J. C. MARRIOTT.

BORING MACHINE AND CUTTER THEREFOR.

APPLICATION FILED OCT. 4, 1906.

915,301

Patented Mar. 16, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

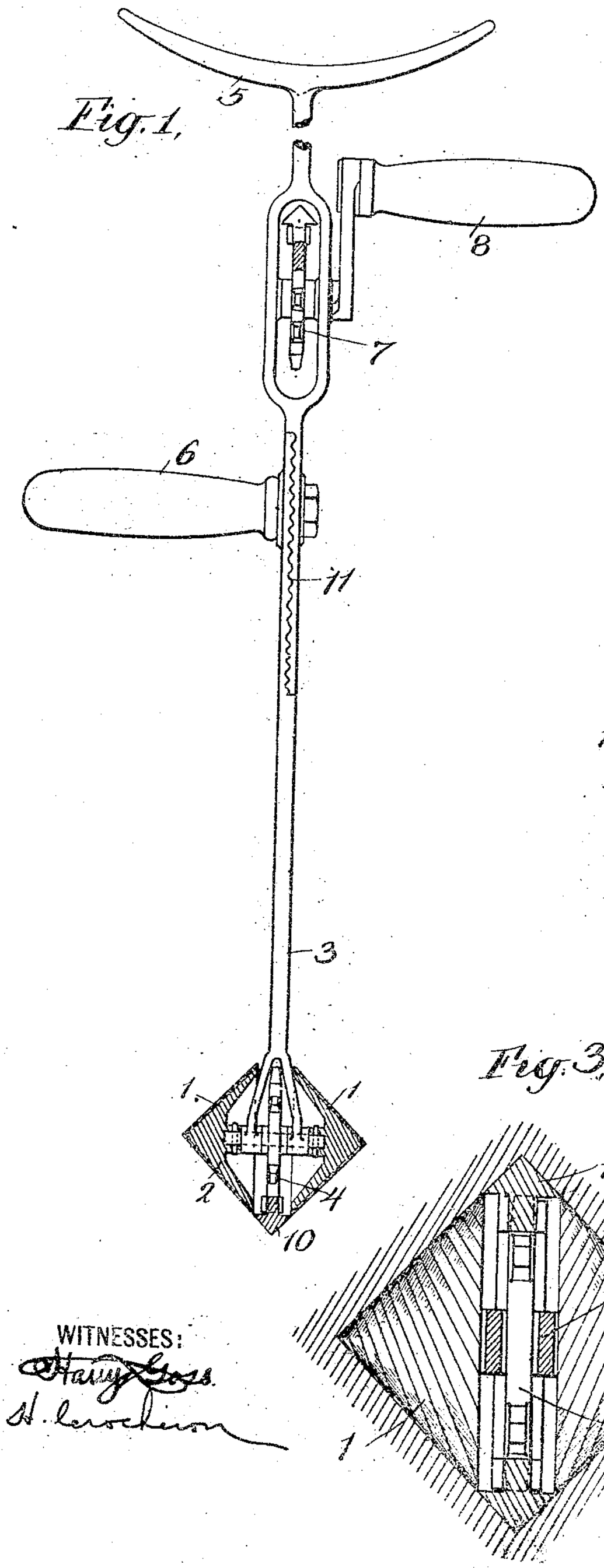

Fig. 2.

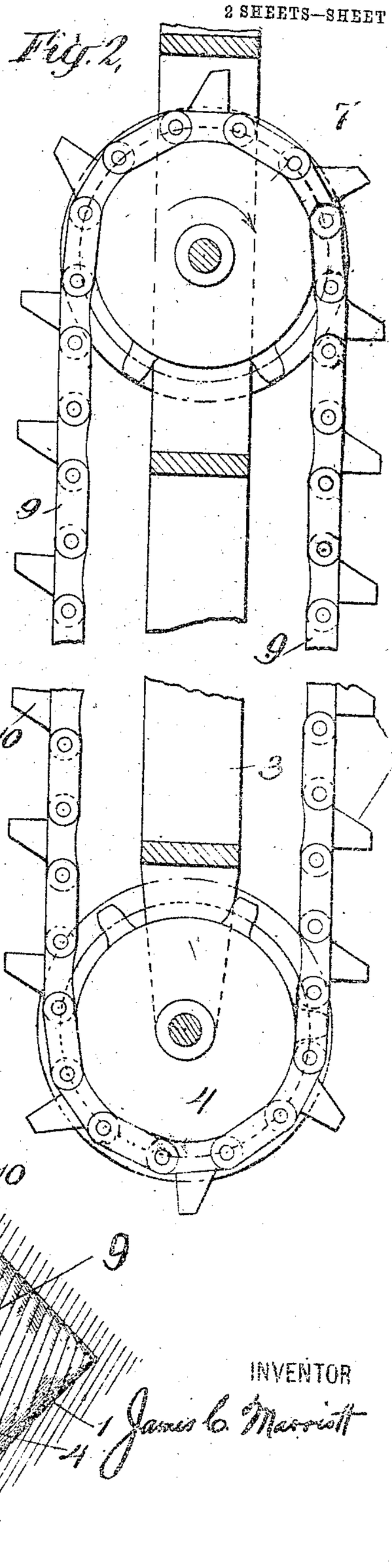

Fig. 3.

WITNESSES:

H. Lenchen

INVENTOR

James C. Marriott

J. C. MARRIOTT.

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2 SHEETS—SHEET 2.

Fig. 4.

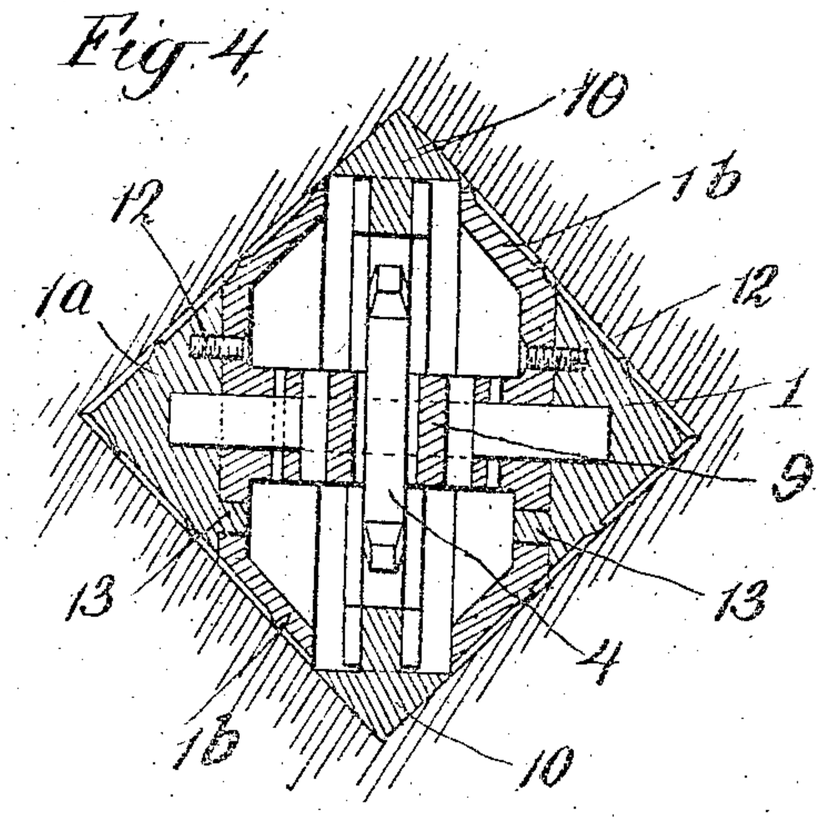


Fig. 6.

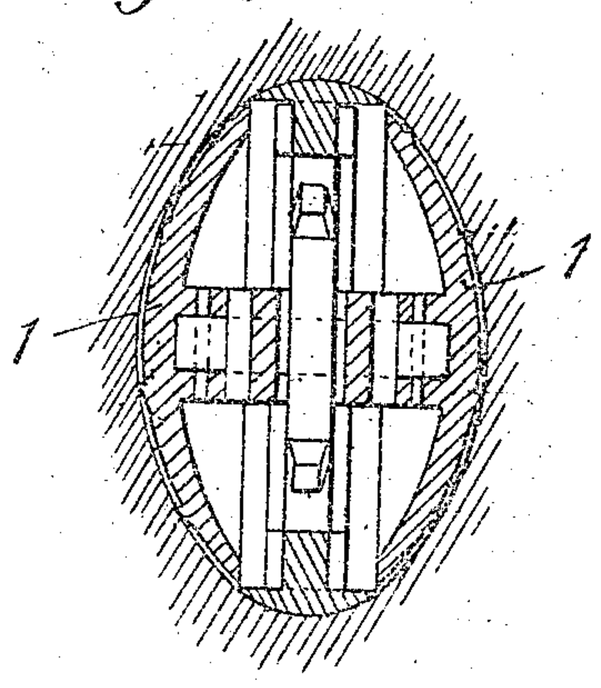


Fig. 5.

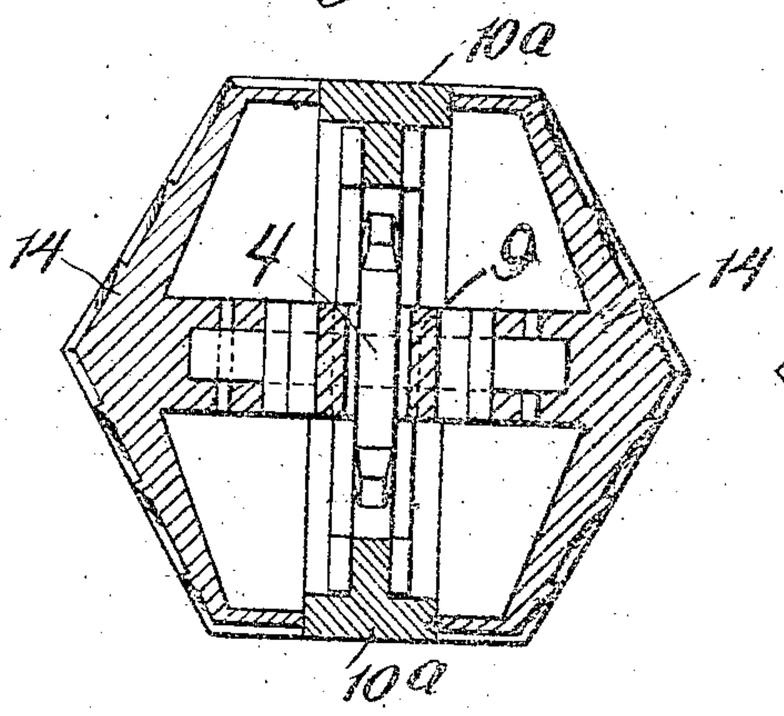


Fig. 7.

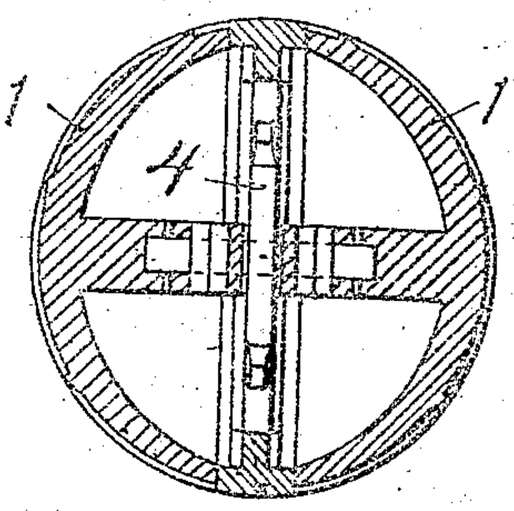


Fig. 10.

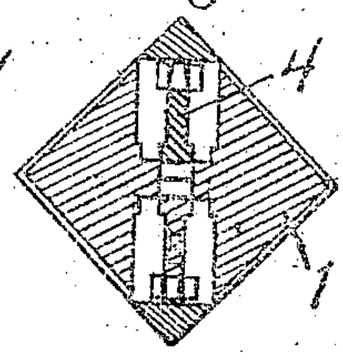


Fig. 9.

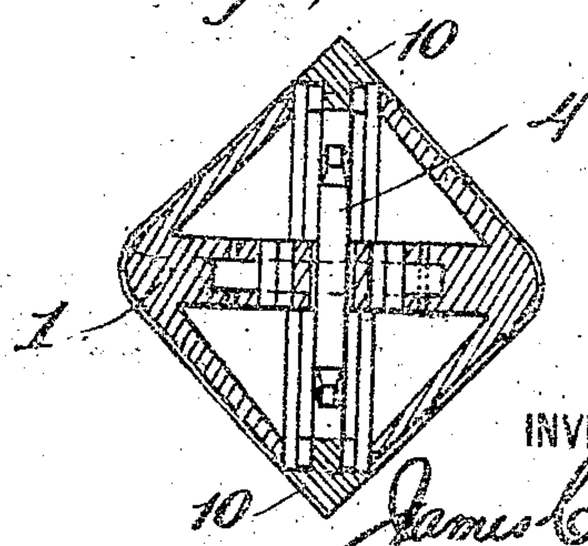
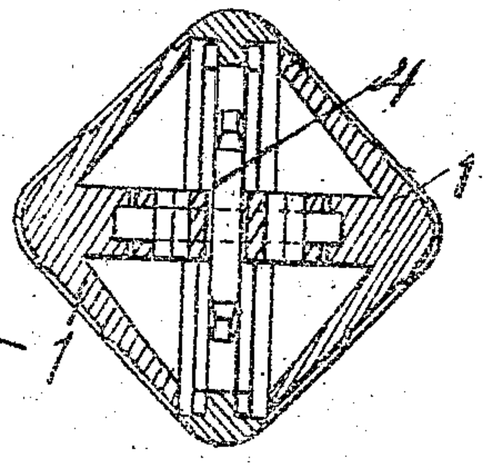


Fig. 8.



WITNESSES:

Harry Goes.

H. Loescheron

INVENTOR

James C. Marriott

UNITED STATES PATENT OFFICE.

JAMES C. MARRIOTT, OF NEW DORP, NEW YORK.

BORING-MACHINE AND CUTTER THEREFOR.

No. 915,301. Specification of Letters Patent. Patented March 16, 1909.

Application filed October 4, 1906. Serial No. 337,440.

To all whom it may concern:

Be it known that I, JAMES C. MARRIOTT, a citizen of the United States, residing at New Dorp, Staten Island, in the county of Richmond, city of New York, and State of New York, have invented certain new and useful Improvements in Boring-Machines and Cutters Therefor; and I do hereby declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in boring machines, and comprises what may be termed a universal boring machine; that is to say, a machine adapted to bore holes of many different cross sections. The machine herein described is particularly intended for boring square and like holes; but by changing the cutters it may be adapted for boring holes of round, elliptical, and various other sections.

My invention consists in the novel construction of the boring machine; in the novel cutters employed; and in various other features hereinafter described and particularly pointed out in the claims.

The objects of my invention are, to provide a boring machine capable of boring at will, holes of great variety of cross sections, ranging from circular to square and other non-circular cross sections, capable of generation by a rotary cutter; to improve and simplify machines for boring holes of non-circular cross section; and generally to make the improved boring machine simple, compact, easily operated and adaptable for boring holes of a great variety of cross sections.

I will now proceed to describe my invention with reference to the accompanying drawings, in which one form of boring machine and certain forms of cutters therefor are illustrated, and will then point out the novel features in claims.

In the said drawings: Figure 1 shows an end elevation of my said boring machine, the cutters thereof being shown in section. Fig. 2 shows a side elevation and partial section of such boring machine. Fig. 3 shows a horizontal transverse section through the axis of the cutters, which latter are shown within a hole such as they are adapted to bore. Figs. 4, 5, 6, 7, 8, 9, and 10, are views similar to Fig. 3, except that the cutters are shown in section, illustrating other forms and constructions of cutters, which may be employed.

According to my invention, I employ in my boring machine, one or more rotary cutting sections, consisting of horizontally rotating bits, or spindles provided with cutting edges adapted to rotate about an axis which is one of the axes of the cross section of the hole to be bored. In the case of a hole of square or like section this axis of rotation of the bit forms, preferably, one of diagonals of such square; in the case of an elliptical hole it forms preferably, the major axis of the ellipse, and in every case the form of the bit and the location of its axis are such that said bit rotating about said axis will cut a hole of the desired cross section.

For the purpose of illustration I will first describe my boring machine as adapted for boring holes of square cross section. For this purpose reference will be made to Figs. 1, 2 and 3. In said figures, numeral 1 designates a bit comprising two conical sections, mounted upon a shaft 2, the axis of which is a line connecting the apices of said cones, said shaft mounted in a bearing in a strut or brace 3, said shaft also carrying a sprocket wheel 4. Said strut or brace is provided with convenient means for holding it steady and for pressing down to cause the bit to feed. I have shown for this purpose a breast piece 5 and a handle 6. It is further provided with bearings for a sprocket wheel 7 in line with sprocket wheel 4, and with means for rotating said sprocket wheel 7, as for example, crank handle 8, and a sprocket chain 9 connecting sprocket wheels 4 and 7, and serving to drive wheel 4 and therefore to drive the bit 1. By reference to Fig. 3 it will be seen that the axis of rotation of bit 1 is one of the diagonals of the hole to be bored. The apices of the bit 1 will obviously cut well into two corners of the hole to be bored, forming sharp corners; but since the bases of the two sections cannot come together (they must be separated by a slot through the strut 3 and the sprocket chain 9 pass), in order to cut the other two corners of the hole I provide certain of the links of said sprocket chain with teeth 10 which will cut well into these corners. In order to adapt the machine for cutting holes of different sizes, I may provide

bits, and corresponding sprocket wheels 4, of sizes corresponding to the different sizes of holes to be cut; it being a simple matter to remove one bit and sprocket wheel, and substitute another bit and sprocket wheel. The strut 3 is provided with a telescopic adjustment, as indicated at 11, to permit adjustment of the distance between the sprocket wheels 4 and 7 necessitated by variation of size of sprocket wheel 4. Each cutter section may also be made in sections, so that with one pair of end sections, and various intermediate sections and sprocket wheels, the device may be adjusted for holes of different sizes. This is illustrated in Fig. 4, in which 1^a, 1^a, are the end sections, and 1^b, 1^b, intermediate sections, connected to end sections 1, 1, by screws 12 and dowels 13, as shown.

Fig. 5 illustrates a cutter 14, adapted to cut hexagonal holes. In this case the teeth 10^a of the chain have straight faces, as shown.

Fig. 6 shows a cutter of elliptical cross-section (the section being taken through the axis of rotation) adapted for cutting elliptical holes. Fig. 7 shows a similar cutter for cutting circular holes.

When cutting holes of square, hexagonal, or like angular cross-section, instead of using a cutter which will cut clear into the corners, as shown in Figs. 1–5 inclusive, I may use a cutter which will form rounded corners, as shown in Fig. 8. This will permit more rapid cutting, and is permissible in most cases. Or, as shown in Fig. 9, I may use a bit 1 forming rounded corners, and teeth 10 on the chain links forming sharp corners, and after the hole has been bored, may withdraw the machine from the hole, turn it around a quarter turn, and run it down through the hole again, the V-shaped teeth of the chain cleaning out rapidly the rounded corners left by the rounded bits 1.

It will be seen that my universal boring machine is adapted for boring in one operation a hole of any cross-section which has an axis of symmetry without angles reëntering longitudinally upon such axis.

It is not necessary that the bits be formed in two or more sections connected together. Instead, the bit may be entirely in one piece, as shown in Fig. 10, the sprocket wheel being formed in two parts, so as to be capable of being passed over the central portion of the bit, or being otherwise secured to said bit, or being cast on.

What I claim is:—

1. A cutter for a boring machine of the class described, consisting of a bit of any variety of shape, revolving on a horizontal axis, which is the longest axis of symmetry of the hole to be cut.

2. A boring machine consisting of the strut 3 in which is journaled the shaft 2, the axis of which is the longest axis of symmetry of the hole to be cut, the bit 1 mounted on said shaft, and cutting teeth 10, mounted on the chain 9 and adapted to cut around said chain and bearings, and means for driving said chain and shaft.

3. In a boring machine, a cutter consisting of one or more bits revolving about an axis which constitutes the longest axis of symmetry of a cross-section of the hole to be cut, bearings for said bits, and means for driving the same, and a cutting chain cutting around said bearings and driving mechanism.

4. A boring machine of the class described, comprising a rotary cutter having tapering cutting portions arranged base to base upon an axis of rotation adapted to form an axis of symmetry of the cross-section of the hole to be cut, and means for holding said cutter and for rotating the same.

5. A boring machine of the class described, comprising a rotary cutter having tapering cutting portions arranged base to base upon an axis of rotation, connecting corners of the axial cross-section of said cutter, and means for holding said cutter and for rotating the same.

6. A boring machine of the class described, comprising a rotary cutter having tapering cutting portions arranged base to base upon an axis of rotation connecting corners of the axial cross-section of said cutter, a brace for holding the cutter, projecting through a space between said cutting portions, and means for rotating the cutter likewise passing through said space.

7. A boring machine of the class described, comprising a rotary cutter having tapering cutting portions arranged base to base upon an axis of rotation connecting corners of the axial cross-section of said cutter, a brace for holding the cutter, projecting through a space between said cutting portions, and a sprocket chain likewise passing through said space and sprocket wheels driving said chain and for driving said cutter from said chain.

8. A boring machine of the class described, comprising a rotary cutter having tapering cutting portions arranged base to base upon an axis of rotation connecting corners of the axial cross-section of said cutter, a brace for holding said cutter projecting through a space between said cutting portions, and sprocket gearing for driving said cutter comprising a chain passing through said space and provided with teeth for cutting across the same.

9. A boring machine of the class described, comprising in combination a rotary cutter having tapering cutting portions and driving means for said cutter passing through a space between said cutting portions and provided with cutting means completing the outline of the said tapering cutting portions, and ar-

ranged to cut across the gap therebetween, said cutter arranged to rotate about an axis of rotation adapted to form an axis of symmetry of the cross-section of the hole to be cut.

10. A boring machine of the class described, comprising in combination a rotary cutter having tapering cutting portions and driving means for said cutter passing through a space between said cutting portions and comprising a drive chain provided with cutting means completing the outline of the cross-section of the hole to be cut, and arranged to cut across the gap between said tapering cutting portions, said cutter arranged to rotate about an axis of rotation adapted to form an axis of symmetry of the cross-section of the hole to be cut.

11. A cutter for a boring machine of the class described, comprising twin tapering cutting portions, having cutting edges from base to apex, and arranged base to base upon a common axis.

12. A cutter for a boring machine of the class described comprising twin composite tapering cutting sections, each comprising an end piece and an intermediate piece or pieces secured together, said cutting sections arranged base to base upon a common axis.

13. A cutter for a boring machine of the class described, consisting of a bit revolving on a horizontal axis, which is the longest axis of symmetry of the hole to be cut, said bit comprising an end piece and one or more other pieces secured together.

14. A cutter for a boring machine of the class described, comprising twin tapering cutting portions, each comprising a toothed 90° cone, said cones arranged base to base upon a common axis.

15. A cutter for a boring machine of the class described comprising twin tapering cutting portion, each comprising a 90° cone provided with cutting edges, said cones arranged base to base upon a common axis, with a space between and provided with bearing and driving means in said space.

In testimony whereof I affix my signature, in the presence of two witnesses.

JAMES C. MARRIOTT.

Witnesses:
ROGER H. LYON,
H. M. MARBLE.