As thus far described, the tool, which may be secured upon the carriage of an engine lathe or the turret of a turret lathe, does not materially differ from tools described in my previous applications hereinbefore referred to. According to the present invention, I employ what may be termed a "chip deflector" or "chip breaker", and it may

be used either alone or in connection with other deflectors. It consists in the present instance of a block 27 which is clamped between two arms 28, 29 projecting from the end of the holder. These two arms are adapted to be drawn together by a screw 30. The deflector 27 fits in vertical grooves 31 in the arms and may be vertically adjusted. Said deflector is normally located below the work and beyond the end of the cutter, and its top or upper surface is inclined as shown in Fig. 1, so as to form an angle, less than a right angle, to its operative face. Said face is grooved or recessed as indicated at 32 and it lies at an obtuse angle to the natural path of the chip which is being removed from the work.

With this construction it will be seen that, when the chip engages the face of the deflector 27, it will be bent outwardly or away from the axis of the work at an angle sufficiently abrupt to cause it to break. The chip will therefore be broken edgewise into relatively short sections. The fracture of the chip is approximately at the point of cleavage of the chip from the face of the work.

In order that the chip may be properly guided and held against lateral play, as it passes from the cutter to the deflector or breaker 27, I employ a supplemental deflector or side guide 33. This consists of a dovetailed block which is placed in a dovetailed groove in the end of the holder. It may be adjusted and held against end thrust by a screw 34 passed into a lateral aperture in the holder. The inner end of the block 33 confronts the top slope of the cutter and it is concave so as to provide a curved guiding surface which will guide the chip downward and hold it against undue lateral movement.

I desire to have it understood that the invention is capable of a variety of embodiments although I have only shown one form, and I do not intend that the invention should be limited by the phraseology which I have adopted in the description of the different parts and instrumentalities comprising the invention.

Having thus explained the nature of my said invention and described a way of constructing and using the same although without attempting to set forth all of the forms in which it may be made or all of the modes of its use, what I claim is:—

1. In a metal-turning tool, a cutter adapted to be held with its cutting edge transverse to the axis of the work, and a deflector having a face intersecting the natural path of the chip formed by the cutter for deflecting it away from the axis of the work at a breaking angle.

2. In a metal-turning tool, a holder, a cutter thereon having a cutting edge transverse to the work axis, and a deflector on said holder arranged in the path of the chip and having a surface for bending the chip at a breaking angle edgewise from its natural path.

3. In a metal-turning tool, a cutter, a deflector having a face intersecting the natural path of the chip for engaging the inner edge of the chip, and a deflector arranged to engage the side of the chip, said deflectors being in intersecting planes.

4. In a metal-turning tool adapted to be fed lengthwise of the rotating work, a holder, a cutter thereon, a deflector having a face at an angle to the natural path of the chip for engaging the inner edge of the chip, and clamping means on the holder for positioning said deflector.

5. In a metal-turning tool adapted to be fed lengthwise of the rotating work, a holder, a cutter thereon, and deflectors on said holder, one having a curved face opposing the cutter, to form a passage for the chip, and the other having a face intersecting the natural path of the chip to engage the edge of the chip and bend it to a breaking angle.

6. In a metal-turning tool adapted to be fed lengthwise of the rotating work, a cutter adapted to be arranged transversely of the axis of the work and having a longitudinal cutting edge and top slope, a deflector arranged to receive the chip from said top slope, and a deflector having a surface arranged at an inclination to the natural path of the chip to receive the chip and deflect it edgewise of its natural path.

In testimony whereof I have affixed my signature, in presence of two witnesses.

JAMES HARTNESS.

Witnesses:
FRED B. GILL,
J. W. WALKER.