

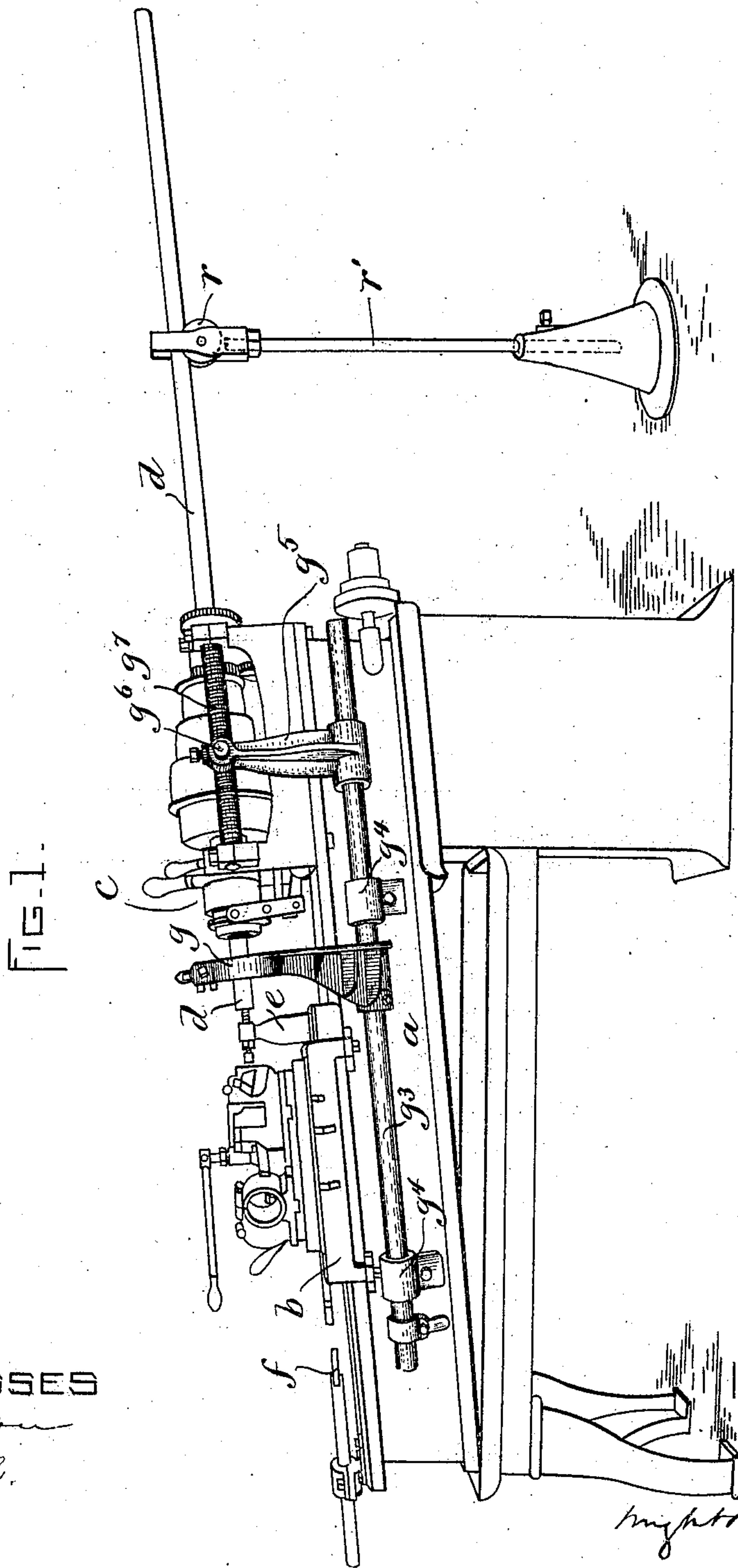
(No Model.)

4 Sheets—Sheet 1.

J. HARTNESS.
METAL SCREW MACHINE.

No. 502,517

Patented Aug. 1, 1893.



WITNESSES
H. Brown
H. A. Hall.

INVENTOR:
J. Hartness
by
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Attys.

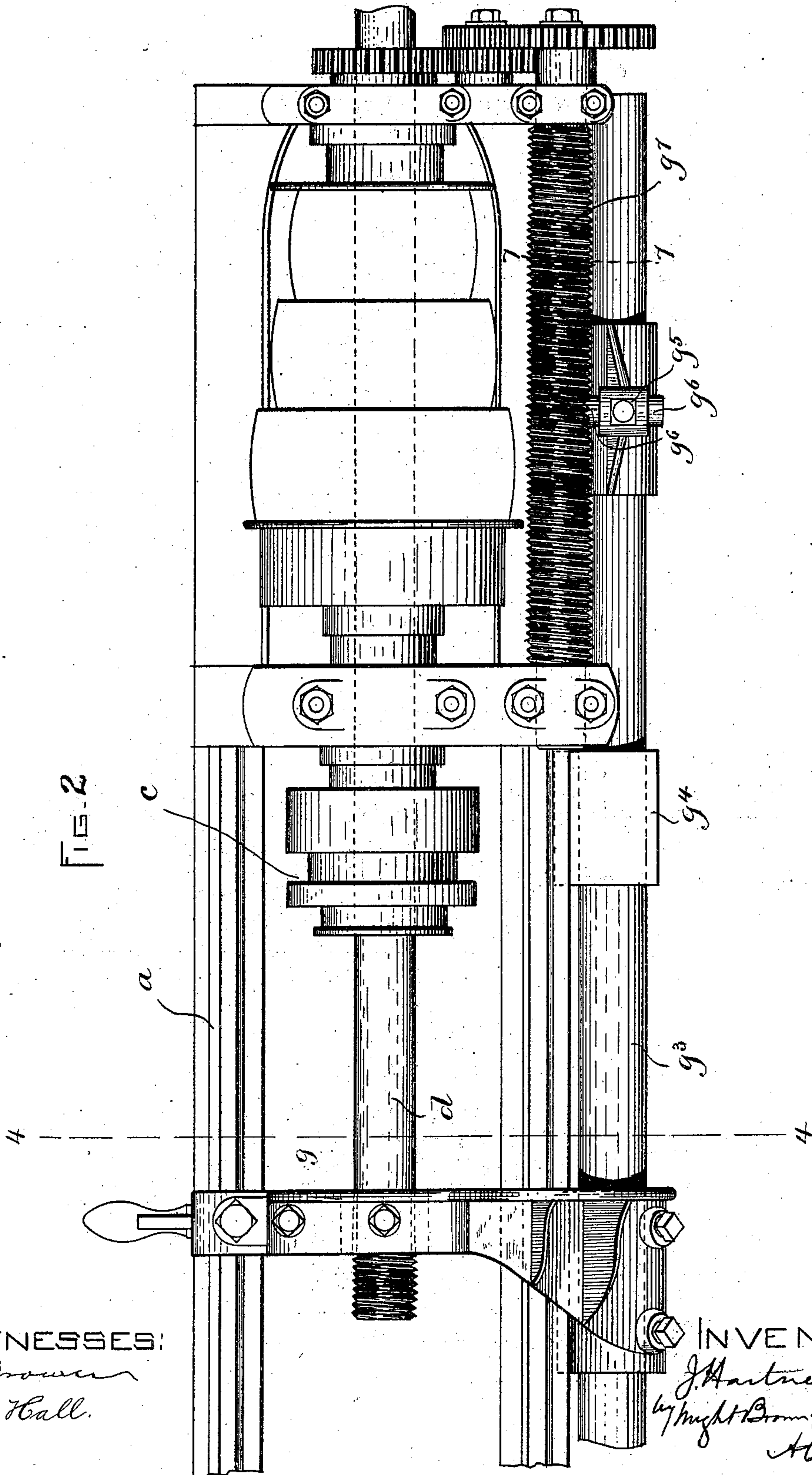
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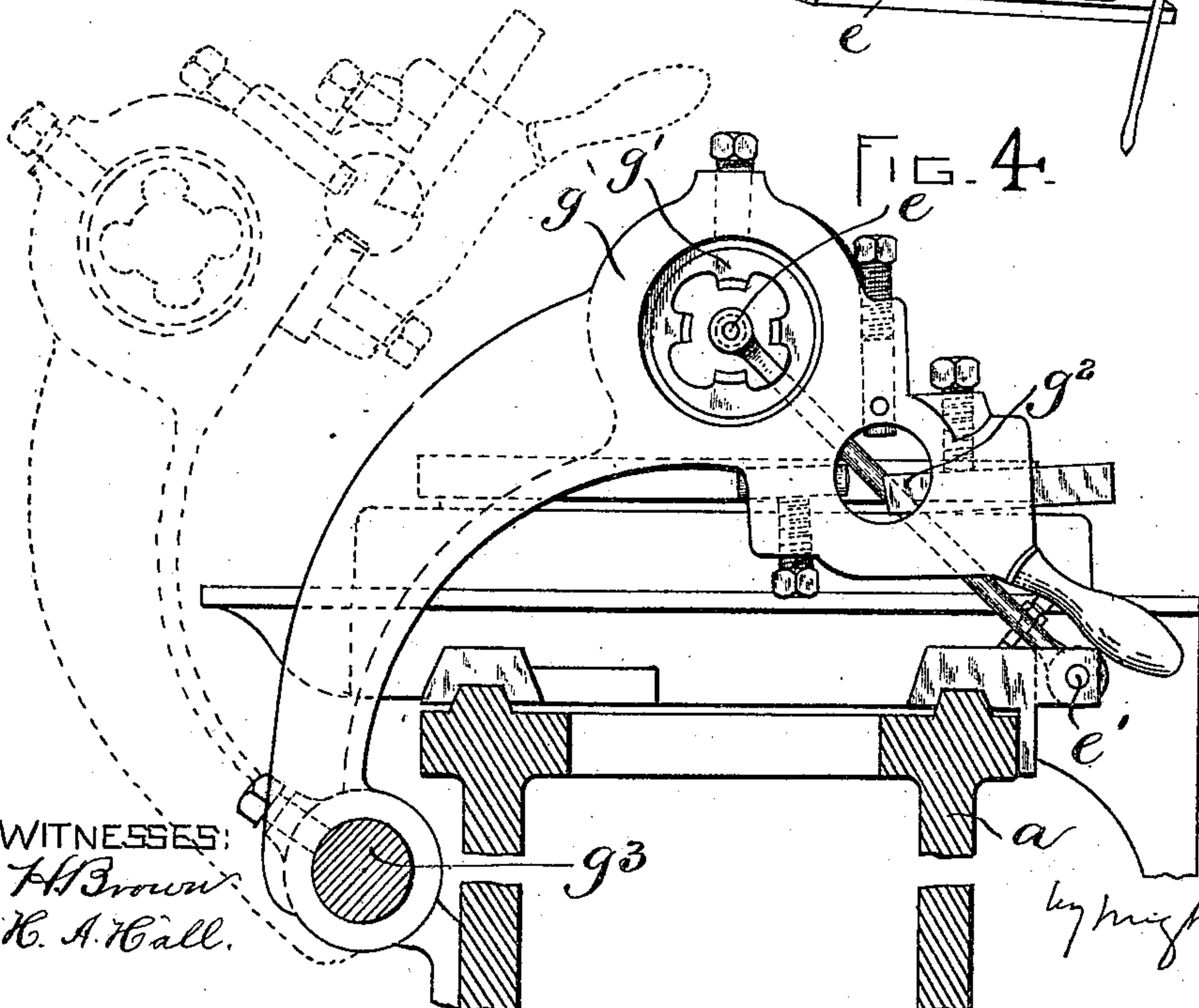
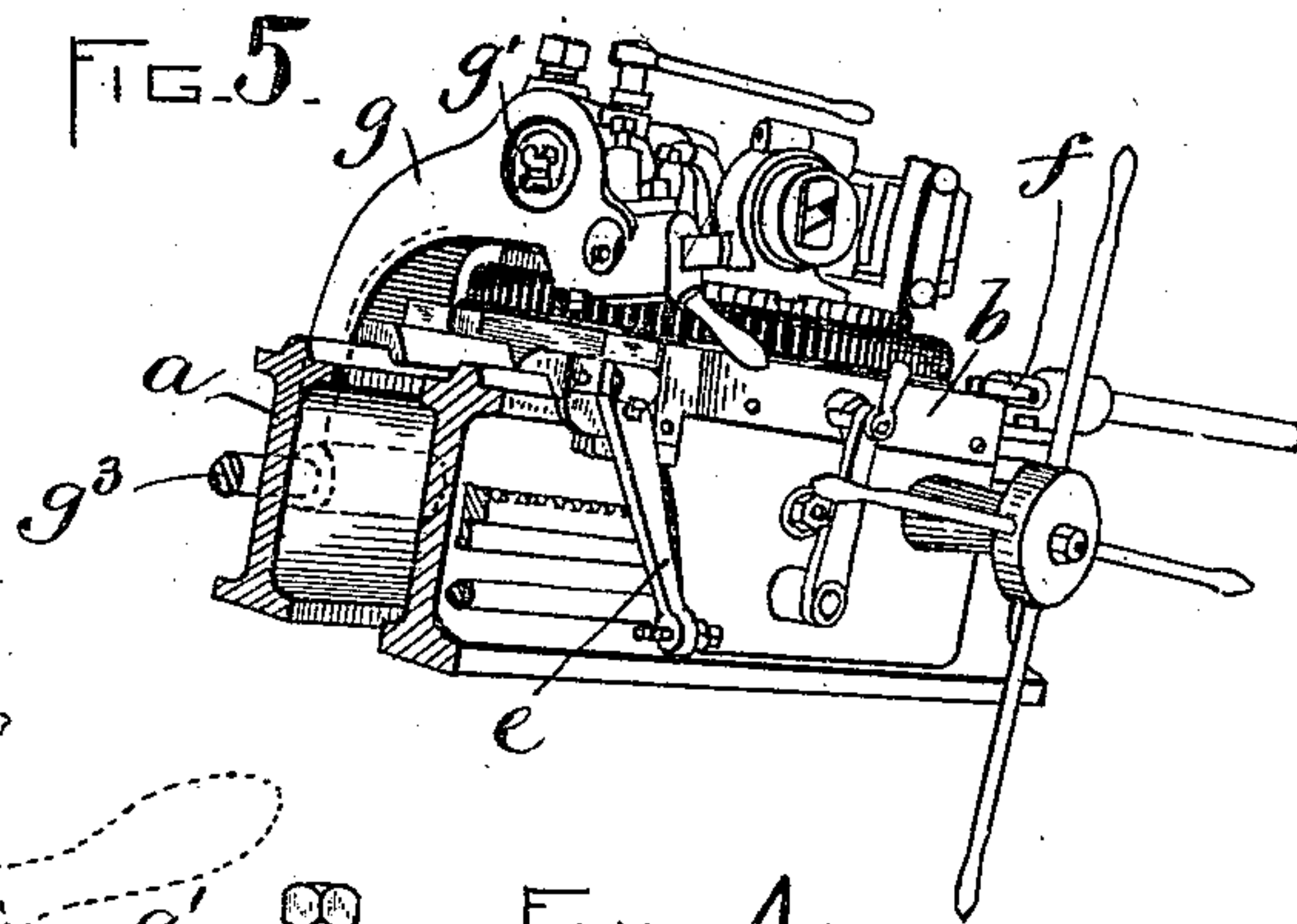
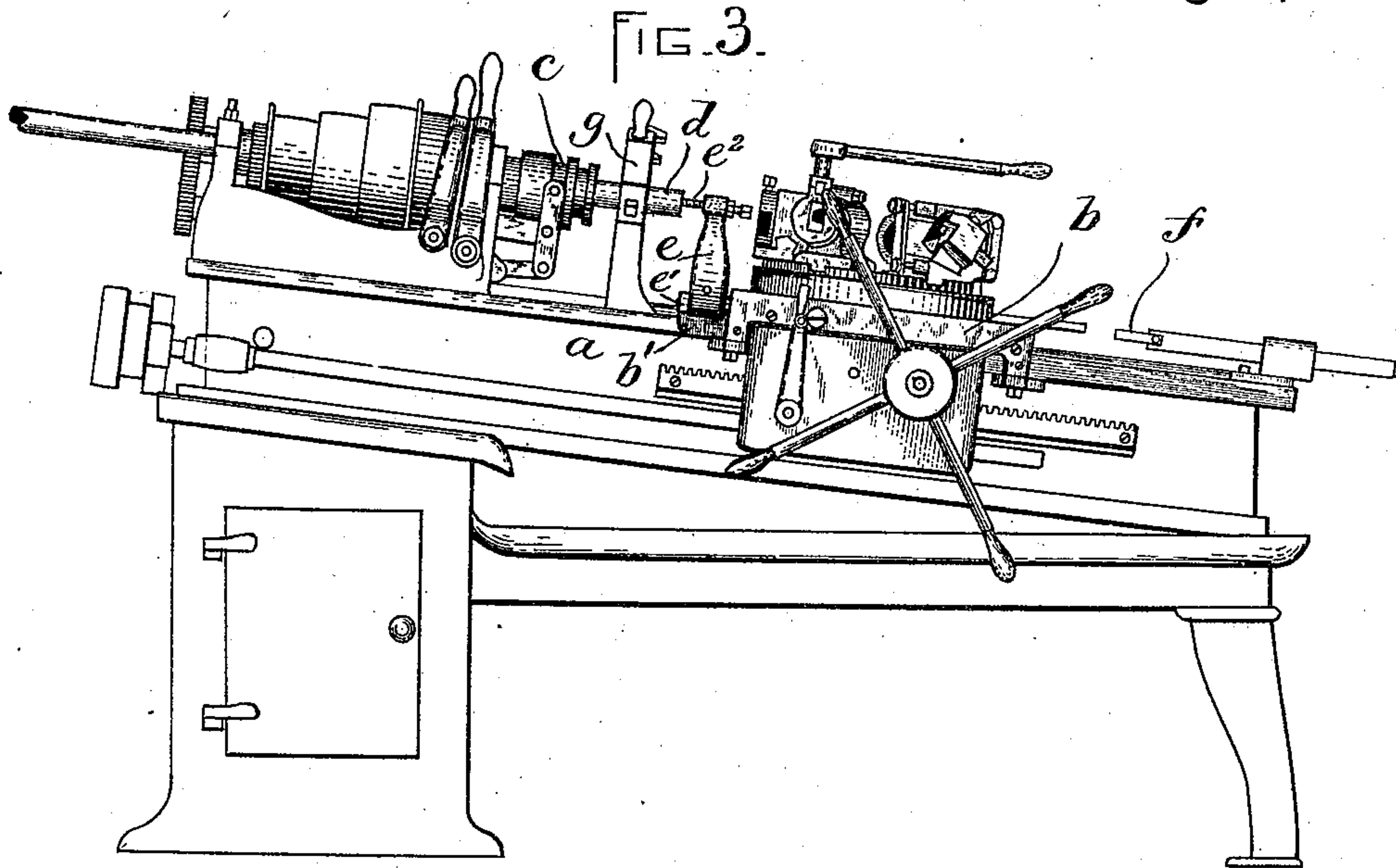
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METAL SCREW MACHINE.

No. 502,517.

Patented Aug. 1, 1893.



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(No Model.)

4 Sheets—Sheet 4.

J. HARTNESS.
METAL SCREW MACHINE.

No. 502,517.

Patented Aug. 1, 1893.

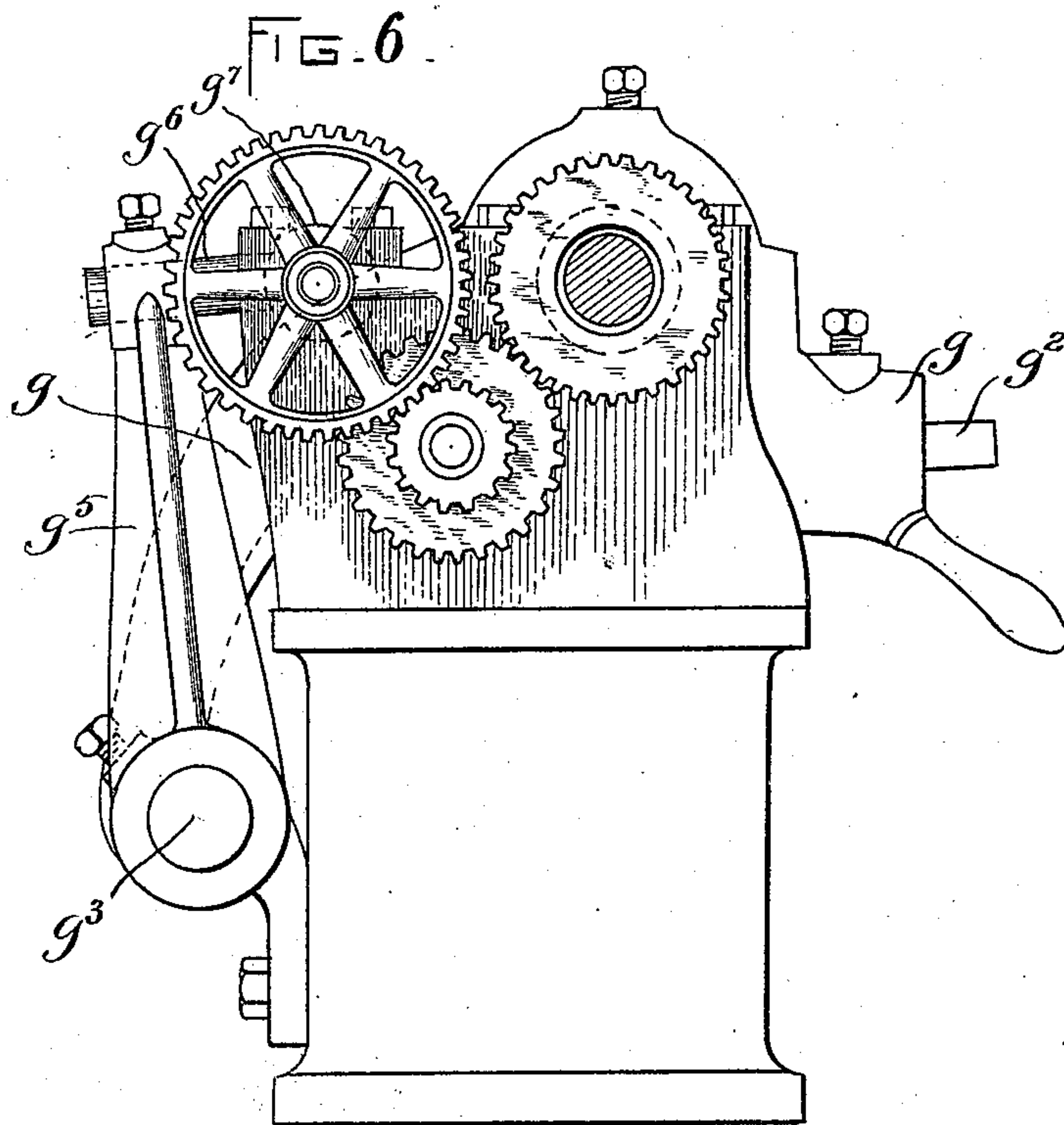
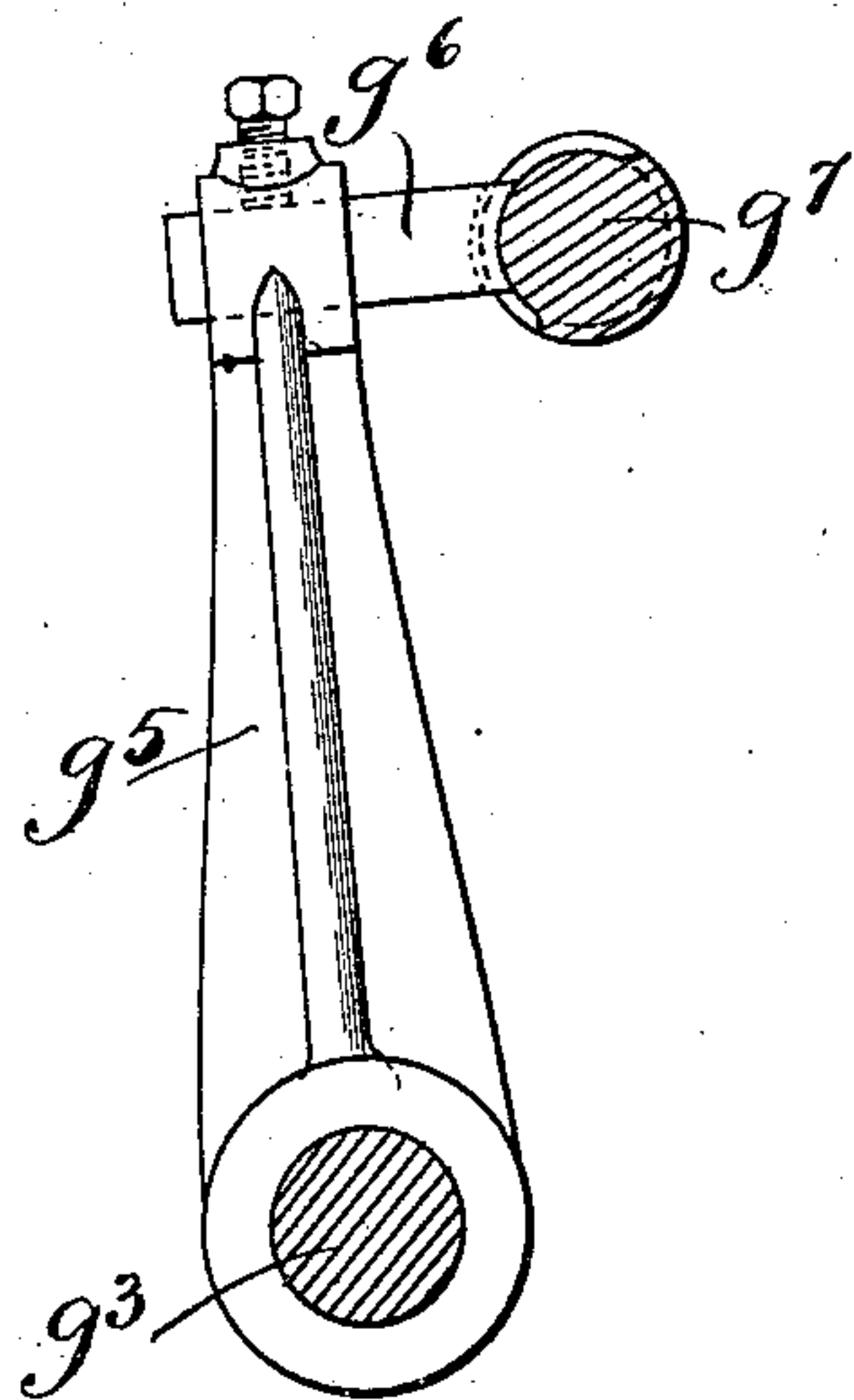


FIG. 7.



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UNITED STATES PATENT OFFICE.

JAMES HARTNESS, OF SPRINGFIELD, VERMONT.

METAL-SCREW MACHINE.

SPECIFICATION forming part of Letters Patent No. 502,517, dated August 1, 1893.

Application filed May 6, 1892. Serial No. 432,025. (No model.)

To all whom it may concern:

Be it known that I, JAMES HARTNESS, of Springfield, in the county of Windsor and State of Vermont, have invented certain new and useful Improvements in Metal-Screw Machines, of which the following is a specification.

This invention relates to that class of machines for making screws in which a work-
holding and rotating chuck is employed, and a turret-slide provided with a turret adapted to be rotated on the slide and provided with a series of tools adapted to perform different parts of the operation of forming screws, bolts, &c., from a rod of metal, the chuck and turret-slide being mounted upon a suitable bed upon which the slide is movable toward and from the chuck, substantially as shown in Letters Patent of the United States No. 457,967, granted to me August 18, 1891.

The invention has for its object, first, to enable the number of operative tools employed in a machine of this class to be increased without crowding or over-loading the turret; and, secondly, to enable the stock to be fed forward through the chuck when the latter is opened, by gravitation, and the return of the turret-slide to its starting position or the end of its backward movement to be facilitated by gravitation.

To these ends my invention consists in the construction and combination of parts as hereinafter described and claimed.

Of the accompanying drawings, forming part of this specification: Figure 1 represents a perspective view of a screw machine provided with my improvements. Fig. 2 represents a top view of a portion of the machine. Fig. 3 represents a side elevation of the opposite side of the machine from that shown in Fig. 1. Fig. 4 represents a section on line 4—4, Fig. 2, looking toward the left. Fig. 5 represents a perspective view of a portion of the machine. Fig. 6 represents an end elevation of the machine. Fig. 7 represents a section on line 7—7, Fig. 2, looking toward the left.

The same letters of reference indicate the same parts in all the figures.

In the drawings: *a* represents the bed of the lathe; *b* represents the turret-slide, which is movable upon said bed; and *c* represents

the chuck, which holds and rotates the bar or rod *d*, which is converted by the action of the machine into the desired articles. For convenience, I will hereinafter call said bar or rod the stock.

The general construction, arrangement and operation of the machine are or may be the same as shown in the above-mentioned Letters Patent No. 457,967, and, as my present improvements relate only to the stock-stop, the independent die-carriage and the inclination of the bed, all as hereinafter described, I do not describe the machine as a whole, but refer to said patent as showing a suitable machine to which my hereinafter described improvements are applicable.

e represents the stock-stop, which constitutes one of my improvements. Said stop is here shown as an arm pivoted at *e'* to an ear or bracket *b'* affixed to the turret-slide *b*, said arm being adapted to swing freely in a plane substantially at right angles to the direction of movement of the turret-slide, and provided at its swinging end with an adjustable screw *e''*, which, when the stop is in the position shown in Figs. 3 and 4, is in position to arrest the forward end of the stock when the latter is moved forward in the chuck. The arrangement of the stock-stop *e* is such that, when the turret-slide *b* is at the limit of its backward movement, and is arrested by the stop *f* employed to determine the extent of the backward movement of the turret, the stock-stop will be in position to arrest the forward end of the stock *d* at the proper point, so that, after the stock has been grasped by the chuck and the stock-stop has been swung laterally out of line with the stock and with the turret, the turret may be advanced upon the stock and caused to present one of its tools thereto. Thus the location of the stop *f* acts, through the turret to determine the point at which the stop *c* will arrest forward movement of the stock.

I do not limit myself to the described means of supporting and moving the stock-stop, as it is entirely obvious that the stop may be moved to and from its operative position by a rectilinear instead of a swinging movement.

g represents the independent tool-carrier, which is arranged to carry a tool such as a screw-cutting die *g'*, or, if preferred, a plu-

reality of tools, such as a screw-cutting die and
 a turning tool g^2 , and to present said tool or
 tools to the stock at a point between the chuck
 and the turret. I have here shown the tool-
 carrier g in the form of an arm, rigidly affixed
 at one end to a rod g^3 , which is adapted both
 to slide and to turn in guides or bearings g^4
 affixed to the bed a , said rod being paral-
 lel with the direction of movement of the tur-
 ret-slide. The rod g^3 is here shown as pro-
 vided with an arm g^5 , rigidly affixed to the
 rod, and carrying in its swinging end a lead-
 nut g^6 , formed to engage a lead-screw g^7 , which
 is journaled in suitable fixed bearings, and
 is rotated by the power of the machine, said
 lead-nut being a stud, affixed to a socket in
 the arm g^5 by a set-screw or other suitable
 means, and having one of its ends provided
 with sections of a screw-thread correspond-
 ing to the thread on the lead-screw, so that,
 when the lead-nut g^6 is brought into engage-
 ment with the lead-screw, the rotation of the
 latter will immediately impart, through the
 lead-nut and the arm g^5 , a longitudinal
 movement to the rod g^3 and tool-carrier g .
 This arrangement of lead-screw and die-car-
 rier is analogous to the ordinary chasing-bar
 mechanism, but differs from the latter in that
 the tool-carrier g has a die instead of a single
 chasing-point such as is operated by the chas-
 ing-bar. There is, however, this difference,
 namely, in the chasing-bar lathe, the chasing-
 tool is generally run over the work a number
 of times to cut the thread, while in the pres-
 ent case the thread-cutting die is adapted to
 cut the full thread at one cut. Another dif-
 ference is that the tool-carrier is or may be
 provided with more than one tool.

When the tool-carrier is provided with a
 screw-cutting die and with a turning tool, as
 here shown, each tool may be brought into
 operative position with relation to the stock
 by a suitable swinging movement of the car-
 rier g , the turning tool being used either for
 shaping the end of the work beyond the screw-
 threaded portion, or for turning the whole
 length of a piece, the same as in the turret
 turner.

Motion may be imparted to the tool-carrier
 when the turning tool is in use, by means of
 the turret, the latter being forced against the
 tool-carrier g to feed the tool into the work,
 such part of the turret being used as carries
 no interfering tool. After the turning tool
 has performed its operation, the carrier g may
 be swung inward until the screw-cutting die
 is brought into position, the arrangement be-
 ing such that the movement of the carrier re-
 quired to bring the screw-cutting die into po-
 sition brings the lead-nut g^6 into engagement
 with the lead-screw g^7 , so that the action of
 the screw-cutting die is governed by the lead-
 screw.

I do not limit myself to the employment of
 the lead-screw in connection with the inde-
 pendent tool-carrier, arranged to present a
 tool to the stock at a point between the tur-

ret and the chuck, it being obvious that said
 tool-carrier may be operated by other means
 than by the lead-screw, as above described;
 nor do I limit myself to the employment of
 the particular tools here shown in the inde-
 pendent tool-carrier g , but may provide said
 carrier with any other suitable tool or tools,
 the main object of said carrier, as well as of
 the stock-stop e , being to provide the machine
 with all the tools and appliances that may be
 desirable, without crowding or over-loading
 the turret.

Heretofore, the stock-stop, the screw-cut-
 ting die and the turning tool have been sup-
 ported entirely by the turret. I have found
 by experience that the maximum number of
 tools that the turret can carry is six (6), and
 that it is not practicable to increase this
 number. It is evident, therefore, that, if the
 turret is obliged to carry the screw-cutting
 die and the stock-stop, the number of addi-
 tional tools which it carries must be curtailed;
 and that, by removing the stock-stop and the
 screw-cutting die from the turret, the range
 of usefulness of the latter is correspondingly
 increased.

Another feature of my invention is the in-
 clination of the bed a , for the purpose of
 causing the automatic feeding forward of the
 stock when the chuck is opened, and of facili-
 tating the backward movement of the turret
 at the conclusion of its work. To this end, I
 give the bed an inclination, preferably, of
 about thirteen degrees (13°), that end of the
 bed which supports the chuck being higher
 than the opposite end of the bed by a suffi-
 cient amount to give the bed, the axis of the
 chuck and the turret-slide, the desired incli-
 nation. This inclination enables the stock
 to move forward by gravitation when the
 chuck is opened, thus enabling the use of
 mechanism for feeding the stock into the
 spindle and chuck to be dispensed with. The
 inclination also enables the turret-slide to run
 back to its starting point more easily than if
 the bed were horizontal, so that there is but
 little effort required to return the turret to
 its starting position. It is well-known that,
 in machines of this class, the turret is carried
 toward the chuck by the feeding mechanism
 operated by power, and is returned to its
 starting point by the power of a hand-wheel.
 The inclination of the bed materially reduces
 the labor of the operator in returning the
 turret. The inclination of the bed may be
 at any desired degree. When the inclination
 is gentle, and is about thirteen degrees (13°),
 as here shown, the outer portion of the stock
 may be supported by an idle-roll r , on a suit-
 able standard r' , said roll enabling the stock
 to feed by gravitation when the chuck is
 opened. When the inclination is greater than
 that here shown, the roll in the stock-support
 r may not be required, because the friction
 would not overcome the tendency of the bar
 to slide down a steep inclination. If desired,
 more than one stock-supporting idle-roll may

be employed, and said rolls may be carried in a head, like that shown in Letters Patent No. 425,377; but, in such case, no mechanism would be employed to positively rotate the rolls.

I do not limit myself to the employment of the inclined bed in all cases, as the other improvements hereinbefore described may be employed in connection with a horizontal bed.

I claim—

1. The improved lathe or screw machine, comprising in its construction a bed, a chuck, a turret-slide mounted to move thereon toward and from the chuck, and provided with a tool-holding turret arranged to be presented to the stock held and rotated by the chuck, a stop to arrest backward movement of the turret, and a movable stock-stop or gage connected with the turret-slide and movable independently of the slide into and out of its operative position, said stop being arranged to be in its operative position when the turret-slide is at the end of its backward movement, as set forth.

2. In a lathe or screw machine, the combination with the bed, the chuck, the turret-slide and the turret, of a stop to arrest backward movements of the turret, a stock-stop pivotally connected with the slide at a point in advance of the turret, and adapted to swing or oscillate substantially at right angles with the direction of movement of the slide, into and out of its operative position, said stop being so located on the slide that it is in its operative position when the slide is at the end of its backward movement, as set forth.

3. A turret lathe comprising in its construction a bed, a chuck, a turret-slide, a turret mounted on said slide, an independent sliding bar on the bed, and an independent

tool-carrier pivotally supported by said independent sliding bar, as set forth.

4. A lathe or screw machine comprising in its construction a bed, a chuck, a turret slide, a turret on said slide, an independent die carrier arranged to present a die to the stop at a point between the turret and the chuck, said die carrier having a plurality of tools, and means for moving said carrier independently, as set forth.

5. A lathe or screw machine, comprising in its construction a bed, a chuck, a turret-slide, a turret on said slide, and an independent tool-holder mounted on a carriage movable lengthwise of the bed, and mounted to swing in a plane substantially at right angles with the axis of the chuck, and provided with a plurality of tools adapted to be brought successively into operative position by the swinging movement of the carrier, the latter being arranged to present the said tools to the stock at a point between the chuck and turret, as set forth.

6. In a lathe or screw machine, the combination of the bed, the chuck, a single rod movable lengthwise in guides on the bed and adapted to turn in said guides, the die-carrier rigidly affixed to said rod, the lead-screw rotated by the power of the machine, and an arm also rigidly affixed to said rod and provided with a lead-nut adapted to engage said lead-screw, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 26th day of April, A. D. 1892.

JAMES HARTNESS.

Witnesses:

W. D. WOOLSON,
G. OTIS GRIDLEY.