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F. BRYAN.

SQUARE AUGER.

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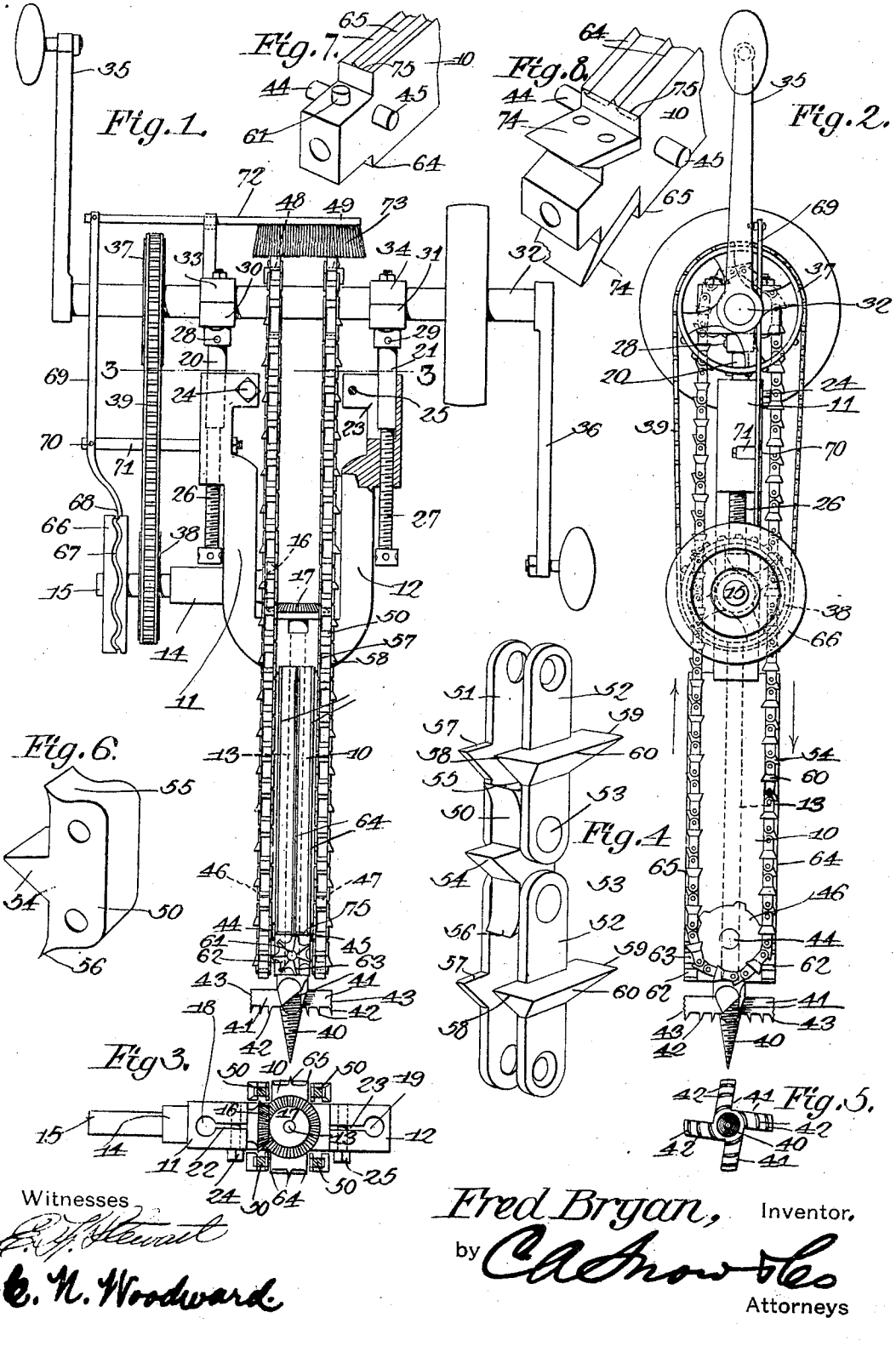

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SQUARE AUGER.

No. 799,889. Specification of Letters Patent. Patented Sept. 19, 1905.

Application filed June 6, 1905. Serial No. 263,992.

To all whom it may concern:

Be it known that I, FRED BRYAN, a citizen of the United States, residing at Mainesburg, in the county of Tioga and State of Pennsylvania, have invented a new and useful Square Auger, of which the following is a specification.

This invention relates to implements for forming square or oblong holes, and has for its object to improve the construction and increase the efficiency and utility of devices of this character.

With these and other objects in view, which will appear as the nature of the invention is better understood, the same consists in certain novel features of construction, as hereinafter fully described and claimed.

In the accompanying drawings, forming a part of this specification, and in which corresponding parts are denoted by like designating characters, is illustrated the preferred form of embodiment of the invention capable of carrying the same into practical operation, it being understood that the invention is not necessarily limited thereto, as various changes in the shape, proportion, and general assemblage of the parts may be resorted to without departing from the principle of the invention or sacrificing any of its advantages.

In the drawings thus employed, Figure 1 is a front elevation, partly in section, and Fig. 2 is a side elevation, of the improved device. Fig. 3 is a plan view, in transverse section, on the line 3 3 of Fig. 1 with the drive-chain and its lower sprocket-wheel detached and also with the chip-brush-operating mechanism detached. Fig. 4 is an enlarged perspective view of a portion of one of the cutting-chains. Fig. 5 is a bottom plan view of the boring implement detached. Fig. 6 is a perspective view of one of the chain-links, enlarged. Fig. 7 is a perspective view of the lower end of the standard member with the attachments removed. Fig. 8 is a view similar to Fig. 6, illustrating a modification in a portion of the device.

The improved device comprises a supporting-standard 10, having a frame extending from the upper end and divided into two members 11 12. The standard portion 10 is provided with a longitudinal bearing to receive a shaft 13, and the spaced member 11 is provided with a transverse bearing 14 to receive a shaft 15, the two shafts having interengaging bevel-gears 16 17 on their adjacent ends, so that the rotation of the shaft 15 will be transmitted to the shaft 13.

The upper ends of the spaced frame members 11 12 are provided, respectively, with sockets 18 19 to receive standards 20 21, the standards being "split," as at 22 23, on one side and provided with clamp-bolts 24 25, by which means the standards may be firmly "pinched" in the sockets.

The upper portions of the side members 11 12 overhang, as shown in Fig. 1, and operating in these overhanging portions are adjusting-screws 26 27, bearing beneath the standards 20 21 and adjustably supporting the same.

Pivoted to swing, as by pins 28 29, upon the upper ends of the standards 20 21 are half-bearings 30 31 for supporting a drive-shaft 32, the latter held in place on the half-bearings by caps 33 34 and adapted to be rotated by handles 35 36.

Attached, respectively, to the shafts 32 and 15 are chain-gears 37 38, connected by a chain 39, by which motion is transmitted from the shaft 32 to the shaft 15, the object to be hereinafter explained.

Attached to the lower end of the shaft 13 is an auger member consisting of a screw-tip 40 and radial cutting-blades 41, the blades having concentrically-arranged depending cutters 42 and with the outer faces of the cutting-blades threaded, as at 43. By this means as the shaft 13 is rotated a circular aperture is bored in the material in advance of the standard 10. The peculiar and novel construction of the circularly-operating auger member insures very rapid action, the "tip" 40 engaging the wood in advance of the cutting-blades, the cutters 42 dividing the material into a plurality of relatively narrow rings which are more readily acted upon by the blades 41. The sections of screw-threads 43 upon the outer ends of the blades 41 also materially aid in the action by engaging the interior walls of the aperture and holding the blades to their work and preventing any tendency to retrograde movement. The sectional threads 43 thus coact with the screw-tip 40 to draw the auger member into the material and greatly accelerate the action of the cutting members.

Extending from the standard 10 adjacent to the auger member are studs 44 45, upon

which chain-wheels 46 47 are rotatively mounted and in alinement with similar chain-wheels 48 49 on the shaft 32, the chain-wheels having cutting-chains of peculiar and novel construction running thereover. The construction of these chains is shown more clearly in Figs. 4 and 6 and consists of alternating solid links 50 and spaced strap-links 51 52, movably connected by pivots 53, as shown. The solid links are formed with a central laterally-extending cutter 54 and with sharpened ends, as at 55 56, while the strap-link 51 is provided with lateral cutters 57 on the side next the cutter 54 of the solid link and the strap-link 52 provided with lateral cutters 58 59 upon either side and connected by side cutters 60, the three cutting edges being integral with the strap portion. Two of the cutting-chains are employed and with the cutting portions of the chains arranged to operate right and left handed—that is to say, with the side cutter portions 60 upon the outer sides. When a square hole is to be formed, the total length of the side cutters 60 and the transverse distance between each opposite pair of the same on the two chains will be the same and also equal to the diameter of the circular auger member, so that as the chains are rotated in the direction of the arrows the circular aperture formed by the auger member will be "squared," as will be obvious. It will also be obvious that by enlarging the sprocket-wheels and adjusting the shaft 32 the chains will cut an oblong hole without structural change in the structure. All the cutting-surfaces of the chain-links coact to produce the desired results, the side cutters 60 severing the material at the sides of the chains and the lateral cutters 54, 57, and 58 severing the material at the front and rear of the chains, the cutting ends 55 56 acting while the chains are turning at the bottom of the aperture, as indicated in Fig. 2.

Extending from the front and rear of the standard 10 are studs upon which disks are mounted for rotation, the disks having radiating cutting-ribs for severing the small amount of the material left between the cutting members 57 of the opposite chains. One of these studs is shown at 61 and one of the disks at 62, with its radial cutting-ribs at 63, and it will be understood that one of the disks may be arranged at each side of the standard or upon one side only, as required. The standard 10 is also provided with spaced vertical guide-ribs 64 65 for entering the sides of the aperture as the cutting proceeds, and thus materially assists in guiding the implement and preventing any tendency of the chains to twist in the aperture by the reaction of the boring member. The central rib of the series projects farther than the side ribs, as shown, to increase the efficiency. The ribs 64 65 are extended transversely of the standard at the lower end, as shown at 75 in Figs. 1, 3, 7, and 8, to prevent the chips from the boring implement working into the sprocket-wheels.

The device is simple in construction, can be inexpensively manufactured in any desired size, and operates effectually for the purposes described.

The chains are reversible, so that when the ends 58 become dulled the chains may be transposed upon the carrier-wheels and the ends 59 brought into action, thereby materially increasing the "life" of the device.

Any required power may be employed to operate the device.

Attached to the counter-shaft 15 is a wheel 66, having a "zigzag" channel 67 in its rim in which one end 68 of an arm 69 is entered, the arm being pivoted to swing, as at 70, upon a bracket 71, extending from the frame member 11, and with a rod 72 connected to the upper end of the arm and carrying a brush 73 for operation upon the cutting-chains. By this arrangement as the different parts of the device are operated the brush 73 will be rapidly vibrated over the cutting-chains as they pass over the carrier-wheels 48 49, and thus remove any chips which may adhere thereto.

Flat chisel members may be substituted for the rotary disk members 62, if preferred and as shown at 74.

All the bearings will preferably be of the "ball" or "roller" form to decrease the friction.

Having thus described the invention, what is claimed is—

1. In a device of the class described, an auger member for boring a circular cavity, and chains spaced apart and provided with cutting members and operating in the rear of said auger member for transforming said cavity into square shape.

2. In a device of the class described, an auger member for boring a circular cavity, endless chains spaced apart and provided with cutting members upon their links, and means for operating said chains simultaneously with said auger and in the rear of the same, for transforming said cavity into square shape.

3. In a device of the class described, an auger member for boring a circular cavity, chains spaced apart and provided with cutting members and operating in the rear of said auger member for cutting two of the sides of said cavity into parallel form, and cutters disposed between said chains for cutting the remaining sides of said cavity and completing the square form of the same.

4. In a device of the class described, an auger member for boring a circular cavity, endless chains spaced apart and formed of alternating solid links and spaced strap-links pivotally united, said solid links having lateral cutters and said strap-links having lateral and side cutters coinciding with the solid-link cutters and said chains operating in the rear of

said auger member for transforming said cavity into square shape.

5. In a device of the class described, an auger member for boring a circular cavity, endless chains spaced apart and formed of alternating solid links and spaced strap-links pivotally united, said solid links having lateral cutters intermediate their lengths and with cutting edges at the ends, and said strap-links having lateral and side cutters coinciding with the solid-link cutters and said chains operating in the rear of said auger member for transforming said cavity into square shape.

6. In a device of the class described, a standard, a shaft extending through said standard and rotative therein, an auger member connected to said shaft for boring a circular cavity, and chains provided with cutter members and connected to said standard for operation in the rear of said auger member for transforming said cavity into square shape.

7. In a device of the class described, a standard, a shaft extending through said standard and rotative therein, an auger member connected to said shaft for boring a circular cavity, and chains provided with cutter members and connected to opposite sides of said standard for operation in the rear of said auger member for cutting two sides of said cavity into parallel shape, and cutter members attached to said standard between said chains for cutting the remaining sides of said cavity and completing the square form of the same.

8. In a device of the class described, an auger member formed with a tapering screw-bit and radiating horizontal cutting-blades having a plurality of concentric cutters spaced apart and depending therefrom and with coinciding screw-threads upon the free ends of said blades, in combination with chains spaced apart for movement in the rear of said auger member and provided with cutting members operating to transform the circular cavity produced by said auger member into square shape.

9. In a device of the class described, an auger member formed with a tapering screw-bit and radiating horizontal cutting-blades having a plurality of concentric cutters spaced apart and depending therefrom and with coinciding screw-threads upon the free ends of said blades, in combination with chains spaced apart for movement in the rear of said auger members and provided with cutting members for forming two sides of said cavity into parallel shape, and cutters operating between said chains for cutting the remaining sides of said cavity and completing the square form of the same.

10. In a device of the class described, a standard, a shaft extending through said standard and rotative therein, an auger member connected to said shaft for boring a circular cavity and consisting of a tapering screw-bit and radiating horizontal cutting-blades having a plurality of concentric cutters spaced apart and depending therefrom and with coinciding screw-threads upon the free ends of said blades, and endless chains upon opposite sides of said standard for operation in the rear of said auger and provided with cutters for transforming the circular cavity into square shape.

11. In a device of the class described, a standard, a shaft extending through said standard and rotative therein, an auger member connected to said shaft for boring a circular cavity and consisting of a tapering screw-bit and radiating horizontal cutting-blades having a plurality of concentric cutters spaced apart and depending therefrom and with coinciding screw-threads upon the free ends of said blades, and endless chains upon opposite sides of said standard for operation in the rear of said auger and provided with cutters for cutting two of the sides of said cavity into parallel form and cutters disposed between said chains for cutting the remaining sides of said cavity and completing the square form of the same.

12. In a device of the class described, a standard having spaced members extending from one end, a drive-shaft mounted for rotation upon said spaced members, a shaft mounted for rotation in said standard, an auger member connected to the outer end of said standard-shaft, chain-pulleys mounted for rotation upon said standard and adjacent to said auger member, chain-pulleys carried by said drive-shaft and spaced apart thereon, endless chains operating over said chain-pulleys and provided with cutter members and operating to transform the cavity formed by said auger member into square shape, and means for transmitting the motion of said drive-shaft to said auger-shaft.

13. In a device of the class described, a standard having spaced members extending from one end, a drive-shaft mounted for rotation upon said spaced members, a shaft mounted for rotation in said standard, an auger member connected to the outer end of said standard-shaft, chain-pulleys mounted for rotation upon said standard adjacent to said auger member, chain-pulleys carried by said drive-shaft and spaced apart thereon, and endless chains operating over said chain-pulleys and provided with cutter members and operating to transform the cavity formed by said auger member into square shape, means for adjusting said drive-shaft to control the tension of said chains, and means for transmitting the motion of said drive-shaft to said auger-shaft.

14. In a device of the class described, a stationary standard having spaced members extending from one end and provided respectively with longitudinal sockets and lateral slits leading from said sockets, standards movably engaging said sockets and having shaft-bearings upon their free ends, screws operating through said spaced members and operat-

ing to clamp said movable standards in said sockets, adjusting-screws operating in said spaced members and bearing longitudinally upon said movable standards, a drive-shaft mounted for rotation in the bearings upon said movable standards, a shaft mounted for rotation in said stationary standard and having an auger member connected to the outer end of the same, chain-pulleys mounted for rotation upon said stationary standard adjacent to said auger member, chain-pulleys carried by said drive-shaft and spaced apart thereon, and endless chains operating over said chain-pulleys and provided with cutter members and operating to transform the cavity formed by said auger member into square shape, and means for transmitting the motion of said drive-shaft to said auger-shaft.

15. In a device of the class described, a standard having spaced members extending from one end, a drive-shaft mounted for rotation upon said spaced members, a shaft mounted for rotation in said standard, an auger member connected to the outer end of said standard-shaft, and a bevel-gear carried by the inner end of the same, chain-pulleys mounted for rotation upon said standard adjacent to said auger member, chain-pulleys carried by said drive-shaft and spaced apart thereon, endless chains operating over said chain-pulleys and provided with cutter members and operating to transform the cavity formed by said auger member into square shape, a counter-shaft carried by one of said spaced members and carrying a bevel-gear for engaging the bevel-gear upon said auger-shaft, chain-pulleys carried respectively by said drive-shaft and counter-shaft and with a chain connecting the same.

16. In a device of the class described, an auger member for boring a circular cavity, chains spaced apart provided with cutting members and operating in the rear of said auger member for transforming said cavity into square shape, a brush bearing upon said chains, and means for vibrating said brush in contact with said chains for removing adhering chips.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

FRED BRYAN.

Witnesses:
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