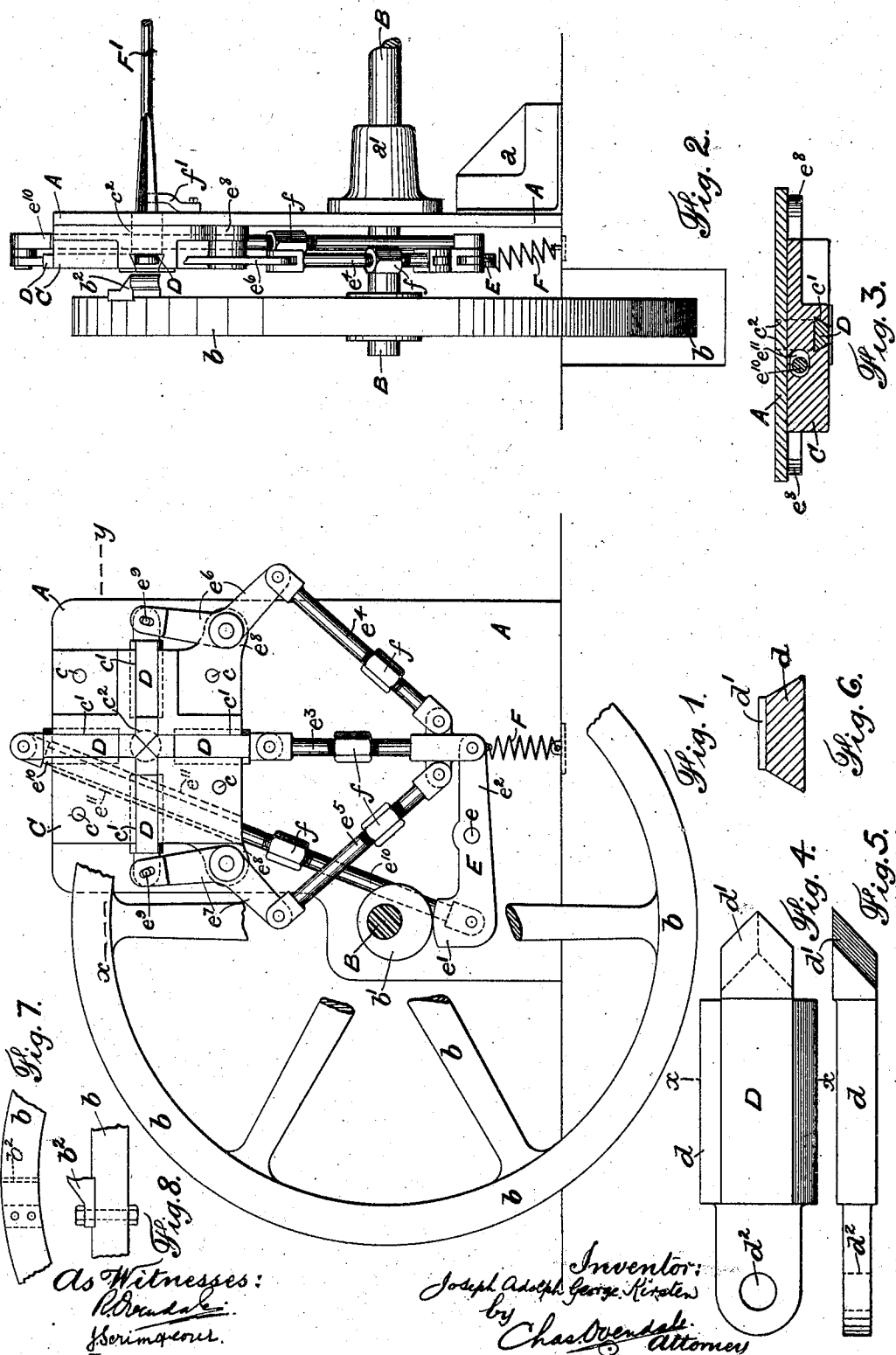


No. 806,347.

PATENTED DEC. 5, 1905.

J. A. G. KIRSTEN.  
 APPARATUS FOR CUTTING DRILL BITS.  
 APPLICATION FILED JUNE 15, 1904.



As Witnesses:  
*R. Wendt*  
*Herrmann*

Inventor:  
*Joseph Adolph George Kirsten*  
 by *Chas. Wendt*  
 Attorney

# UNITED STATES PATENT OFFICE.

JOSEPH ADOLPH GEORGE KIRSTEN, OF FORDSBURG, NEAR JOHANNESBURG, TRANSVAAL.

## APPARATUS FOR CUTTING DRILL-BITS.

No. 806,347.

Specification of Letters Patent.

Patented Dec. 5, 1905.

Application filed June 15, 1904. Serial No. 212,666.

*To all whom it may concern:*

Be it known that I, JOSEPH ADOLPH GEORGE KIRSTEN, a subject of the King of England, residing at Fordsburg, near Johannesburg, Transvaal, have invented certain new and useful Improvements in Apparatus for Cutting Drill-Bits and the Like, of which the following is a specification.

This invention relates to apparatus for cutting that kind of rock-drilling-machine bit known as a "Star bit" or for other drills or bits of cruciform section employed either for machine or hand rock-drilling, and is designed to provide an efficient and comparatively simple and inexpensive machine in which the bits or drills may be cut expeditiously.

The invention consists in novel means for cutting off fractured or broken portions of the wings or webs of the drill or bit when necessary.

The invention will now be described by aid of the accompanying drawings, wherein—

Figure 1 shows a rear elevation of the machine. Fig. 2 is a side elevation of Fig. 1. Fig. 3 is a section of part of the machine, taken on line *xy*, Fig. 1. Figs. 4 and 5 represent back and side elevations, respectively, of one of the cutters detached and drawn to an enlarged scale. Fig. 6 is a section on line *xy*, Fig. 4. Figs. 7 and 8 represent a segment of the rim of the fly-wheel, showing the wiper or device which operates to remove the bur.

A represents a vertically-arranged plate which carries the several operative parts of the machine. The plate A is bolted or otherwise firmly secured at the base to a substantial support or standard *a*, which support *a* is preferably carried across the plate A for its full width. In the plate A at one side is journaled a horizontally-arranged driving-shaft B. To provide a sufficiently long bearing for the driving-shaft B, a boss *a'* is formed on or bolted or otherwise fixed to the back of the plate A. On the extremity of the driving-shaft B at the front of the machine is mounted a heavy fly-wheel *b*, which conserves the power and applies it in the operation of the machine to detach that part of the drill to be removed. The other extremity of the driving-shaft B at the back of the machine may be carried in a suitable bearing and be equipped with fast and loose pulleys for driving the shaft by means of a belt, or it may be rotated at a suit-

able speed in any other convenient manner. This machine may be kept running continuously, or otherwise, as may be preferred. On the shaft B, between the fly-wheel *b* and the front of the supporting-plate A, is fitted an eccentric or cam *b'*.

To the top of the plate A, at the front, is fixed another plate C. This latter plate C may be fixed to the back plate A by means of bolts or the like passed through the bolt-holes *c* from the front to the back of the machine. In the front of the plate C are formed four radial dovetail grooves *c'*, all of which meet in the front of a cylindrical hole *c''*, formed through both the front and back plates A C at the center. In the dovetail grooves *c'* four radial cutters D are arranged in such manner that they can advance toward or recede from the center of the cylindrical hole *c''*, formed in the plates A C. The several cutters are of the same construction, and one is illustrated in detail in Figs. 4, 5, and 6 of the drawings. It is constructed in its central portion *d* of dovetail section corresponding to the dovetail groove *c'* in the plate in which it slides, and its inner end *d'* is beveled off from the sides to the center and from the back to the front to form the pointed V-shaped cutter, as shown, which enters between adjacent webs or wings of the drill to cut off the broken portion. The blade *d'* of the cutter D is made somewhat thicker than the dovetail part *d*, so that it projects slightly beyond the level of the plate C at the front. The other and outer ends of the cutters D are formed with a hole *d''* for attaching them to their operating-levers. The several cutters are operated so that they move inward simultaneously and meet in the center. In Fig. 1 the several cutters are shown in their innermost position. The means for operating the several cutters comprise a tappet-lever E, which works on a pin or pivot *e*, fixed in the plate A. The arm *e'* of the lever E is so arranged that it is engaged by the eccentric or cam *b'* on the main driving-shaft B, and thereby depressed. The other arm *e''* is pivotally connected to an adjustable rod *e'''*, which rod at its upper end is pivotally attached to the outer end of the bottom vertical cutter D. To the lower end of the rod *e'''* are pivotally attached two other adjustable rods *e''''*, which rods at their other ends are bifurcated and pivotally connected to two levers

$e^6 e^7$ , which operate the two horizontally-arranged cutters D. The levers  $e^6 e^7$  are mounted on pins or pivots fixed to two lugs  $e^8$ , formed on the front plate C at the bottom corners, the pins passing also through the back plate. One arm of each of the levers  $e^6 e^7$  is connected to the rods  $e^4 e^5$  and the other arms are connected to the outer ends of the two horizontal cutters D. The arms of these levers  $e^6 e^7$  are formed with slots in which the pins  $e^9$ , forming the connection between them and the cutters D, are located. This allows the arms of the levers  $e^6 e^7$  to move in an arc of a circle, while the cutters move in a rectilinear path in either direction. The levers  $e^6 e^7$  are formed with bosses at the center, which bring the upper arms of the levers  $e^6 e^7$  into line with the outer ends of the cutters D. The upper ends of the levers  $e^6 e^7$  are preferably bifurcated, and the outer ends of the cutters D, carrying the pins  $e^9$ , fit into the bifurcations. The top vertical cutter D is operated by means of an adjustable rod  $e^{10}$ , which is pivotally attached to one side of the arm  $e'$  of the tappet-lever E. This rod  $e^{10}$  projects through a hole  $e^{11}$ , formed through the plate C, which rod  $e^{10}$  projects above the top of the plate C, where it is pivotally attached to the outer end of the top vertical cutter D. The tappet-lever E is operated, by means of the eccentric or cam  $b'$ , to force the several cutters D inward to cut the drill, while the return stroke of the cutters is effected by means of a suitable spring F, fixed at its lower end and attached to the outer end of the arm  $e^2$  of the tappet-lever E. The several connecting-rods between the tappet-lever and the cutters D are made adjustable to allow of the rods being lengthened after the grinding of the cutters. The connecting-rods are shown made in two pieces formed with right and left hand screw-threads, over which adjusting-nuts  $f$ , formed with corresponding right and left hand threads are screwed, so that by turning the nuts  $f$  in one direction the rods are shortened, and by turning the nuts in the opposite direction the rods may be lengthened.

A rest  $f'$  for the forward end of the drill  $F'$  is provided fixed to the back of the plate A.

On the rim of the fly-wheel  $b$  on the inside is fixed a wiper or projecting piece  $b^2$ . This wiper  $b^2$  serves for taking off the bur or portion of the bit which is severed or partially severed by the several cutters D. This wiper  $b^2$  is fixed to the rim of the wheel in such a position that it passes over quite close to the front of the cutters D and just at the time that the cutters reach the end of their inward stroke.

In the operation of this machine the drill  $F'$  is placed in the rest  $f'$  and projected forward through the cylindrical hole  $c^2$  and between the cutters D sufficiently far for the cutters to remove the desired portion of the wings of the

bit  $F'$ . The four cutters D, moving inward simultaneously between the webs or wings of the drill  $F'$ , sever or partially sever the piece to be removed, whereupon the wiper  $b^2$  completes the operation and detaches the same.

What I claim as my invention, and desire to protect by Letters Patent, is—

1. In apparatus for cutting drill-bits, a plate having radial guideways and a central aperture, cutters in said guideways adapted to move toward and away from the center of said aperture, means for reciprocating the cutters in their guideways, a driving-shaft, and means mounted on said shaft adapted to pass at intervals across the central aperture to remove the partially-severed portion of the drill held between the cutters.

2. In apparatus for cutting drill-bits, a plate having radial guideways and a central aperture, cutters in said guideways adapted to move toward and away from the center of said aperture, means for reciprocating the cutters in their guideways, a rotating member, and a device carried by said member for removing the partially-severed portion of the drill projecting beyond the cutters.

3. In apparatus for cutting drill-bits, a plate having radial guideways and a central aperture, cutters in said guideways adapted to move toward and away from the center of said aperture, means for reciprocating the cutters in their guideways, a shaft, a fly-wheel mounted on said shaft, and a wiper fixed to said fly-wheel and adapted to pass across the central aperture of the plate.

4. In apparatus for cutting drill-bits, a plate having radial guideways and a central aperture, cutters in said guideways adapted to move toward and away from the center of said aperture, means for reciprocating the cutters in their guideways, a shaft, a lever mounted independently of said shaft, means for connecting said lever with the several cutters, and means for actuating said lever to reciprocate the cutters.

5. In apparatus for cutting drill-bits, a plate having radial guideways and a central aperture, cutters in said guideways adapted to move toward and away from the center of said aperture, means for reciprocating the cutters in their guideways, a driving-shaft, a main lever mounted independently of said shaft, adjustable connecting means between said lever and the several cutters, means mounted on the driving-shaft for actuating the main lever, and means for returning the main lever to withdraw the cutters.

6. In apparatus for cutting drill-bits, in combination, a main plate, a second plate fixed thereto constructed with a central aperture and four guideways, cutters in said guideways, a main lever pivoted to the main plate, a connecting-rod between said lever and the lower vertical cutter, levers pivoted to the second plate and connected to the two hori-

zontal cutters, connecting-rods between said  
levers and the rod reciprocating the lower  
vertical cutters, a connecting-rod pivotally  
attached to the main lever and attached at its  
5 other end to the top vertical cutter, a driv-  
ing-shaft, an eccentric on the driving-shaft  
engaging the main lever, a spring acting on  
said lever, a fly-wheel on the driving-shaft,  
and a wiper fixed on said fly-wheel and adapted

to pass across the central aperture to remove 10  
the partially-severed portion of the drill.

In witness whereof I have hereunto set my  
hand in the presence of two subscribing wit-  
nesses.

JOSEPH ADOLPH GEORGE KIRSTEN.

Witnesses:

CHAS. OVENDALE,

R. OVENDALE.