

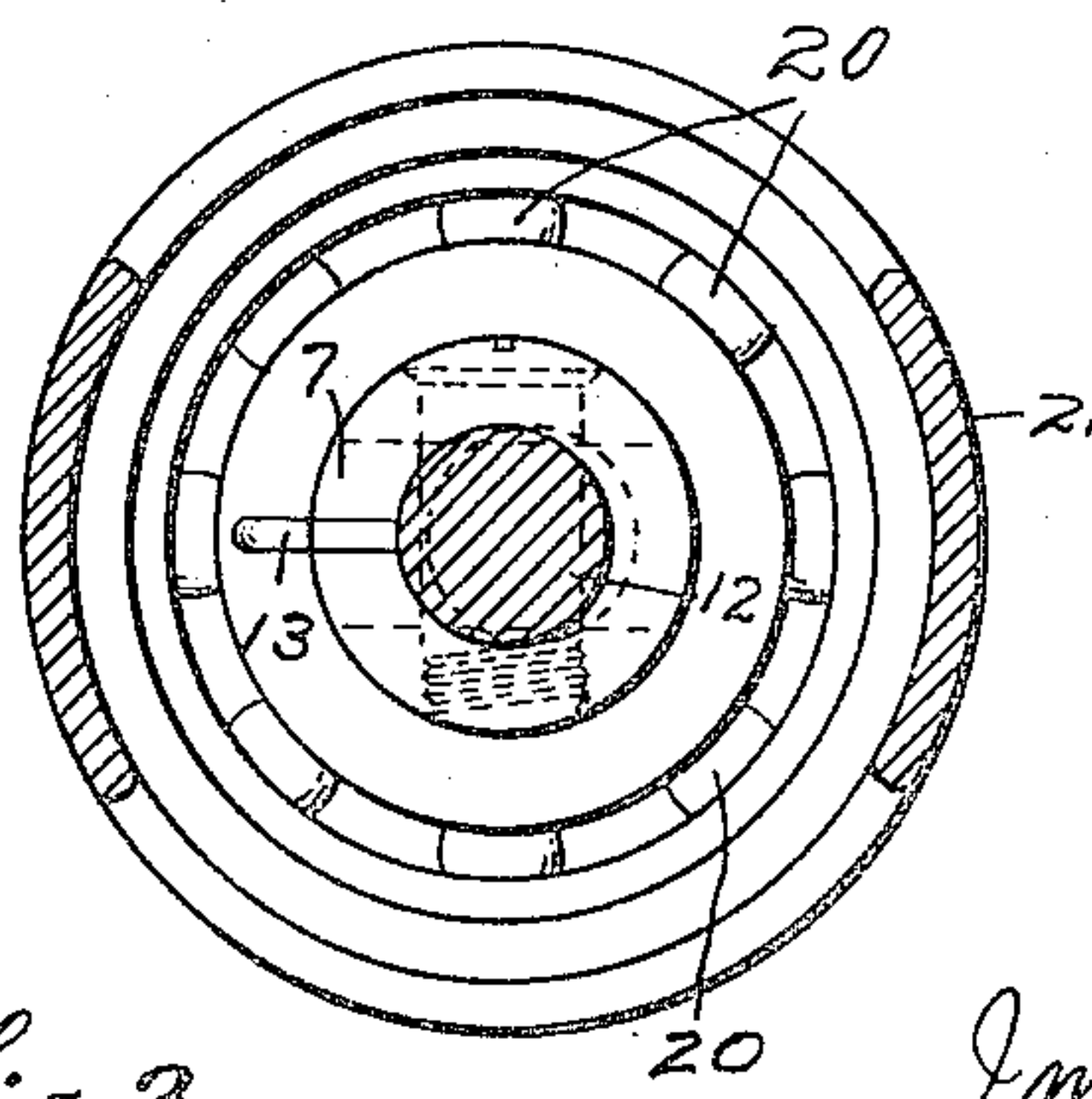
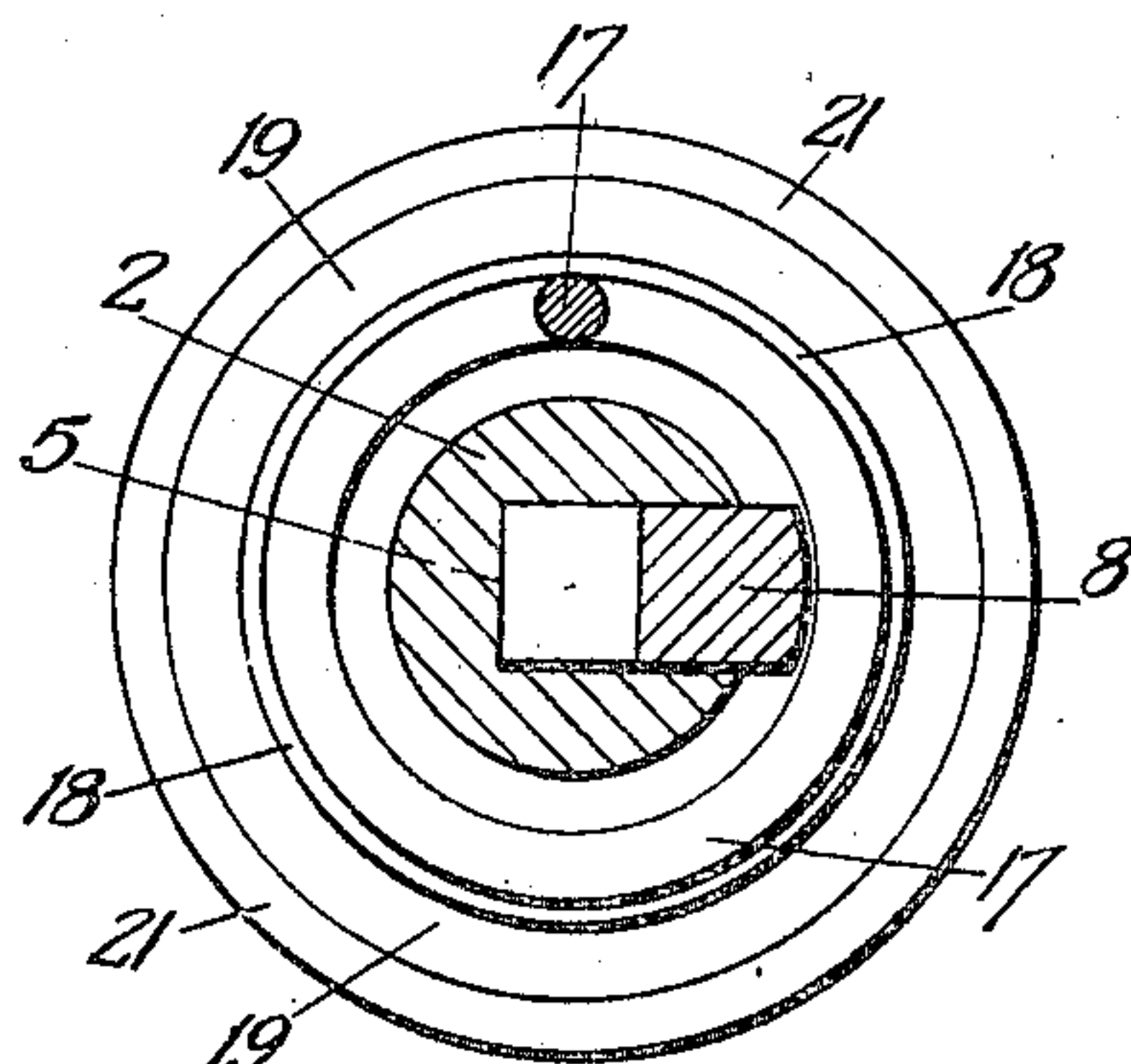
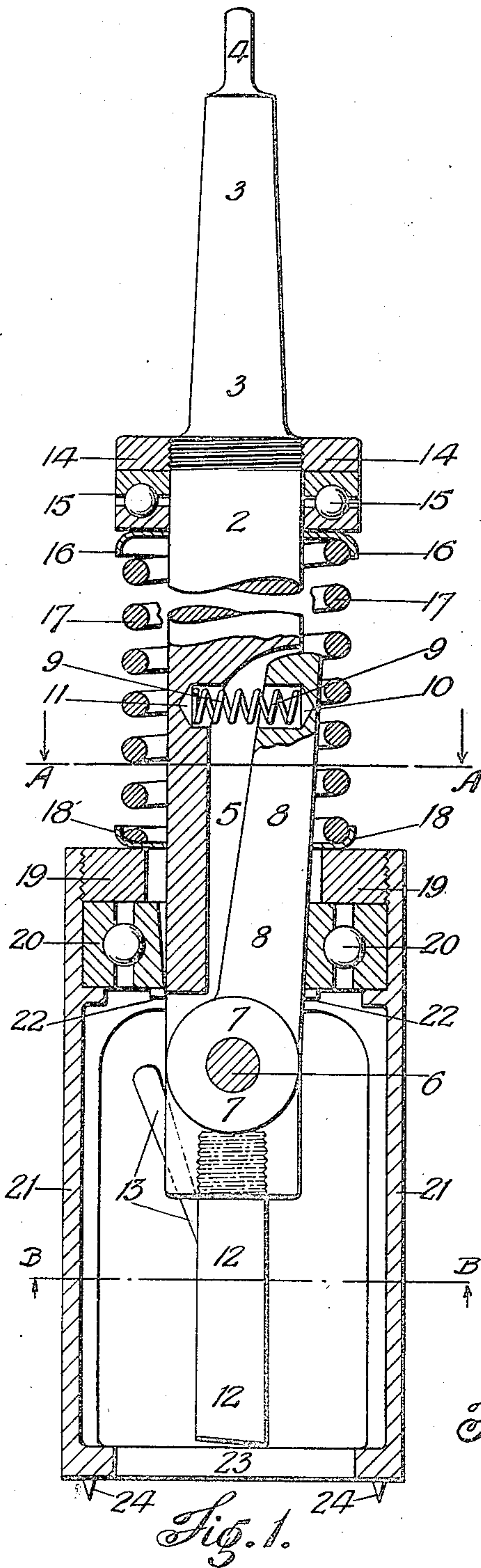
June 19, 1923.

1,459,366

A. GOSPER

EXPANDING AUGER

Filed Aug. 31, 1921



Inventor  
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By  
B. Singer, Atty.



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# UNITED STATES PATENT OFFICE.

AMOS GOSPER, OF BANKSIA, NEAR SYDNEY, NEW SOUTH WALES, AUSTRALIA, ASSIGNOR TO HENRY PETRIE FLETCHER, OF SYDNEY, NEW SOUTH WALES, AUSTRALIA.

## EXPANDING AUGER.

Application filed August 31, 1921. Serial No. 497,252.

*To all whom it may concern:*

Be it known that I, AMOS GOSPER, a subject of the King of Great Britain, residing at Banksia, near Sydney, in the State of New South Wales, Commonwealth of Australia, have invented new and useful Improvements in Expanding Augers, of which the following is a specification:—

This invention relates to an improved self-contained tool for boring an undercut or reverse taper hole in wood or the like in one operation. More particularly it has reference to a tool having a cutting element adapted to incline outwardly as it enters the material being bored, with provision for counter-sinking around the smallest diameter of the hole formed.

A feature of the invention resides in provision for the work being fed to the tool and, further, in causing the cutting element to be de-aligned from the vertical to an inclined plane in synchronism with and under the pressure exerted by the progressive feeding travel of the work, and, still further, in returning the operative elements of the tool to their initial positions as and when the work is withdrawn after boring and countersinking have been completed.

With these and other objects in view, the invention consists of the features of construction, combination and arrangement hereinafter fully described reference being had to the accompanying drawings wherein:—

Figure 1 is a part sectional elevation of the invention.

Figure 2 is a cross-sectional plan taken on line A—A Figure 1.

Fig. 3 is a cross-sectional view on line B—B of Fig. 1.

A tool according to the invention comprises a spindle 2 having a tapered upper end 3 terminating in a lug 4 by which attachment to a drilling machine or the like is effected.

The spindle is provided with a slot-way 5 wherein is mounted a pivot pin 6 to support the boss 7 of a cutter control member or tongue 8 accommodated in the slot-way of said spindle. The tongue 8 normally projects beyond the edge of the spindle 2 under the influence of a coiled spring 9, the outer end of which bears in a recess 10 formed in the upper end of the tongue. The inner end of the spring 9 bears in a recess 11 formed in

the spindle and in communication with the slotway thereof. Threaded into or otherwise secured to the lower end of the tongue 8 is the upper end of a cutting element or bit 12.

Formed in the lower end of the tongue 8 is an inclined hole or slot accommodating a removable counter-sink 13. The counter-sink may be tapered and retained by a driving fit or it may be otherwise secured.

Threaded upon the spindle 2, below the tapered portion 3 thereof, is a nut 14 adapted to retain an upper ball bearing 15. Bearing against the upper ball bearing 15 is an upper inverted cup 16 into which projects the upper end of a compression spring 17 encircling the spindle 2. The lower end of the spring 17 is accommodated in a lower cup 18 resting upon an externally threaded nut 19 adapted to retain a lower ball bearing 20 within a holder 21. The bearing 20 encircles the lower end of the spindle 2 and normally rests upon limit stops 22 carried by the said spindle.

The holder 21 is constructed with a central hole 23 and is provided with holding pins or spikes 24 adapted to enter the material to be bored.

In use, the spindle 2 is secured by the lug 4 to a drilling machine or the like and rotated thereby, the material to be bored being disposed below the holder 21 and fed towards the cutting element 12 by any known or suitable means. The pins or spikes 24 enter the material and prevent it from rotating under the influence of the rotating cutting element 12. As the material or work advances towards the cutting element 12 the holder 21 and ball bearing 20 and nut 19 move along the spindle 2, the tongue 8 being forced inwardly against the pressure of the spring 9 by contact with the encircling bearing 20.

It will be obvious that as the upper end of the tongue 8 moves into the slotway indicated at 5 the cutting element 12 carried by the lower end of the tongue 8 moves outwardly and is inclined to the axis of the spindle 2. A hole is thus cut by the rotating cutting element 12, which is larger at the inner or lower end than at the point of entry. Upon the work being fed a predetermined distance in relation to the cutting element 12 the counter-sink 13 engages the material and by enlarging the narrow end



of the hole cut forms a counter-sunk recess simultaneously with the completion of the hole by the cutting element 12.

The spring 17 is compressed when the work is fed to the cutting element 12 and the holder 21 and its appurtenances are obviously returned to their initial position under its influence as the work is withdrawn. The spring 9 then forces the upper end of the tongue 8 outwardly, thereby returning the cutting element 12 into vertical alignment with the spindle 2. Should it be desired to form reverse tapered holes without a counter-sunk narrow end the counter-sink 13 is removed and the apparatus functions as already described.

What I do claim is:—

1. A tool for boring reverse taper holes comprising a spindle, a pivoted cutter control member carried by the spindle, a cutting element carried by the member, a work holder slidably mounted in relation to the spindle, a bearing in the holder including a member through which the spindle and con-

trol member extend and arranged for actuating the control member and hence the cutter, a second bearing for the spindle, and a spring between the bearings for returning the holder to initial position upon completion of boring, and for also returning the control member and the cutter to initial position synchronously with the holder.

2. A tool for boring reverse taper holes comprising, a spindle, a pivoted tongue carried by the spindle, a spring pressing the tongue beyond the spindle, a cutting element carried by the tongue, a counter-sink carried by the tongue, a ball bearing encircling the spindle and bearing against the tongue, a work holder carrying the bearing, a plurality of pins carried by the holder, and a coiled spring encircling the spindle and bearing upon the holder.

In testimony whereof I affix my signature in presence of a witness.

AMOS GOSPER.

Witness:

W. J. CREAGH.