

D. M. WATKINS.
METAL WORKING MACHINE.
APPLICATION FILED JUNE 18, 1906.

918,105.

Patented Apr. 13, 1909.
3 SHEETS—SHEET 1.

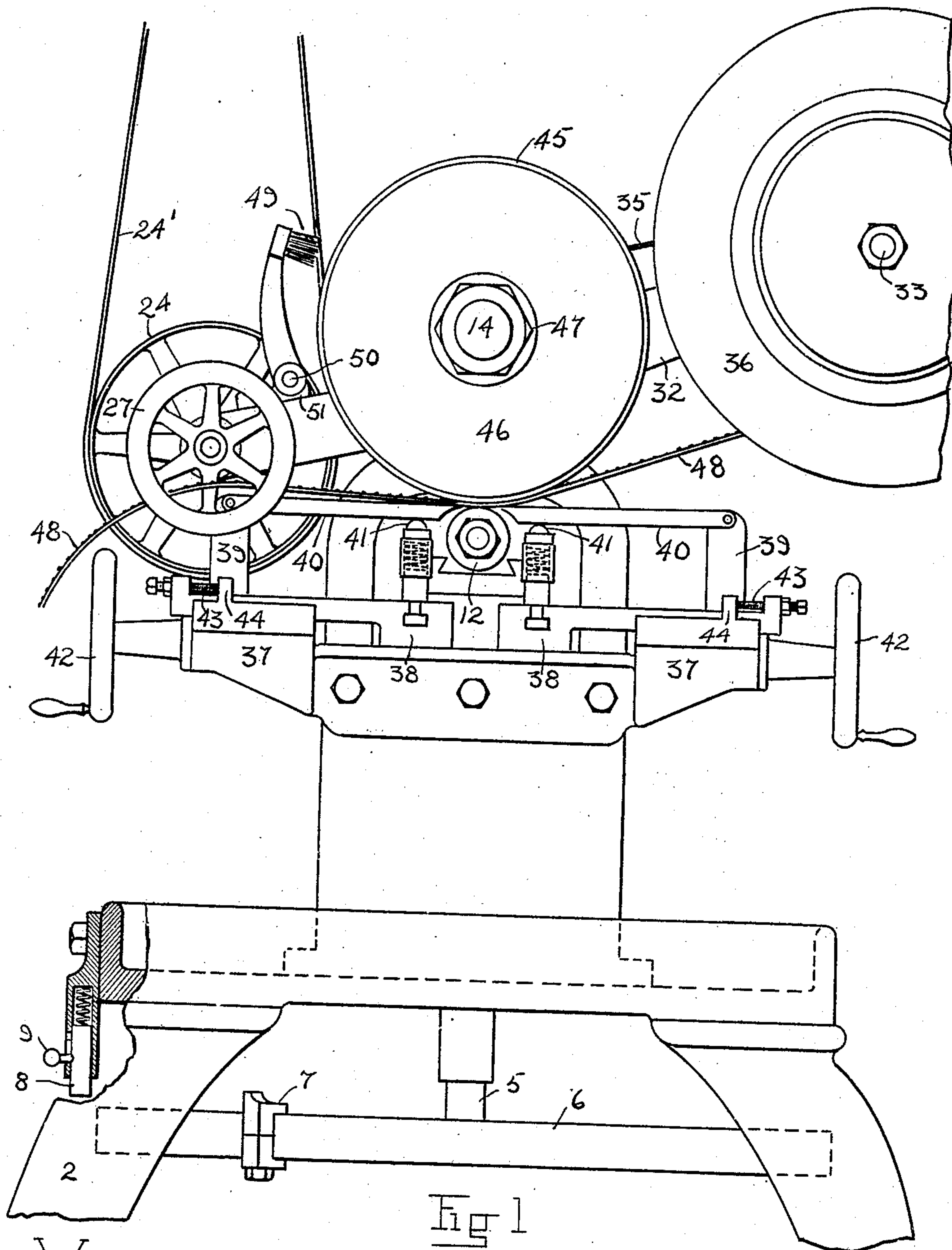


Fig 1

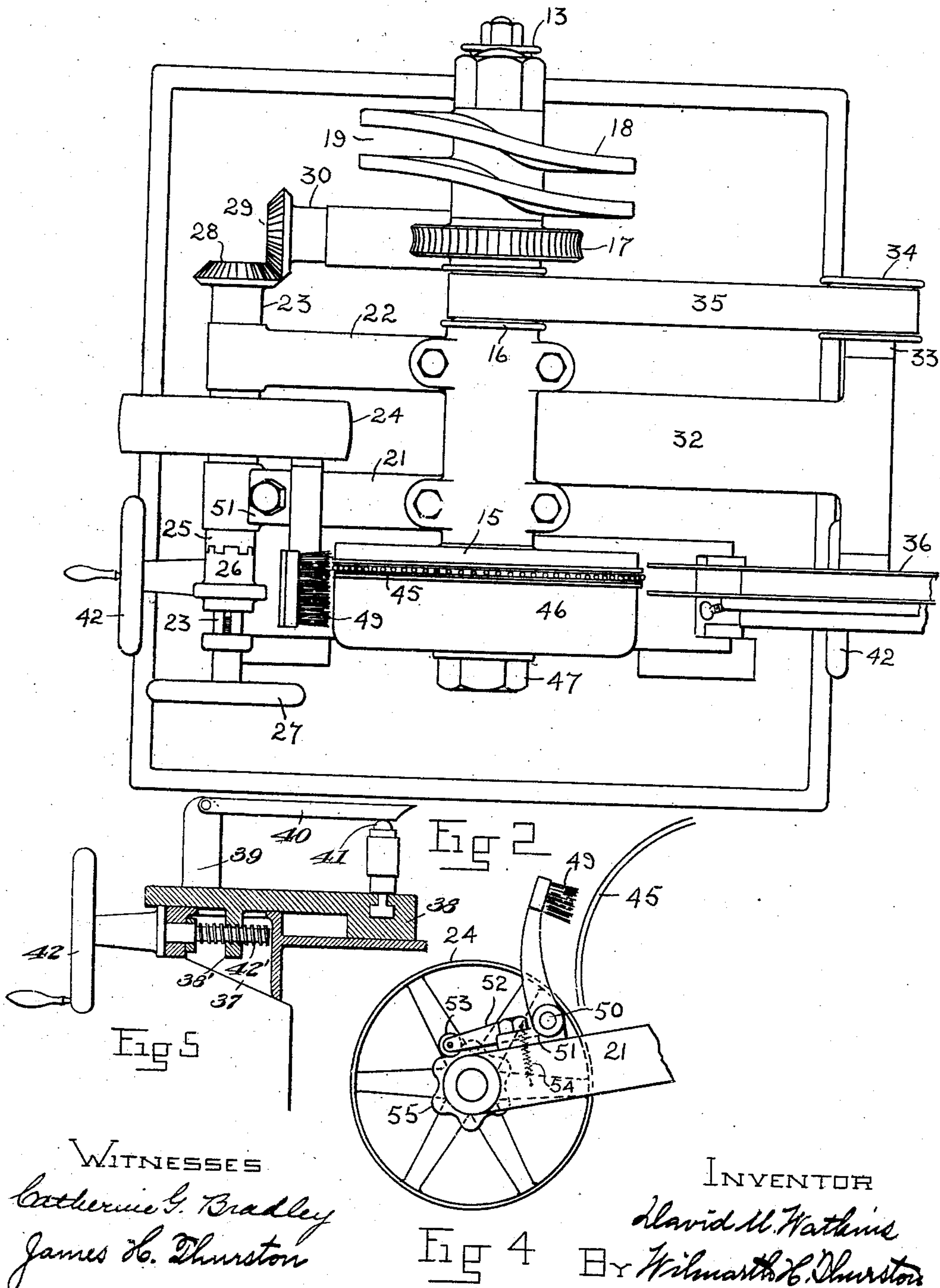
WITNESSES
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James H. Thurston

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Fig 4

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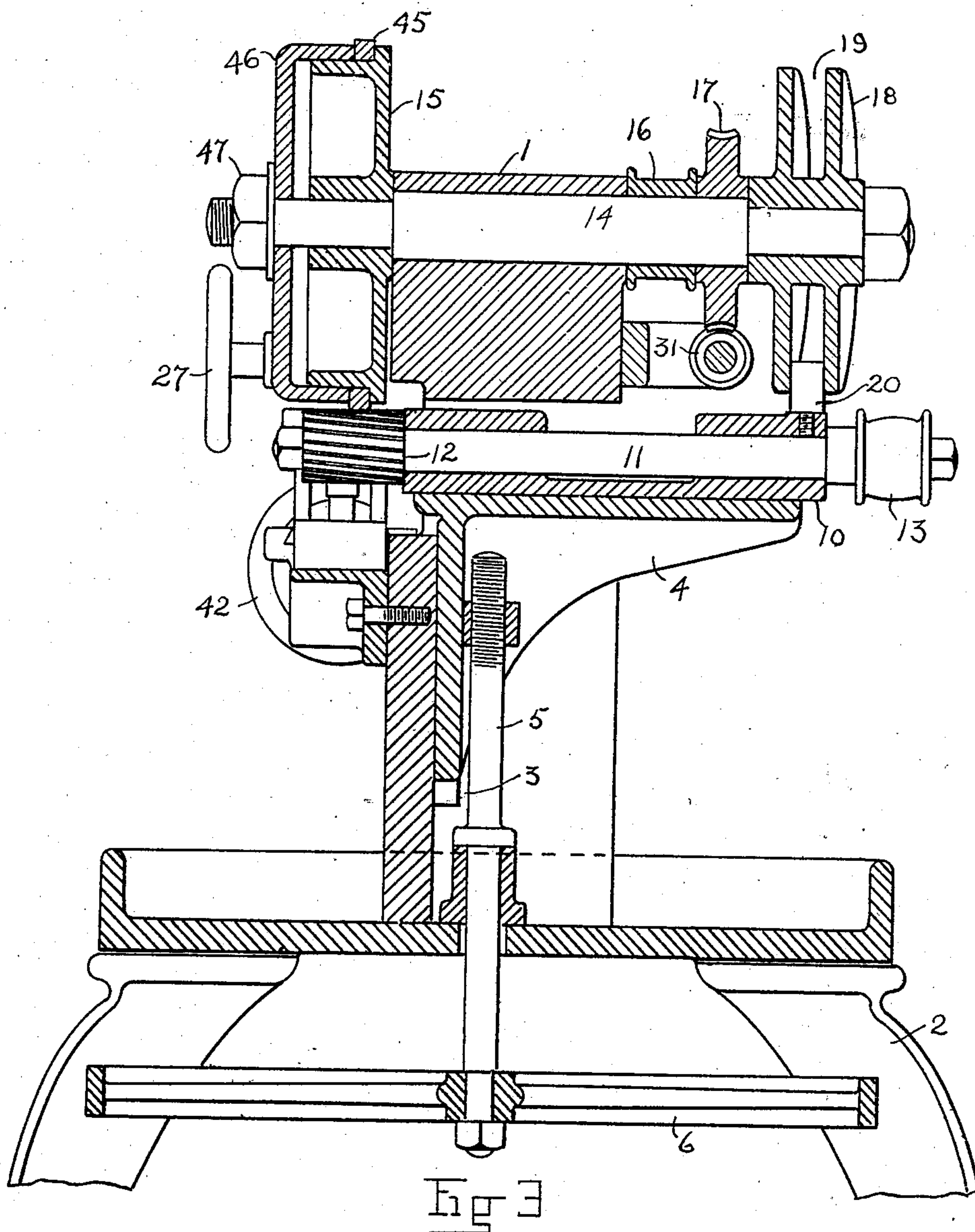


Fig 3

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UNITED STATES PATENT OFFICE.

DAVID M. WATKINS, OF PROVIDENCE, RHODE ISLAND.

METAL-WORKING MACHINE.

No. 918,105.

Specification of Letters Patent.

Patented April 13, 1909.

Application filed June 18, 1906. Serial No. 322,122.

To all whom it may concern:

Be it known that I, DAVID M. WATKINS, of Providence, county of Providence, and State of Rhode Island, have invented certain new and useful Improvements in Metal-Working Machines; and I do hereby declare the following specification, taken in connection with the accompanying drawings, forming a part of the same, to be a full, clear, and exact description thereof.

The invention relates to metal working machines in which the work is acted upon by a cutter and more especially to machines of this character which are designed and adapted for finishing ornamental metal stock, such as used in the manufacture of jewelry. In the manufacture of such ornamental metal stock the metal in the form of a strip is first passed between a male and female roll having the desired ornamental design formed on the periphery thereof. This operation produces the design upon the strip of metal with the ornamental figured part raised and the waste metal not used in the formation of the design depressed or sunk below the figured portion. Heretofore these strips after leaving the rolls which form the design have been finished by submitting them to the action of a press which punches out the waste metal and leaves the design perforated as desired. This method of finishing the stock has been found objectionable, as it is a slow and expensive operation. The stock has to be brought to a stand during the punching operation, thus causing the feed of the stock through the press to be a slow intermittent feed. Furthermore different dies or punches are necessary for different parts of the design to be finished, a great many of which require considerable time and expense to produce.

It is the object of the present invention to overcome these objections and produce a machine in which the stock is continuously fed by means of a rotary die ring and is operated upon by a rotary cutter which removes the waste metal from said stock at the same time the stock is being fed through the machine.

The features of the invention will be more clearly understood by referring to the accompanying drawings and description of the machine and are clearly set forth in the claims.

In the drawings, Figure 1 is a front eleva-

tion of the machine; Fig. 2 is a plan view; Fig. 3 is a vertical section through the cutter spindle; Fig. 4 is a detail, and Fig. 5 is a vertical section through the adjustable work-rest.

Referring to the drawings, 1 is the frame of the machine which is mounted upon suitable legs or supports 2. The frame 1 is provided with vertical ways 3 on which is mounted the knee 4 which is adjusted by means of the screw 5 and hand-wheel 6. The hand-wheel is provided with an adjustable stop 7 adapted to engage a fixed stop 8 secured to the frame 1 and limit the movement of said hand-wheel 6 in one direction. The fixed stop 8 is spring actuated, and the ends of both of said stops 7 and 8 are beveled so that the stop 7 will pass by the stop 8 when the wheel 6 is moved in the other direction. The fixed stop 8 is provided with a projection 9 by means of which said stop may be raised so that the stop 7 will not engage the same, and the hand-wheel 6 may then be moved in either direction at will, which is desirable in setting the machine for a given piece of work.

Dovetailed on the knee 4 is the carriage 10 in which is mounted the cutter spindle 11 carrying a cutter 12 on one end and a driving pulley 13 on the other end thereof.

Mounted in the top of the frame 1 and directly over the cutter spindle is a shaft 14 provided at one end with a flanged wheel 15 and at its other end with a pulley 16, worm-wheel 17 and cam-wheel 18 provided with the cam-groove 19 upon the periphery thereof. The cam groove 19 is engaged by a stud 20 secured to the carriage 10 so that the cam-wheel 18 when revolved will reciprocate the cutter-spindle 11.

Mounted in the free ends of arms 21 and 22, which are secured to the frame 1, is a shaft 23 having a pulley 24 loosely mounted thereon and provided with a clutch member 25 formed on the hub thereof. The pulley 24 is driven by a belt 24' from any suitable source. The clutch member 25 is adapted to be engaged and disengaged by the movable clutch member 26 which is keyed to the shaft 23. One end of said shaft 23 is provided with a hand-wheel 27 and the other end with a bevel-gear 28 which meshes with a bevel-gear 29 on the end of a shaft 30 which carries a worm-gear 31 arranged to engage the worm-wheel 17 and drive the shaft 14.

Mounted in the free end of an arm 32 secured to the frame 1 is a shaft 33 having a pulley 34 on one end thereof which is driven by a belt 35 passing over the pulley 16 on the shaft 14. Mounted on the other end of the shaft 33 is a flanged wheel or drum 36 on which the finished stock is wound.

Mounted to slide in suitable ways on the brackets 37, which are secured to the frame 1, are two blocks 38 provided with standards 39 in which are pivoted arms 40 which serve as rests for the work being operated upon. The free ends of the arms 40 overlie the cutter 12 and are arranged to rest upon spring pressed pins 41 which are provided with suitable stops for limiting the upward and downward movements of said arms. The blocks 38 are adapted to be moved toward or away from the cutter 12 by means of the hand-wheels 42, secured to the screw-rods 42', which screw rods are held against lengthwise movement and engage a screw-threaded opening in each of the projections 38', as shown in Fig. 5. Said blocks are provided with adjustable stops 43 adapted to engage projections 44 on the brackets 37 and thereby limit the movement of the arms 40 and prevent said arms from coming in contact with the cutter 12.

In operating the machine a die-ring 45, having the design of the stock to be operated upon cut or otherwise formed upon the outer periphery or face thereof, is clamped upon the flanged wheel 15 by means of the cap 46 and nut 47, said ring 45 projecting beyond the flange on the wheel 15, as shown in Fig. 3. The stock 48 is placed upon the arms 40 face upward, and said arms are advanced toward the cutter 12 which brings the face of said stock into engagement with the ring 45, the configuration of the design upon the stock intermeshing with the configuration of the same design cut in the face of said ring 45. The cutter 12 is then raised by means of the hand-wheel 6 so as to engage and operate upon the back of the stock 48. Power is then applied to the pulley 13 to drive the cutter 12 and the pulley 24 which, through the medium of the clutch members 25 and 26, shaft 23, bevel-gears 28 and 29, shaft 30, worm-gear 31, worm-wheel 17, shaft 14 and flanged wheel 15, rotates the ring 45 and automatically feeds the stock 48 while the cutter 12 is operating upon the same to remove the waste part thereof. The cam-wheel 18 operating upon the stud 20 reciprocates the carriage 10 and the cutter 12, so that the cutting edges of said cutter will wear evenly throughout their entire length, and the cutter 12 can be changed for different widths of stock. While the feeding of the stock 48 can be started automatically if desired, and at the same time the cutter 12 is started, it is preferred to start the feed of the stock by hand and then apply the power, as by so doing the

cutter can be carefully adjusted to remove the proper amount of the stock before the power is applied to the feed mechanism and there is less liability of breaking or injuring the stock. When it is desired to start the feed by hand the clutch 26 is disengaged from the clutch 25 before the power is applied to the machine and the feed mechanism is operated by the hand-wheel 27 until the proper adjustments are effected, and then the clutch 26 is moved into engagement with the clutch 25 and the feed is performed automatically. After passing over the cutter 12 the stock 48 disengages the ring 45 and is wound up on the drum 36, which is driven from the pulley 16 on the shaft 14. It will thus be seen that strips of stock of any desired length may be operated upon, and the strips are automatically and continuously fed through the machine during the removal of the waste stock and the finished stock is wound into a coil of any desired size.

In order to prevent the fine cutting produced by the cutter 12 from entering and filling the recesses in the design on the ring 45 a brush 49 is mounted on a rock-shaft 50 so as to overlie said ring 45. The rock-shaft 50 is mounted in a bracket 51 secured upon the arm 21 and is provided with an arm 52 having a roller 53 mounted in the free end thereof and arranged to be held by means of a suitable spring 54 in engagement with a tappet-wheel 55 secured to the hub of the pulley 24. As will be seen, the revolution of the pulley 24 and the tappet-wheel 55 will cause the brush 49 to be rocked and intermittently strike the face of the die-ring 45 and remove any of the cuttings that may have caught in the configuration of the design formed thereon.

What I claim as my invention and desire to secure by Letters Patent is:

1. In a machine of the class described, the combination of a cutter-spindle, a cutter mounted thereon, a shaft mounted parallel with said cutter-spindle, a die-ring mounted on said shaft opposite said cutter, and means for automatically reciprocating said cutter across the face of said die-ring, substantially as described.

2. In a machine of the class described, the combination of a cutter-spindle, a cutter mounted thereon, a shaft mounted parallel with said cutter-spindle, a die-ring mounted on said shaft opposite said cutter, means for moving said cutter transversely toward and away from said die-ring, and means for automatically reciprocating said cutter across the face of said die-ring, substantially as described.

3. In a machine of the class described, the combination, with a suitable frame, of a cutter mounted therein, a die-ring mounted in operative relation to said cutter, and automatically adjustable means for holding the

work in engagement with said die-ring while being operated upon by the cutter, substantially as described.

4. In a machine of the class described, the combination, with a suitable frame, of a cutter mounted therein, a die-ring mounted above said cutter, and spring actuated means for holding the work in engagement with the die-ring while being operated upon by the cutter, substantially as described.

5. In a machine of the class described, the combination, with a suitable frame, of a cutter mounted therein, a die-ring mounted above said cutter and having a design formed on the periphery thereof, and spring actuated arms engaging the work to hold said work in engagement with the design on said die-ring, substantially as described.

6. In a machine of the class described, the combination, with a suitable frame, of a cutter mounted therein, a die-ring mounted above said cutter, means for rotating said cutter and die-ring, and an arm pivoted to a suitable standard and having its free end arranged and adapted to extend between said cutter and die-ring, substantially as described.

7. In a machine of the class described, the combination, with a suitable frame, of a cutter mounted therein, a die-ring mounted above said cutter, means for rotating said cutter and die-ring, a block mounted to slide in suitable ways, an arm pivoted to said block and having its free end arranged and adapted to extend between said cutter and die-ring, and means for advancing and retracting said block with relation to said cutter and die-ring, substantially as described.

8. In a machine of the class described, the combination, with a suitable frame, of a rotary cutter, a die-ring having its axis parallel with the axis of said cutter, a block mounted to slide in suitable ways, an arm pivoted to said block, means for advancing

said block to bring the free end of said pivoted arm between the periphery of said cutter and die-ring, and means for limiting the advancing movement of said block, substantially as described.

9. In a machine of the class described, the combination, with a suitable frame, of a rotary cutter, a rotary die-ring having its axis parallel with the axis of said cutter, two pivoted arms, one of said arms being located upon one side of the axis of said cutter and the other arm upon the opposite side of said axis, the free end of each of said arms extending between the periphery of the cutter and die-ring, and means for moving said arms toward or away from each other, substantially as described.

10. In a machine of the class described, the combination, with a suitable frame, of a rotary cutter, a rotary die-ring having its axis parallel with the axis of said cutter, a pivoted arm having its free end located between the periphery of said cutter and die-ring and resting upon a spring pressed pin, substantially as described.

11. In a machine of the class described, the combination, with a suitable frame, of a die-ring mounted to rotate therein, a pulley mounted to drive said die-ring, a brush mounted on said frame and overlying the periphery of said die-ring, and means carried by the driving pulley for operating said brush to intermittently strike the periphery of said die, substantially as described.

12. In a machine of the character described, the combination, with a suitable frame, of a rotary die-ring, a brush mounted adjacent said die-ring, and means for operating said brush to intermittently strike the periphery of said die-ring.

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Witnesses:

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