To all whom it may concern:

Be it known that I, EDWARD CHARLES TRUYTER, a citizen of the United States, and resident of the borough of Richmond, county of Richmond, city and State of New York, have invented certain new and useful Improvements in Universal Hammer-Drills, of which the following is a specification.

This invention relates to that type of hand operated drill some times termed "breast drills" and has for its object the object of the device that will not only impart to a drill a rotary movement, but will also under predetermined conditions, impart a series of hammer blows to the outer end of a drill while slowly rotating the drill.

The action when the hammer mechanism is used is adapted for the purpose of drilling through cement, brick wall, tiling, etc., where star drills are usually used and it expedites this work by increasing the number of blows which may be administered to a drilling within a given time and by assuring a rotary motion during the entire operation which will clear the drill allowing it to be used much more rapidly than under ordinary conditions.

The following is what I consider a good means of carrying out this invention and the accompanying drawings should be considered to fully appreciate the specification which follows:

In the drawings:

Figure 1 is a perspective view of a completely assembled drill.

Fig. 2 is a sectional view through the spring cylinder and the hammer and spring adjusting means are shown in elevation.

Fig. 3 is an enlarged plan view of the eccentric gear.

Fig. 4 is an enlarged plan view of the internal gear.

Fig. 5 a sectional view of a spring operating pin.

Fig. 6 an elevation of the member shown in Fig. 5.

Fig. 7 is a bottom perspective view partly in section and the tool holding means and parts adjacent thereto.

Fig. 8 is a longitudinal sectional view of a complete device.

Fig. 9 is a reverse plan view of a part removed.

Fig. 10 is a plan view of a part adapted to cooperate with the part shown in Fig. 9.

Similar reference numerals indicate like parts in all of the figures where they appear.

The frame work or body of my device may be made of any general shape or size and as is customary with ordinary breast drills, I arrange a saddle or body member 1, formed integral with or secured to a frame.

The frame is provided with two parallel parts 2 and 3, and between them the rotating shaft and gears are supported. High up in the frame 2 and 3, I arrange a cross-bar 4, and at the lower end I provide an enlarged portion 5, for reasons that shall later appear.

Extending between the cross bar 4, and the enlarged portion 5, is a hollow shaft 6, upon the outer end of which is rotatably mounted a beveled gear 7, in mesh with the large driving gear 8, and at the lower end of the bar 6, a second beveled gear 9, is arranged also in mesh with the gear 8.

The gear 8, is rotated by means of a shaft 10, and a handle bar 11, and handle 12, all of ordinary construction, and the functions of which will be thoroughly understood without further description.

Formed integral with the gear 9, is a toothed member 13, and this member rotates with the gear 9. At the opposite side of the gear a further projection is arranged and upon this projection I secure the eccentric 14. The shaft 6, does not rotate, this is a hollow shaft and within the hollow shaft 6, I place another solid shaft or hammer 15, which is movable within the shaft 6, and extending through a slot 16. In the shaft 6, is a pin 17, which is secured in the hammer 15, and which enters the teeth of the member 13.

It will be noted that the teeth of the member 13, are each provided with an inclined face and when the gear 9, is rotated the teeth of the member 13, will force the pin 17, and hammer 15, outward against the pressure of a spring 18, and the pin 17, passing the apex of opposite teeth will be forcibly depressed into the next recess between succeeding teeth, with the result that the hammer 15, will be ejected forcibly outward.

At the opposite end of the spring 18, I have arranged a disk 19, secured to an adjusting screw 20. The screw 20, is adjustable through the cross bar 4, and a lock nut 21, serves to retain the screw in a pre-determined position. By the adjustment of the:

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screw 20, the force of the blow of the hammer or the pressure of the spring may be ad-
justed at will, and when the disk 19, is fully withdrawn from the spring 18, the hammer
will not be depressed by the spring, and to relieve the hammer entirely from operation
during a rotation of the gear 9, I may secure the spring to the hammer, and the other end
of the spring to the disk 10, then when the screw 20, is withdrawn the hammer 13, will
also be withdrawn and the pin be caused to pass out of the slots of the toothed member
13.

The eccentric 14, operates in a gear 22, which gear is secured to a disk 23, having a
slot 24, a rotation of the eccentric 14, by means of the beveled gear 9, will impart an
eccentric movement to the gear 22, provided that a spring pin 25, is entered into the slot
24, of the disk 23. This eccentric movement of the gear 22, will cause this gear to in-
terminently move the internal toothed gear 26, and it will be noted that the gear 26, is
permanently secured to a cupped member 27, which carries the tool holder 28.

In the gear 22, I provide a perforation or recess 29, into which a second spring pin 30,
may be inserted and when this second pin enters the recess 29, and the first spring pin
25, is withdrawn, the internal gear 27, and eccentric gear 22, will operate in unison, with
the eccentric 14, imparting to the tool holder 28, a synchronous motion with the gear 9.

The spring pin 25, is supported by a lug
31. formed integral with the lower end 5,
of the frame and the spring pin 30, is sup-
ported upon a cupped shaped portion of the
tool holder. Each of these pins are of gen-
eral similar construction, each is provided
30 with a casing 32, through which a pin 33, ex-
tends. This pin terminates in an enlarged
pin 34, and between shoulders 35, formed
32, of the casing 32, of the enlarged end 34 of
the movable pin, a spring 36, is arranged,
which spring will urge the enlarged pin 34,
outward.

In the casing 32, I provide recesses 37, and
upon the head 38, of the pin 33, I provide
31 projections 39, which may enter the recesses
37, and allow the enlarged portion 34, to be
projected to a desirable extent.

It will be noted that I have provided a shield 40, and ring 41, covering the toothed
member 13, and pin 17. This shield may be
55 a perforated brass cup and I may provide
a movable ring 42, to secure the beveled gear
7, in position.

From the foregoing description, it is be-
lieved that the operation of this device will
be fully understood. I will however, briefly
detail it referring to the reference charac-
ters that indicate the separate parts.

When my device is to be used as an ordi-

nary drill, that is when it is to turn a twist
drill, to drill holes in relatively soft ma-
terial, the tension of the spring 18, is re-
leased. The spring pin 25, is withdrawn
from the slot 24 and the spring pin 30 in-
serted into the recess 29.

The spring pin 30, locks the tool holder
28, and cup secured thereto, to the gear 22,
whereupon a rotation of the gear 8, by means
of the handle 12, will rotate the gear 9, the
eccentric shaft and eccentric gear 22, and
the tool holder 29, and cup 27. The
speed of revolution of a drill held in the tool
holder 28, will be determined by the rate of
movement of the handle 12.

When a hammer drill is to be used, the
twist drill is removed from the tool holder
28, and star drill or other similar or suitable

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and will allow the eccentric to move in the eccentric gear 22, without effecting the rotation of the internal gear 26.

Other modifications may be made within the scope of the appended claims without departing from the principle or sacrificing the advantages of the invention.

Having carefully and fully described my invention what I claim and desire to secure by Letters Patent is:
1. A drill having a rotating driving gear, an eccentric operated thereby, and internal and external toothed gears, operated by said eccentric, a slotted plate secured to one said gear, and a pin entering said slot to prevent a rotation of said gear, to impart an intermittent revolveable motion to a drill.
2. A device of the character described comprising a toothed member, a gear arranged thereon, an eccentric connected to said gear, a hammer having a pin entering the teeth of said toothed member, resilient means for depressing said hammer and said pin, means for rotating said gear for lifting said hammer against the pressure of said resilient member, and a tool holder and means operated by said eccentric for intermittently rotating said tool holder, said means comprising an externally toothed gear, and a slotted plate secured thereto, and operated by said eccentric, and an internally toothed gear in mesh with said externally toothed gear, and secured to said tool holder.
3. A device of the character described having a driving gear, a driven gear having an eccentric rotated thereby, a gear surrounding said eccentric, and an internal gear, surrounding said last mentioned gear, a tool holder, secured to said internal gear, and a pin non-rotatably connecting said gear around the eccentric for obtaining an intermittent movement of said tool holder by said first mentioned gear.
4. A device of the character described comprising a driving gear 8, and a driven gear 26, having a tool holder 28 secured thereto, an eccentric 14 and gears 9 and 22 between said driven gear and said driving gear for revolving said tool holder, means for securing said tool holder to said driven gear, a slotted plate secured to said driven gear 22, and a spring operated pin entering said slot for preventing a synchronous revolution of said tool holder and said driving gear.
5. A device of the character described comprising a driving gear and means for rotating it, a hollow shaft arranged adjacent to said driving gear and provided with slots, a movable hammer within said hollow shaft and having pins projecting through the slots in said shaft, and a gear rotatable upon said shaft, and having a plurality of projections adapted to engage said projecting pin to elevate said hammer, and means for depressing said hammer.
6. A device of the character described comprising a driving gear and means for rotating it, a tubular member arranged adjacent thereto, and provided with a plurality of longitudinal slots, a movable member within said tubular member and having a pin projecting through said slots, an adjustable resilient member for depressing said movable member within said tubular member and a gear upon said tubular member and rotated by said driving gear, and a plurality of projections upon said second gear for elevating said movable member.
7. A device of the character described comprising a gear and means for rotating it, a tubular member adjacent to said driving gear, a member within said tubular member movable longitudinally therein, a second gear upon said tubular member, and rotated by said driving gear, a plurality of projections rotated by said second gear, and adapted to move said movable member, an eccentric rotated by the said second gear, and a gear and disk upon said eccentric, means for preventing the rotation of said gear, and an internal gear and a tool holder intermittently rotated by the gear upon said eccentric.

Signed at New York city, this 18th day of August, 1916.

EDWARD C. TRUYTER.