No. 769,200. PATENTED SEPT. 6, 1904.

W. J. USCHOLD.

EXPANSION BIT.

APPLICATION FILED APR. 11, 1904.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

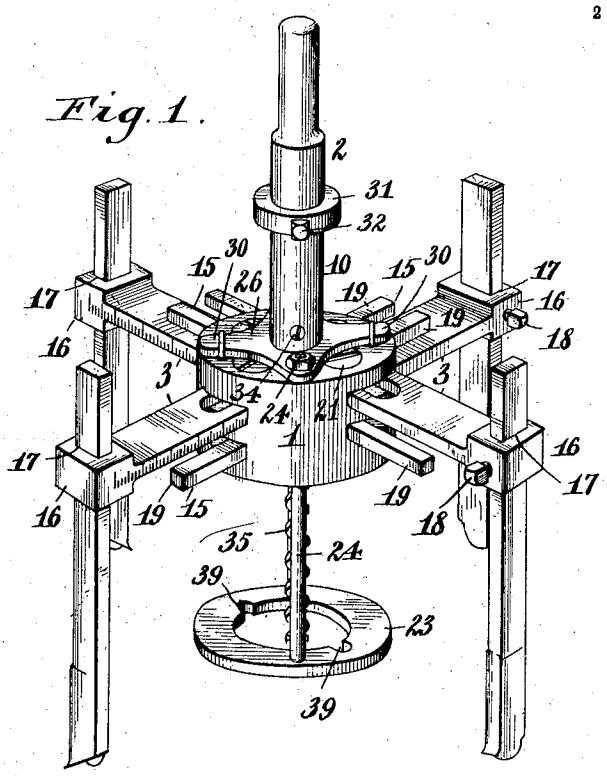


Fig. 2.

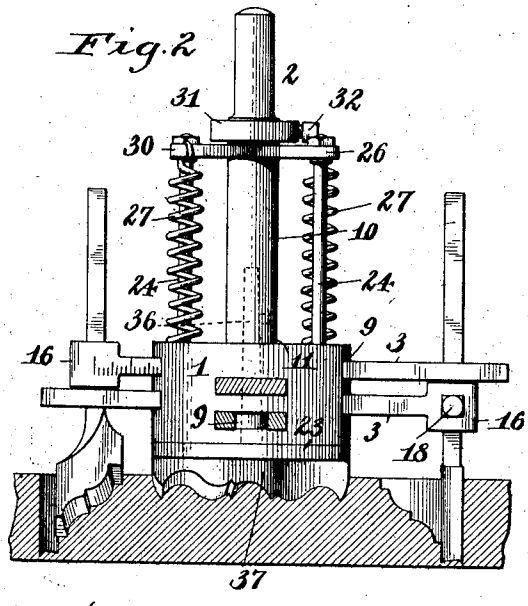
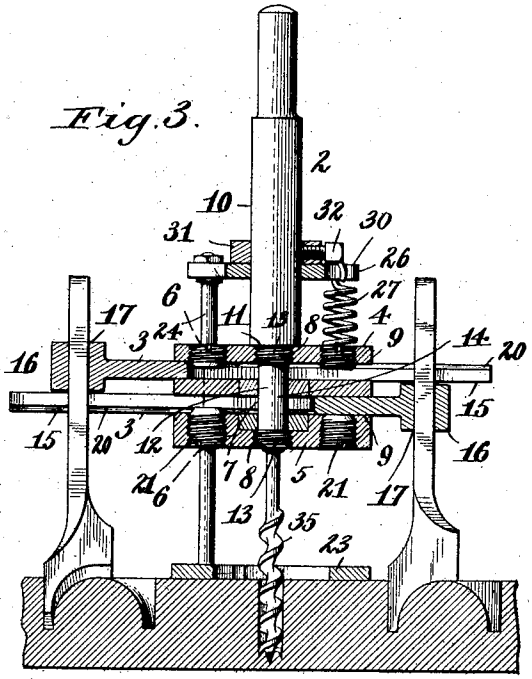


Fig. 3.



Witnesses:

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 4.

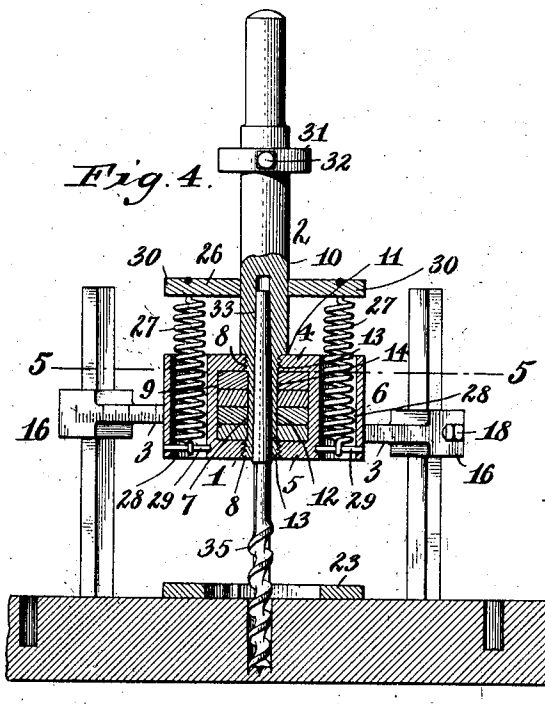


Fig. 5.

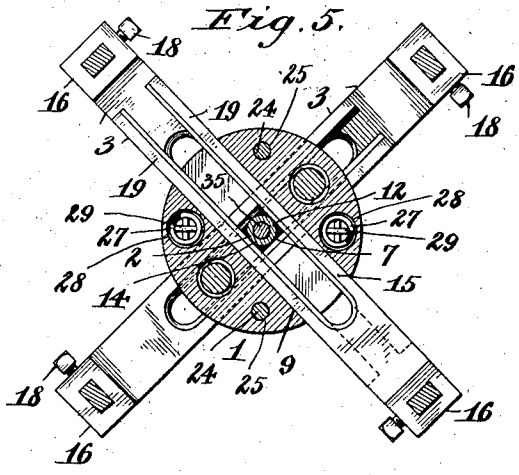


Fig. 8.

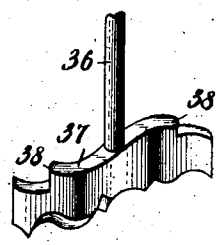


Fig. 6.

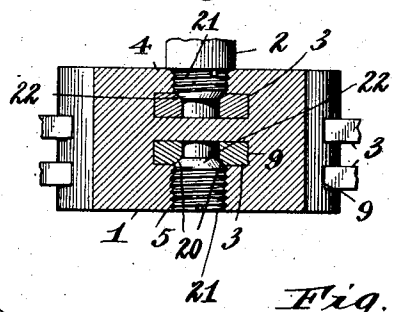


Fig. 7.

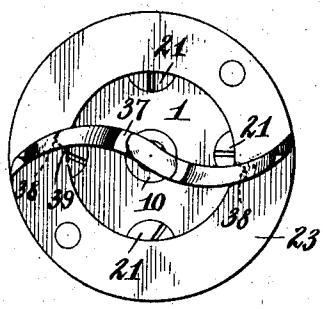
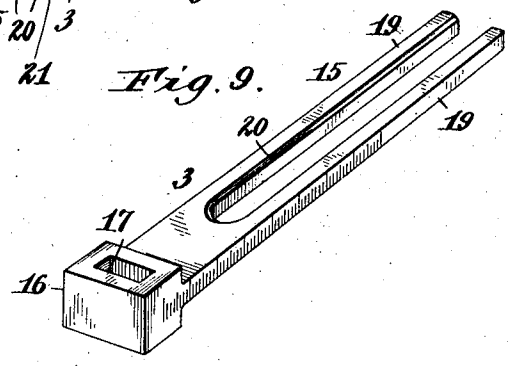


Fig. 9.



Witnesses:

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No. 769,200. Patented September 6, 1904.

UNITED STATES PATENT OFFICE.

WILLIAM J. USCHOLD, OF BUFFALO, NEW YORK.

EXPANSION-BIT.

SPECIFICATION forming part of Letters Patent No. 769,200, dated September 6, 1904.

Application filed April 11, 1904. Serial No. 202,702. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. USCHOLD, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Expansion-Bits, of which the following is a specification.

This invention relates to expansion-bits for cutting circular holes, disks, panels, &c.; and its object is to provide a device of this character which shall be simple and compact in construction and efficient in operation.

It may be said to consist in the details of construction and arrangements of parts set forth in the following specification and illustrated in the accompanying drawings, wherein—

Figure 1 is a perspective view of the device. Fig. 2 is a sectional elevation of the same, showing three different cutters for cutting a circular rosette. Fig. 3 is a vertical section of the tool, showing the cutters partly entered into a piece of wood for cutting an annular groove with a rounded bead therein. Fig. 4 is a vertical section taken through the spring-chambers. Fig. 5 is a horizontal section taken on line 5 5, Fig. 4, showing one of the diametral passages. Fig. 6 is an enlarged vertical section taken on line 6 6, Fig. 3. Fig. 7 is an inverted view of the cutter-head, showing the parts as arranged in Fig. 2. Fig. 8 is a detached perspective view of the central cutter shown in Figs. 2 and 7. Fig. 9 is a detached perspective view of one of the tool-arms.

The reference-numeral 1 designates the cutter-head, 2 the spindle, and 3 the cutter-arms. The cutter-head consists of a shell comprising top wall 4, bottom wall 5, and side wall 6 and having a central chamber 7, registering threaded openings 8 in the top and bottom walls, and diametral passages 9, intersecting at the chamber. The threaded openings 8 and the central chamber 7 together form a vertical aperture, within which fits the spindle 2. The spindle comprises an upper portion 10, whose lower end 11 forms a shoulder or stop engaging with the upper face of the cutter-head around the upper opening 8, and a reduced extension 12, having threaded ends 13 engaging with the threaded openings 8, and an intermediate reduced region 14, standing within the central chamber. Lying in the diametral passages and extending on opposite sides of reduced region 14 are bifurcated shanks 15 of tool-arms 3. The lowest of these shanks engages with the upper face of the lower screw-threaded end of the spindle extension, which forms an enlarged region or stop locking the spindle against upward movement, while shoulder 11 prevents the downward passage of the spindle. While the lower end of the extension is described as an enlarged region or stop, it is to be understood that the whole of the extension is of such diameter as to pass through the vertical aperture when inserted from the upper end thereof.

The diametral passages 9 may vary in number according to the number of tool-arms to be used, but are preferably arranged in parallel pairs—that is to say, the members of each pair are parallel. If desired, the pairs may have a sort of dovetail relation to each other. The object of the above arrangement of passages is to permit the use of a plurality of tool-arms with the greatest economy of space within the cutter-head with reference to other parts which will be described.

Each tool-arm comprises, in addition to bifurcated shank 15 referred to, an end 16, having a vertical aperture 17 and a screw 18, the whole forming a tool-holder. The shank 15 consists of two substantially parallel members 19, free at their outer ends and beveled upon their inner opposed edges 20. As stated, the shank members pass on either side of the spindle. The tool-arm is secured to the cutter-head by wedge members 21 passing through the top and bottom walls of the head and engaging with the upper and lower members of each pair. In this instance the wedge members are set-screws having tapered ends 22, that engage with the beveled edges of the shank members, and as the screws are of greater diameter than the slot between the members the result is a spreading of the shank, firmly clamping the arm within the head. There are preferably two screws for each arm, passing through the wall of the cutter-head at points on opposite sides of the center.

The numeral 23 indicates an annular pressure member adapted to be held yieldingly against the surface of the work to prevent upward crowding of the material. Guide-rods 24 are secured to the pressure member and pass upward through vertical apertures 25 in the cutter-head, being connected at their upper ends to yoke 26, that loosely encircles the spindle. Between the yoke and cutter-head are interposed resilient connections comprising spiral springs 27, housed within vertical chambers 28 in the cutter-head and secured at their lower ends to pins 29, fastened in the walls of the chamber and at their upper ends to arms 30 of the said yoke. A collar 31 is adjustably secured by set-screw 32 to the upper portion of the spindle and is adapted at a certain stage of the operation to contact with the upper face of the yoke 26. The springs 27 are of sufficient strength to hold the yoke normally in contact with the upper face of the cutter-head, while keeping pressure member 23 normally separated from the lower face thereof. I consider the location of the springs within the chambers in the head as an important feature, as it provides for their protection when the bit is not in use and greatly increases the compactness of the instrument.

The cutters will now be described. The spindle 2 is provided in its lower portion with an axial socket 33, and within the socket may be secured by set-screw 34 the shank of any suitable central cutter 35. The tool-holding ends of the tool-arms are occupied by suitable cutters. These may be of greatly-varied construction and may be used with or without the central cutter. Moreover, as the tool-arms are adjustable radially the outer cutters may be set at different distances from the center. The bit is thus adapted to produce an infinite variety of designs. During the cutting operation pressure member 23 is held yieldingly against the face of the work by the tension of springs 27. The collar 31 is intended to be set so that at a desired point in the operation it will contact with yoke 26, transforming the pressure member into a gage and stopping the downward movement of the cutters.

Figs. 2, 7, and 8 illustrate a form of central cutter used in the formation of rosettes, &c. It comprises a shank 36 and a transverse blade 37, having shoulders 38 formed on its upper edge. With this form of cutter the pressure member is removed from the work. It is provided on its inner periphery with opposed notches 39, within which fit shoulders 38, just referred to. When the shank of the cutter is pushed up into the axial socket of the spindle and tightened by the set-screw, the blade engages with the lower face of the pressure member and clamps the latter to the lower face of the cutter-head against the tension of springs 27. As soon as the cutter is removed the springs will automatically return the pressure member to its normal position.

For accurate adjustment the shanks of the tool-arms are provided with scales.

The whole instrument is adapted for a large range of work and possesses a high degree of strength and neatness.

What is claimed as new is—

1. In a device of the character described, a cutter-head having a vertical aperture and a transverse passage intersecting said aperture, a spindle having a stop engaging with the upper face of the cutter-head and being further provided with an extension below said stop removably secured within the aperture and having a stop below the passage, said extension and its stop being of such size as to pass through the aperture; combined with means for locking the spindle against upward movement, comprising a tool-arm standing in the passage and contacting with the upper face of the last-named stop.

2. In a device of the character described, a cutter-head having a vertical, threaded aperture and a transverse passage intersecting said aperture, a spindle having a stop engaging with the upper face of the cutter-head and being further provided with a threaded extension below said stop fitting within the threaded aperture and having a stop below the passage, said extension and its stop being of such size as to pass through the aperture; combined with means for locking the spindle against upward movement, comprising a tool-arm standing in the passage and contacting with the upper face of the last-named stop.

3. In a device of the character described, a cutter-head having a vertical aperture and a transverse passage intersecting said aperture, a spindle having a stop engaging with the upper face of the cutter-head and being further provided with an extension below said stop removably secured within the aperture and having a second stop below the passage, said extension and its stop being of such size as to pass through the aperture; combined with means for locking the spindle against upward movement, comprising a tool-arm having a bifurcated shank standing in the passage on either side of the spindle and contacting with the upper face of the last-named stop.

4. In a device of the character described, a cutter-head having a vertical aperture and a transverse passage intersecting said aperture, a spindle comprising an upper portion whose lower end engages with the upper face of the cutter-head and an extension removably secured within the aperture and having an enlarged region below the passage, said extension being of such diameter throughout as to pass through the aperture; combined with means for locking the spindle against upward movement, comprising a tool-arm standing in the passage and contacting with the upper face of said enlarged region.

5. In a device of the character described, a cutter-head provided with a vertical aperture having threaded portions and a transverse passage intersecting said aperture, a spindle having a stop engaging with the upper face of the cutter-head and being further provided with an extension below said stop, said extension comprising threaded ends engaging with the threaded portions of the aperture and an intermediate reduced region; combined with a tool-arm standing in the passage and contacting with the reduced region of the spindle.

6. In a device of the character described, a cutter-head comprising top, bottom and side walls, and being provided with a central chamber, registering threaded openings in its top and bottom walls communicating with said chambers, and passages through its side walls radiating from the chamber; in combination with a threaded spindle passing through the openings, and tool-arms standing in the passages.

7. In a device of the character described, a cutter-head comprising top, bottom and side walls, and being provided with a central chamber, registering apertures in its top and bottom walls communicating with said chamber, and a plurality of diametral passages through its side walls intersecting the chamber, said passages being arranged parallel in pairs; in combination with a spindle passing through the apertures, and tool-arms having bifurcated shanks standing in said passages and passing on opposite sides of the spindle.

8. In a device of the character described, a cutter-head having a transverse passage, and a tool-arm having a shank standing within said passage, said shank comprising two members having an intervening slot; combined with a wedge member passing through the wall of the cutter-head and engaging with the opposed inner edges of the shank members.

9. In a device of the character described, a cutter-head having a transverse passage, and a tool-arm having a shank standing within said passage, said shank comprising two members having an intervening slot; combined with a set-screw of greater diameter than the width of the slot passing through the wall of the cutter-head and engaging with the opposed inner edges of the shank members.

10. In a device of the character described, a cutter-head having a transverse passage, and a tool-arm comprising a tool-holder and two shank members standing within said passage and having beveled inner edges; combined with a wedge member passing through the wall of the cutter-head and engaging with said beveled edges.

11. In a device of the character described, a cutter-head having a transverse passage, and a tool-arm having a forked shank within said passage comprising two parallel members having their inner edges beveled; combined with a set-screw passing through the wall of the cutter-head and having a tapered end in engagement with said beveled edges.

12. In a device of the character described, the combination with a cutter-head having vertical chambers; of a pressure member, and springs connecting the cutter-head and pressure member and lying within said chambers.

13. In a device of the character described, the combination with a cutter-head having vertical chambers; of a pressure member below the cutter-head, a yoke above the cutter-head, connections between said yoke and pressure member, and springs located in the chambers secured at one end to the cutter-head and at the other end to said yoke.

14. In a device of the character described, the combination with a cutter-head having vertical chambers and vertical apertures; of a pressure member below the cutter-head, a yoke above the cutter-head, rods passing through said apertures and connecting the yoke and pressure member, and springs lying in said chambers and secured at their lower ends to the cutter-head and at their upper ends to the yoke.

15. In a device of the character described, the combination with a cutter-head, a pressure member below said cutter-head, and a resilient connection between the cutter-head and pressure member operating normally to keep them apart; of means for holding the pressure member in contact with the lower faces of the cutter-head, comprising a cutter secured with reference to the cutter-head and in engagement with the lower face of the pressure member.

16. In a device of the character described, the combination with a cutter-head, a pressure member below said cutter-head, and a resilient connection between the cutter-head and pressure member operating normally to keep them apart; of means for holding the pressure member in contact with the lower face of the cutter-head, comprising a cutter having a shank passing through the pressure member and secured with reference to the cutter-head and a lateral blade engaging with the lower face of said pressure member.

17. In a device of the character described, the combination with a cutter-head, an annular pressure member below said cutter-head having notches on its inner periphery, and a resilient connection between the cutter-head and pressure member operating normally to keep them apart; of a cutter comprising a shank passing through the pressure member and secured with reference to the cutter-head and a lateral blade engaging with the lower face of the pressure member and having shoulders occupying the notches therein.

18. In a device of the character described, a cutter-head, a spindle passing therethrough and being provided with a socket in its lower end, an annular pressure member below said cutter-head, and springs operating normally to keep the cutter-head and pressure member

apart; combined with a cutter comprising a shank within said socket and a lateral blade engaging with the lower face of the pressure member, and a set-screw passing through the wall of the spindle and contacting with the shank of the cutter.

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

WILLIAM J. USCHOLD.

Witnesses:
EDWARD USCHOLD,
CHARLES GOEHRIG.