No. 869,223. PATENTED OCT. 29, 1907.

M. L. ANDREW.

BORING MACHINE.

APPLICATION FILED SEPT. 17, 1906.

3 SHEETS—SHEET 1.

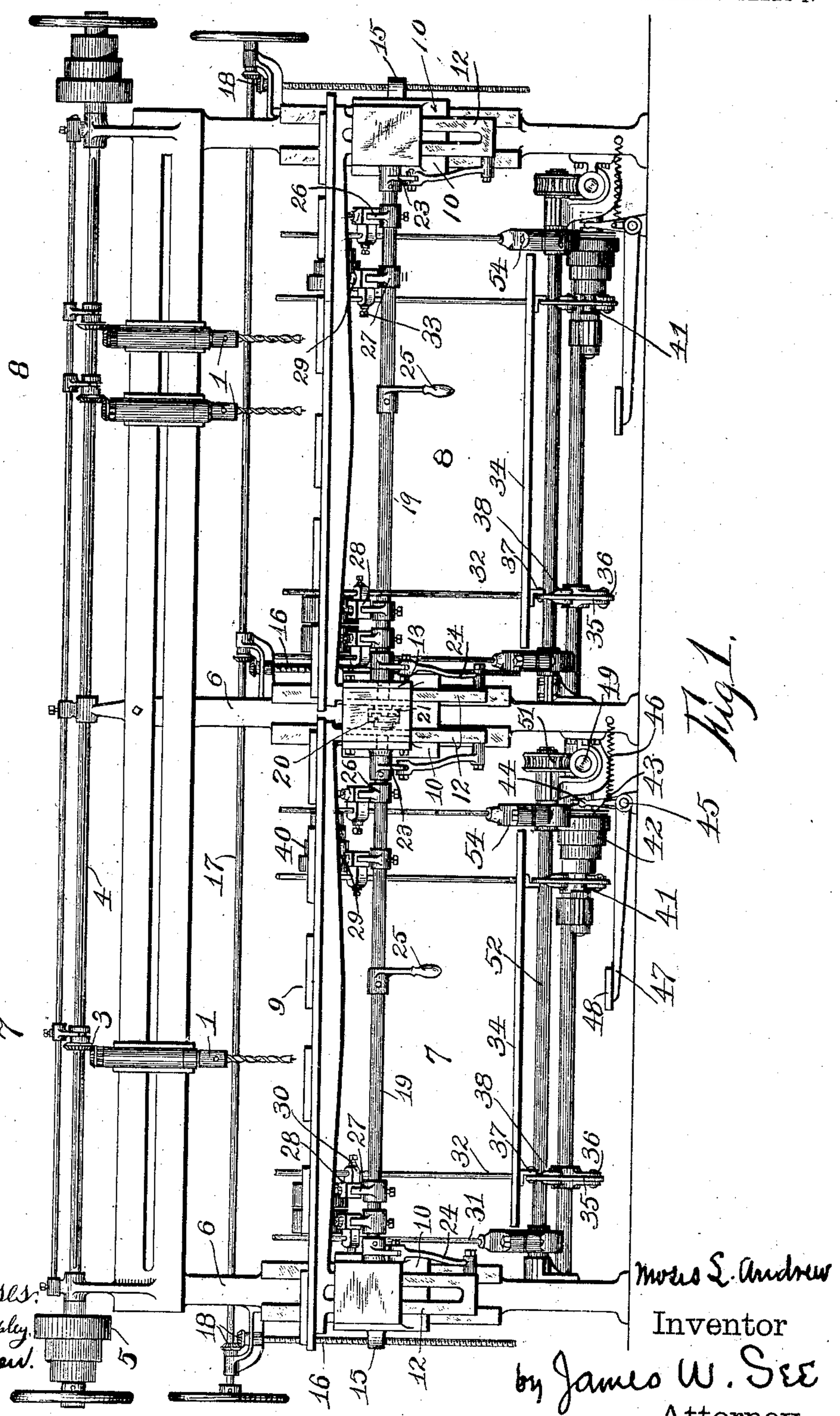

Fig. 1.

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3 SHEETS—SHEET 2.

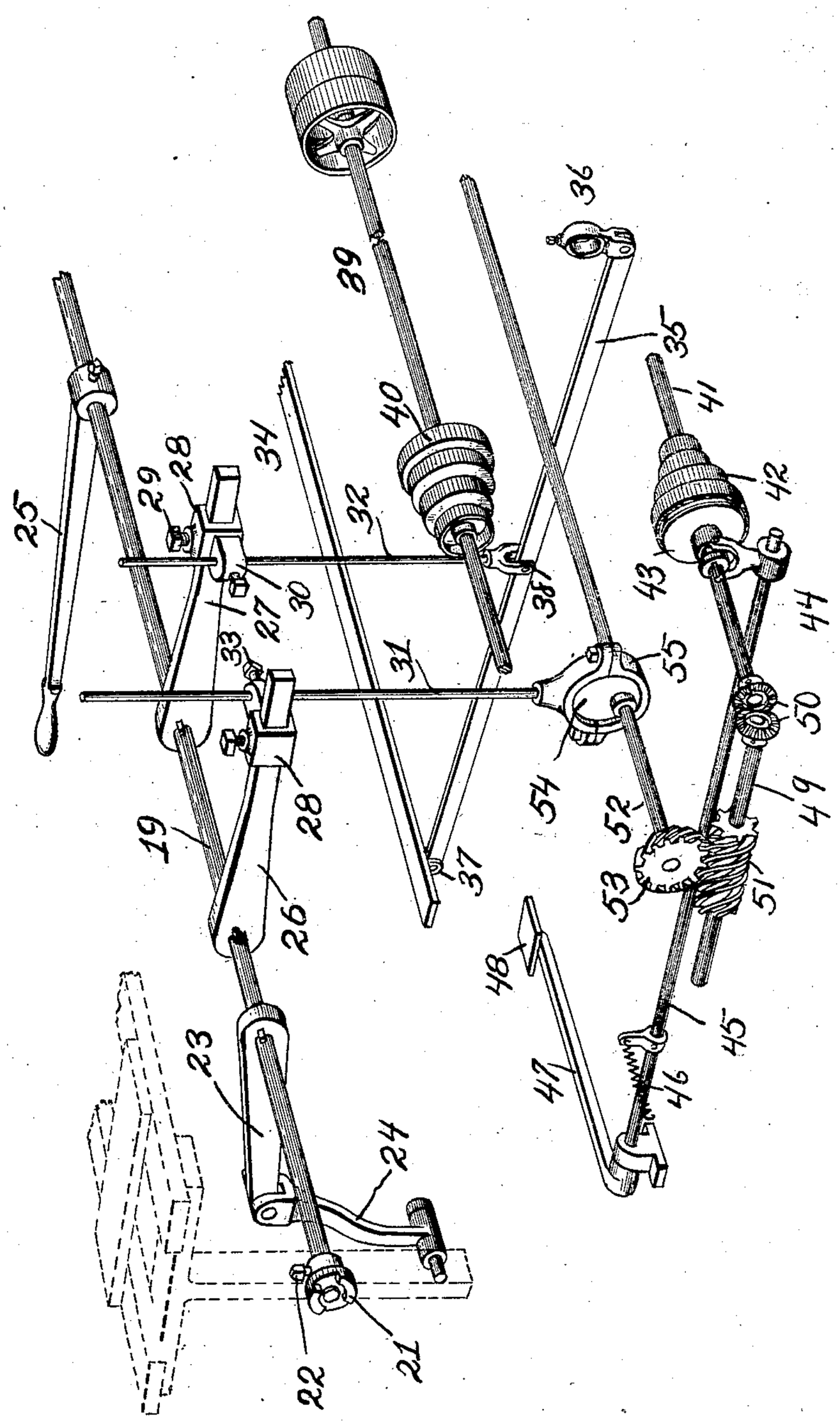

FIG. 2.

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3 SHEETS—SHEET 3.

FIG. 3.

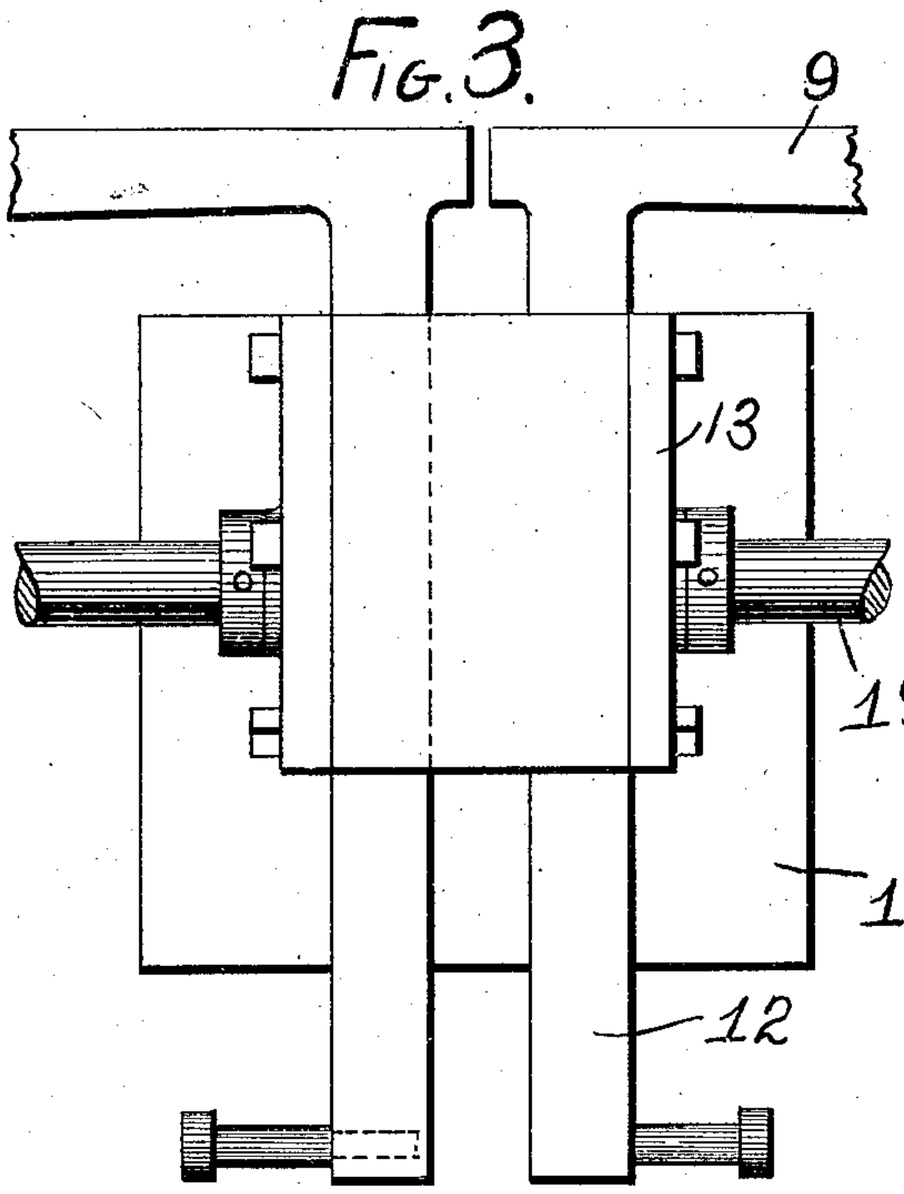


FIG. 4.

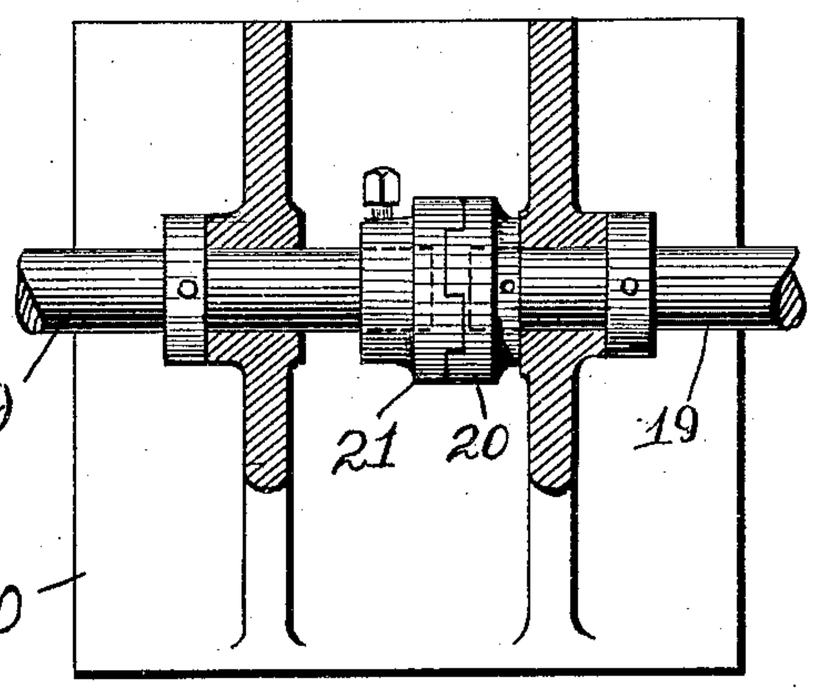
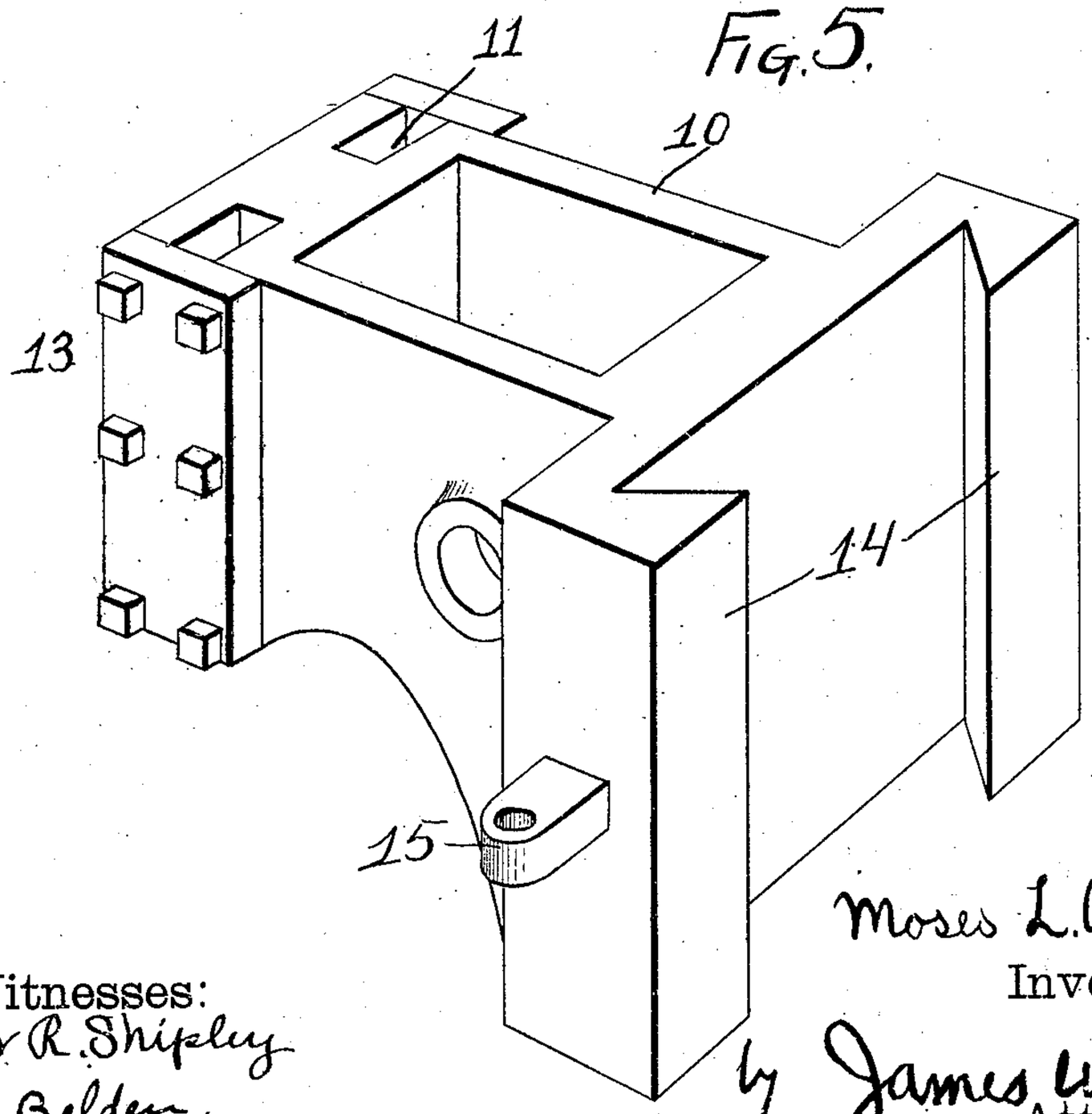


FIG. 5.



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UNITED STATES PATENT OFFICE.

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BORING-MACHINE.

No. 869,223. Specification of Letters Patent. Patented Oct. 29, 1907.

Application filed September 17, 1906. Serial No. 335,008.

To all whom it may concern:

Be it known that I, MOSES L. ANDREW, a citizen of the United States, and resident of Delhi, Hamilton county, Ohio, have invented a certain new and Improved Boring-Machine, of which the following is a specification.

My invention relates to boring machines and especially to table feed mechanism. The invention is particularly adaptable to wood boring machines, but may also be used in connection with machines for boring metal, etc.

A further important feature of the invention consists in the combination of two machines so that they perform certain desirable results either singly or in conjunction, as will appear hereinafter.

The accompanying drawing shows one exemplifying structure in which the invention is embodied:

Figure 1, is a front elevation of a double machine embodying my invention: Fig. 2, a perspective diagrammatic view of the table operating mechanism: Fig. 3, front view of one of the housings in which the movable tables are mounted: Fig. 4, a detail view of a clutch for connecting the two machines in certain cases: and Fig. 5, a perspective view of one of the adjustable housings.

Referring first to Fig. 1, reference numeral 1 designates a series of drill chucks and drills of any suitable number and driven by any approved mechanism; in the present instance by beveled gears 3 from a shaft 4 driven from any suitable source of power by pulley 5.

Instead of drills, any other tool for performing other operations upon the work than drilling to which the table feed later described is adaptable, may be employed. The tools and driving mechanism shown, therefore, are simply a typical form representing any suitable device which may be employed in connection with my invention.

6 designates a frame comprising uprights carrying the tools and the driving mechanism therefor, and also carrying the tables and other parts: 7 and 8 designates the two principal component parts of the mechanism which together constitute the table feed mechanism of the complete machine; these two machines may be of practically identical construction and a description of one will suffice for the other: 9, one of the work tables on which the work, such as lengths of lumber or any other material, may be secured in any suitable manner: 10, housings carried by the frame: 11, ways in the housings: 12, table supports or guides movable in the ways: 13, plates secured to the housings after the guides are in position to retain them in place: 14, gibs on the housings engaging suitable ways on the frame: 15, lugs on the housings: 16, screws carried by the frame engaging screw threads in lugs 15: 17, an adjusting shaft on the frame provided with a hand-wheel: 18, beveled gears connecting the shaft and screws.

By turning the hand-wheel the screws 16 are rotated and the height of the housings regulated in an obvious manner. By the construction shown in Fig. 1 the position of the housings of machines 7 and 8 are both controlled simultaneously. (Now consult Figs. 1 and 2.)

19, are rock shafts, one for each machine, mounted in suitable bearings in housings 10: 20, a clutch having a movable member 21 provided with a set screw 22 for locking it in engaged or disengaged position; this clutch serves to connect and disconnect the two shafts 19: 23, one or more table operating arms on each shaft 19: 24, links, one connecting each arm 23 with one of the table guide members: 25, a hand lever on each shaft 19: 26, a power-feed arm on each shaft 19: 27, a manual-feed arm on each shaft 19: 28, a connecting block on each arm 26 and 27, the said blocks embracing said arms and being movable thereon toward and from the shaft: 29, set screws for securing the blocks in an adjusted position: 30, lugs on blocks 28: 31, a connecting rod passing through a hole in lug 27 of block 28 on arm 26: 32, a connecting rod passing through a hole in lug 30 of block 28 on arm 27: 33, set screws in lugs 30 for securing connecting rods 31, 32 in adjusted position in relation to the lugs and blocks: 34, treadles, one for each machine: 35, treadle levers connected pivotally, as at 36, to a frame member, at 37 to the treadles, and at 38 to connecting rods 32: 39, a main power shaft which may serve to drive both machines and which is impelled from any suitable source of power: 40, a stepped pulley thereon, one for each machine: 41, clutch shafts, one for each machine: 42, a stepped pulley on each clutch shaft belted to the corresponding pulley 40: 43, any suitable clutch, preferably a friction clutch, for connecting clutch shaft 41 with its pulley 42: 44, an ordinary shifting fork for engaging and disengaging the clutch: 45, a clutch-controlling rod bearing clutch fork 44: 46, a spring urging the clutch toward disengagement: 47, a pedal arm: 48, a pedal piece thereon: 49, a worm shaft: 50, bevel gears connecting shaft 49 with shaft 41: 51, a worm or skew gear on shaft 49: 52, an eccentric shaft, one for each machine: 53, a worm gear or skew gear on each shaft 52 engaging the worm or skew gear 51 in the corresponding shaft 49: 54, an eccentric on each shaft 52: and 55, an eccentric strap on connecting rod 31 surrounding eccentric 54.

It is assumed that shaft 39 is running and that the clutch between the two rock shafts 19 is disengaged, allowing the two machines to operate independently. To cause either table to feed the work toward the tools which are to operate upon it, the attendant with his foot depresses the corresponding pedal 48. This engages the clutch 43 and causes clutch shaft 41 to be rotated under power from the main shaft 39. The relative speed of the clutch shaft in relation to the main driving shaft can be regulated independently in each machine by shifting the belt connecting pulleys 40, 42. Power is transmitted from shaft 41 through

bevel gears 50 to worm shaft 49, thence through the skew or worm gears 51, 53 to shaft 52, and eccentric 54 is rotated with the last named shaft. The speed of rotation of the eccentric may be regulated by the proportions and particular arrangement of the transmission gearing in each machine to suit the particular work for which it is intended. For wood working a relatively fast speed of shaft 52 is desirable, and in metal working a much slower speed. As the eccentric revolves from the position shown in Fig. 2 it pulls down the eccentric strap 55 and connecting rod 31, end of arm 26, rock shaft 19, moves up arm 23 and link 24 and through the table guide member 12 elevates the table toward the tool. When the table reaches its maximum elevation it drops again until, when it is low enough to free the work from the tools, the attendant releases the pedal and the clutch is disengaged by spring 46, discontinuing the table movement. As has been pointed out the rock shafts 19 are journaled in the adjustable bearings which serve as guideways for the table. Therefore when these housings are adjusted the rock shafts are correspondingly moved. This vertical movement of the shafts is permitted by loosening set screws 33, freeing the connecting rods 31, 32 in the blocks 28. After the housings have been adjusted set screws 33 are tightened up and the driving connection for the table is again completed. With the housings in any particular position adjustment of connecting rod 31 in relation to its block 28 and of the block itself longitudinally upon arm 26 connected to shaft 19, serves to regulate the position of the table in relation to its power driving mechanism. With the parts in the position shown in Fig. 2 it is evident that the eccentric is able to move arm 26 through an arc equal to its full stroke since the connecting rod 31 is in a straight line with the dimension of greatest eccentricity. If, however, block 28 is moved along arm 26 toward the shaft and there secured by set screw, the connecting rod will be at an angle to the eccentric and the latter is able to drive the rock shaft and consequently the table at only a fraction of its full stroke.

The treadle 34 and hand lever 25 are convenient means for moving the table when it is not desired to use the power drive, for instance, when testing its proper position in relation to the tools. The hand or foot movement of the table is also convenient in making the adjustment just referred to of the connecting rod 31. When set screw 33 is loosened in block 28 carried by arm 26 the table may be freely moved up and down by manipulating the lever 25 or the treadle 34 to put it in the proper position in relation to the power driving mechanism.

It will now be apparent that each of the two machines may be operated independently of the other (1) with the table housings in the same or different positions; (2) with the tables adjusted in the same or different relations to the power driving mechanism; (3) with the tables working at the same or different lengths of stroke; and (4) with the tables working at the same or different speeds in relation to that of the main driving shaft 39 (depending on position of the belt connecting pulleys 40 and 42). The combined machine is thus rendered adaptable to use at the same time upon different pieces of work involving widely different requirements as to table movement. By connecting clutch 20, rock shafts 19 are rendered operatively integral. The whole machine then operates as a unit and the tables rise and fall together and may be employed if desired on one large piece of work or on separate smaller pieces involving the same requirements as to feed. With the machines connected in this manner the attendant may control the power feed by means of either of the two pedals 48.

It is not my intention to limit myself to the use of two machines related to each other in the manner described. There may be three machines similarly related, or a greater number, and the operation and construction in such cases will be clear from the foregoing to those properly skilled in the art. Each of the machines 7, 8 may in some cases be used separately from the other.

I claim as my invention:—

1. In a machine, having a plurality of power-driven tools, the combination of two tables for feeding work to be operated on by the tools, power-driving means for the tables, clutches for connecting said tables with said power-driving means independently, and means for connecting the tables to move in unison.

2. In a machine for feeding work, the combination of two tables, power driving means for each table, and means for operating the tables in unison or independently as desired.

3. In a machine for feeding work, the combination of two reciprocable tables, power driving mechanism for each table comprising a clutch for controlling the movement of the table independently, and means for permitting the tables to operate independently or connecting them to move in unison.

4. In a machine for feeding work, the combination of two reciprocable tables, power driving mechanism for each table comprising a clutch and a controlling member for the clutch for controlling the movement of the table independently, and means for permitting the tables to operate independently or connecting them to act in unison by manipulation of either clutch.

5. In a machine for feeding work, the combination of a reciprocating table, a rotary member connected to the table serving to move it in forward and back directions by rotation in the same direction, and means for adjusting the table in relation to the rotary member so as to regulate the length of the stroke of the table.

6. In a machine for feeding work, the combination of two movable tables, means for moving the tables forward and back at independently-variable speeds, and means for connecting the tables to move in unison.

7. In a machine for feeding work, the combination of two movable tables, means for moving the tables forward and back at independently variable speeds, and means for connecting the tables to move in unison at variable speeds.

8. In a machine for feeding work, the combination of two reciprocating tables, means for reciprocating each table independently at variable speeds, and means for connecting the tables to move in unison.

9. In a machine for feeding work, the combination of two reciprocating tables, means for reciprocating said tables independently with independently-variable lengths of stroke, and means for connecting the tables to move in unison.

10. In a machine for feeding work, the combination of two reciprocating tables, power driving mechanism for each table including a clutch for controlling the movement of each table independently, means for moving each table manually, and means for connecting the tables to move in unison.

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