(No Model.) 4 Sheets—Sheet 1.

J. J. CLAUSE.

MACHINE FOR CUTTING SCREW THREADS UPON CONICAL ARTICLES.

No. 302,239. Patented July 22, 1884.

Fig 1.

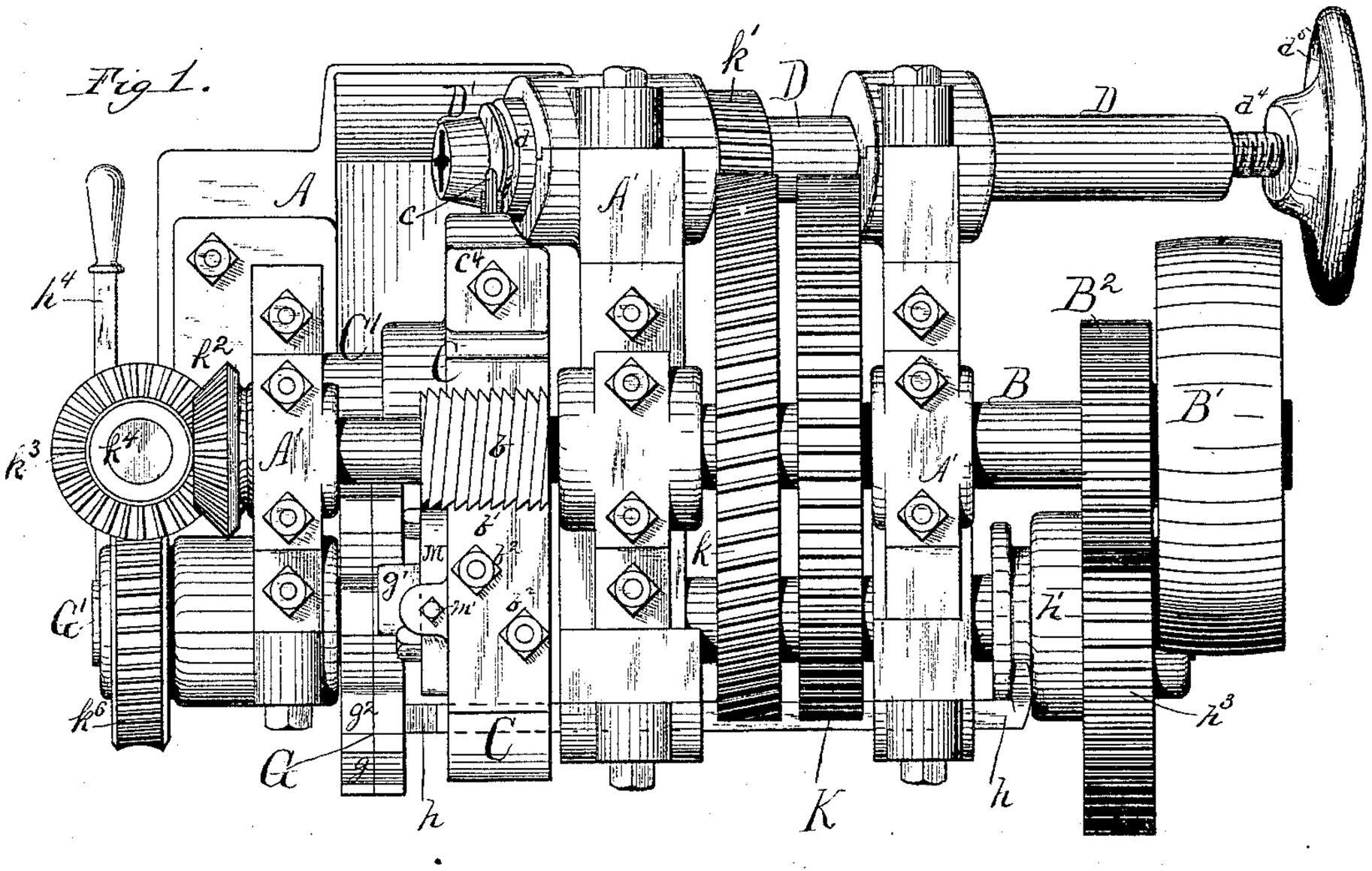
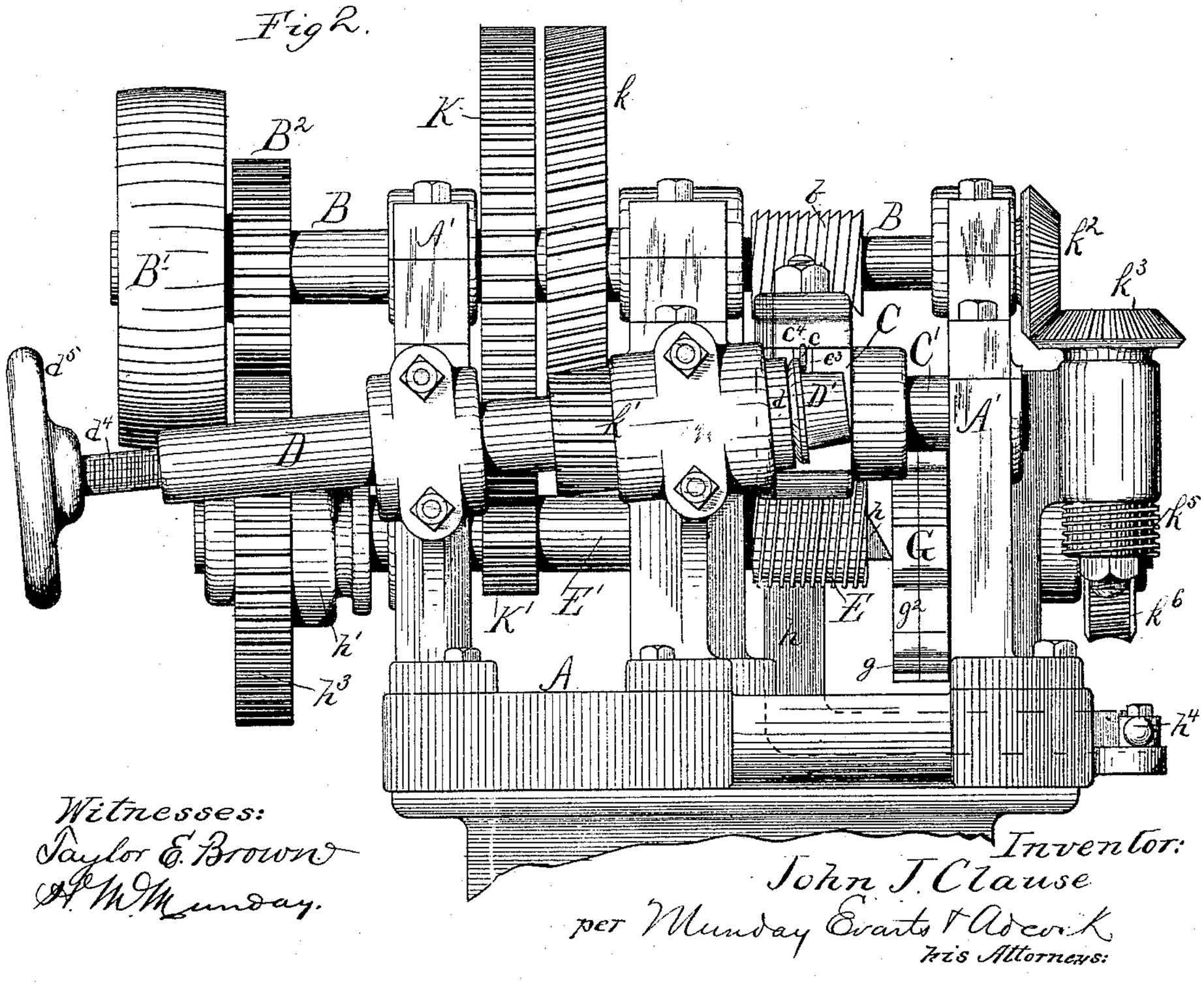


Fig 2.



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(No Model.) 4 Sheets—Sheet 2.

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Fig 3.

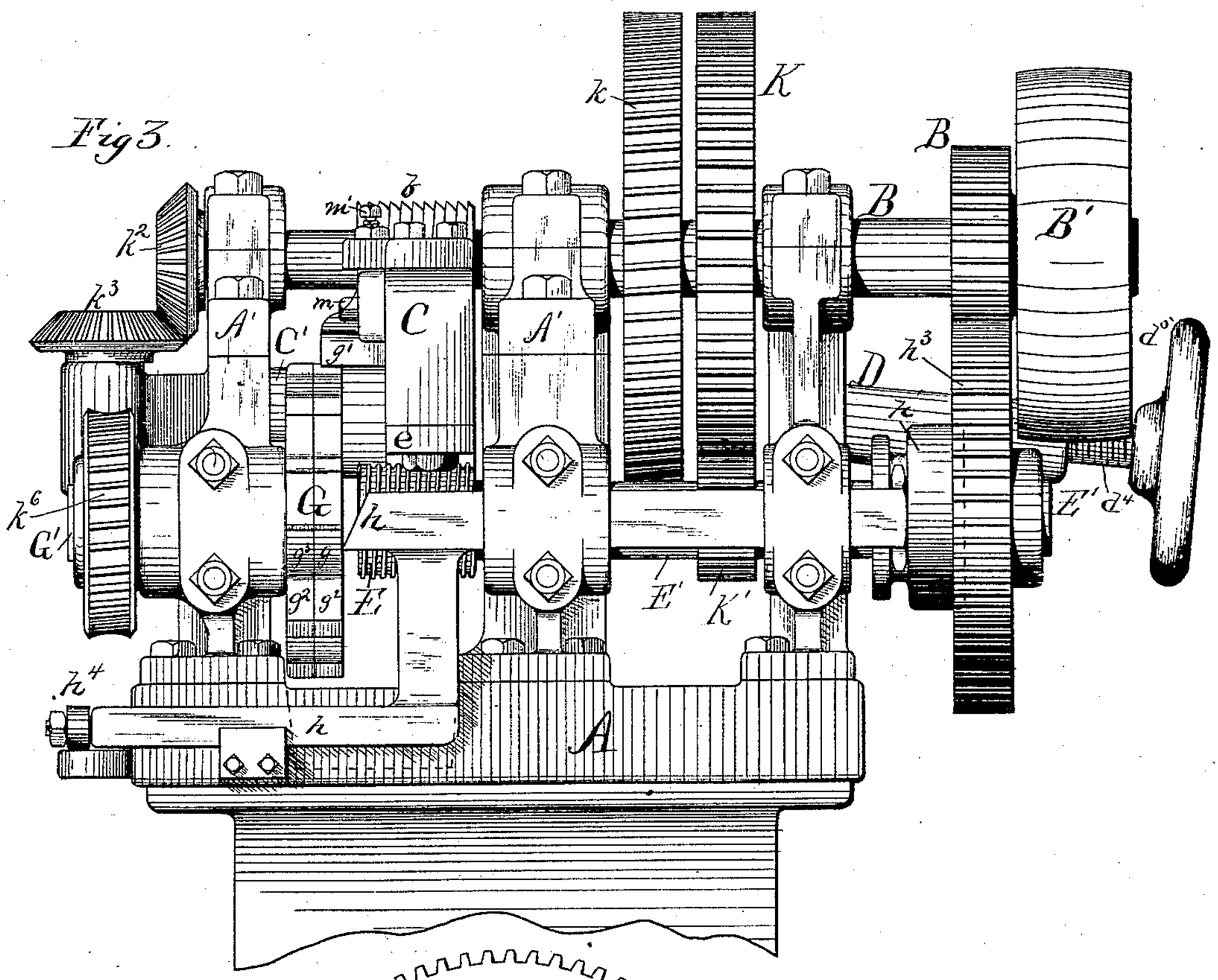

Fig 4.

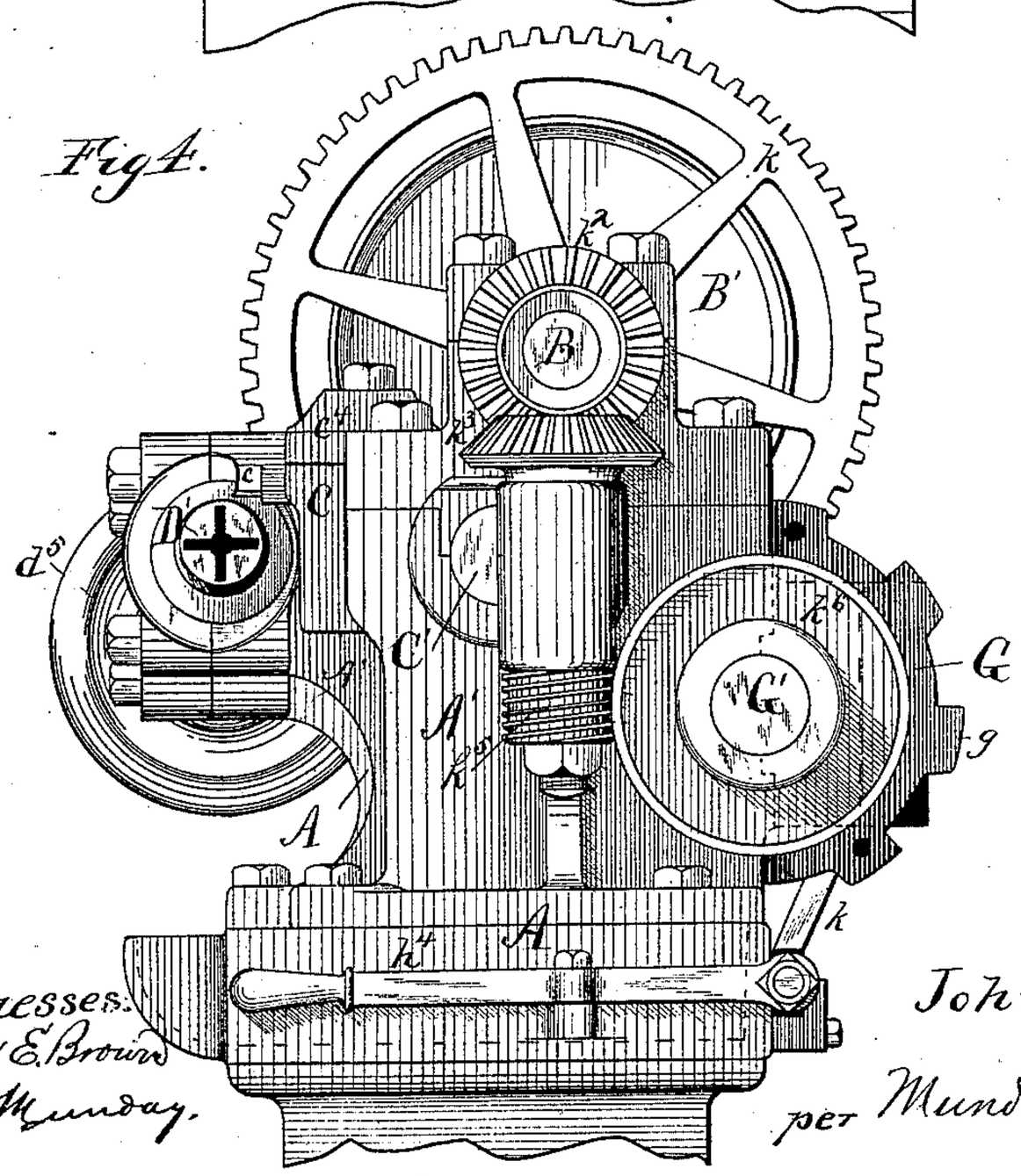

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Fig 5.

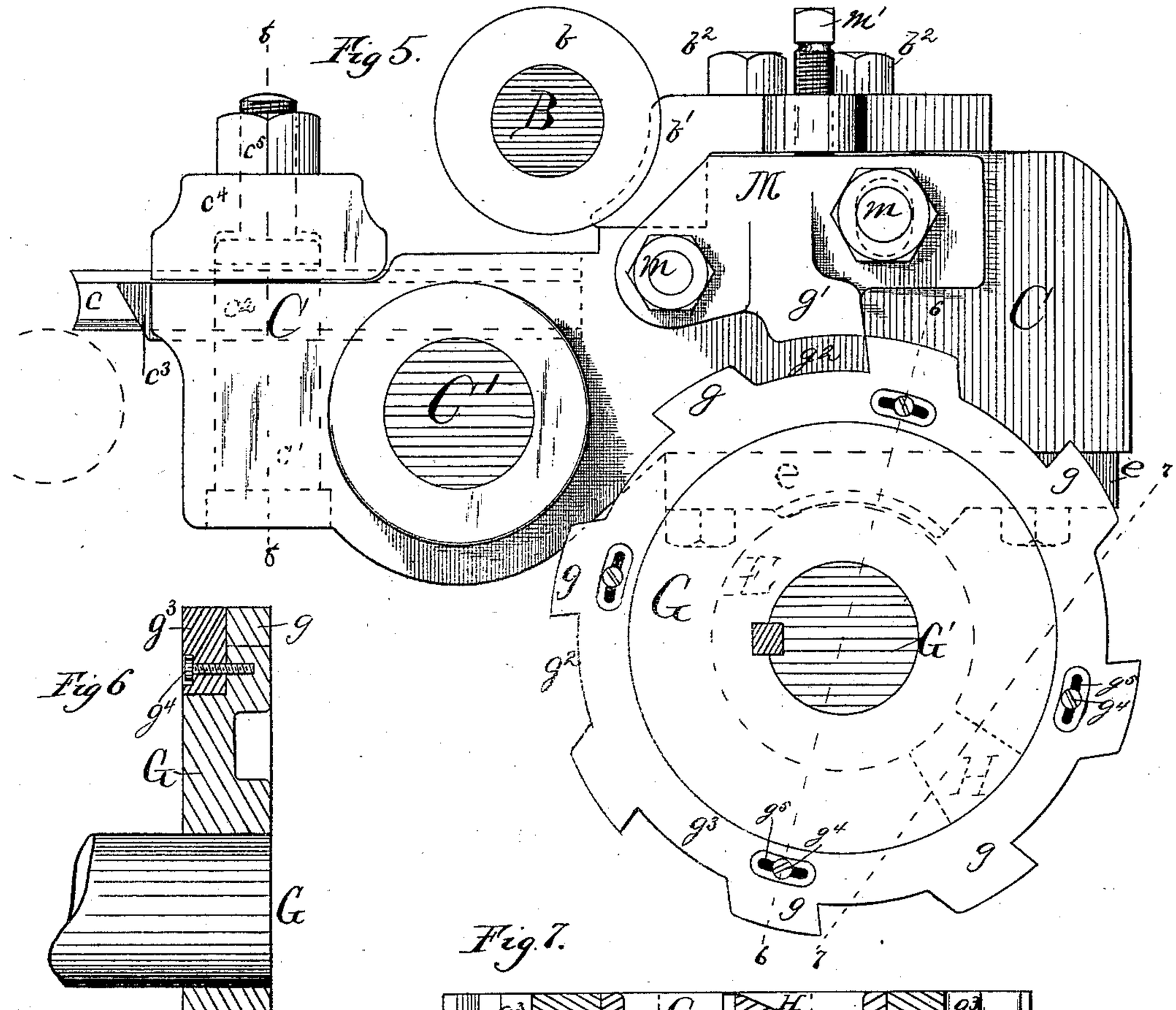


Fig 6

Fig 7.

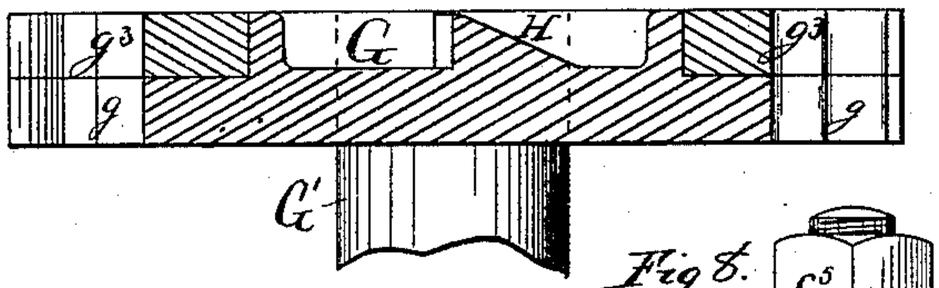


Fig 8.

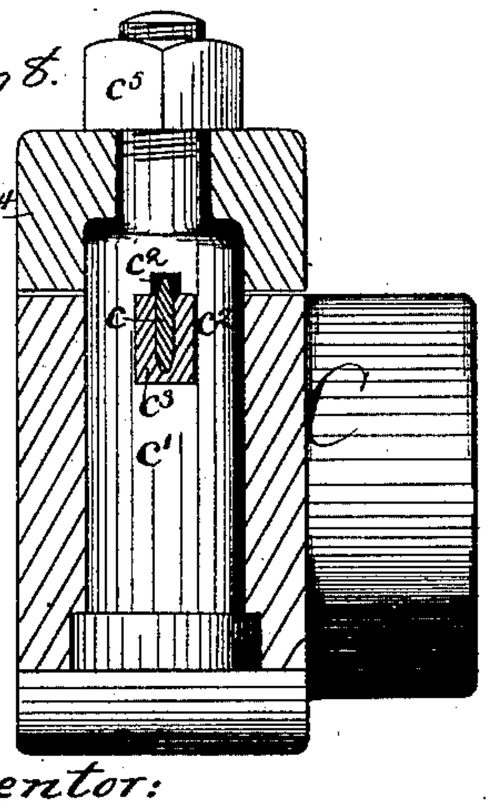


Fig 9.

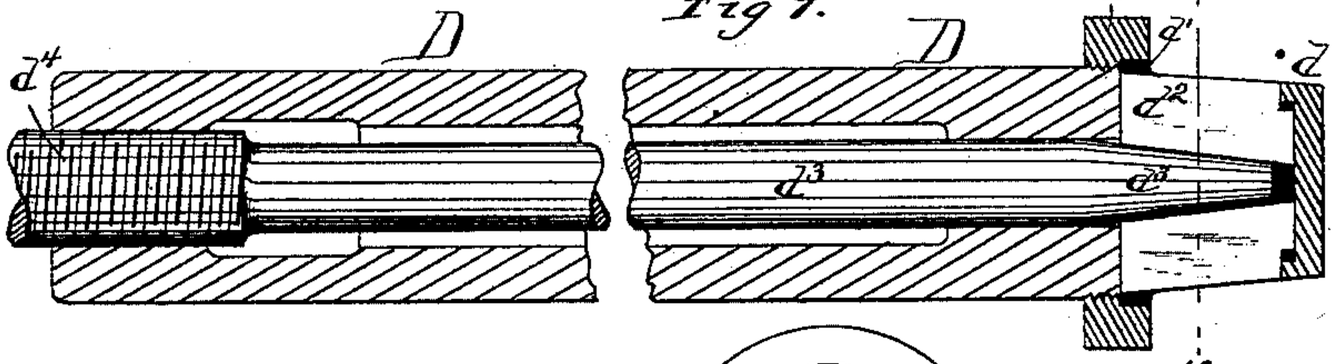
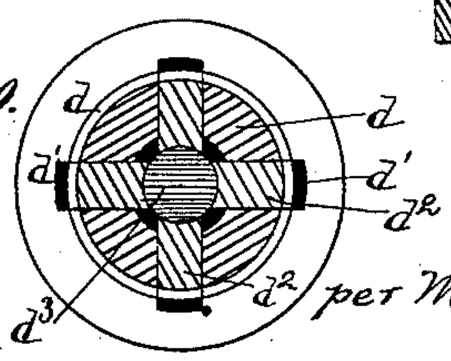


Fig 10.



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MACHINE FOR CUTTING SCREW THREADS UPON CONICAL ARTICLES.

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Fig. 11.

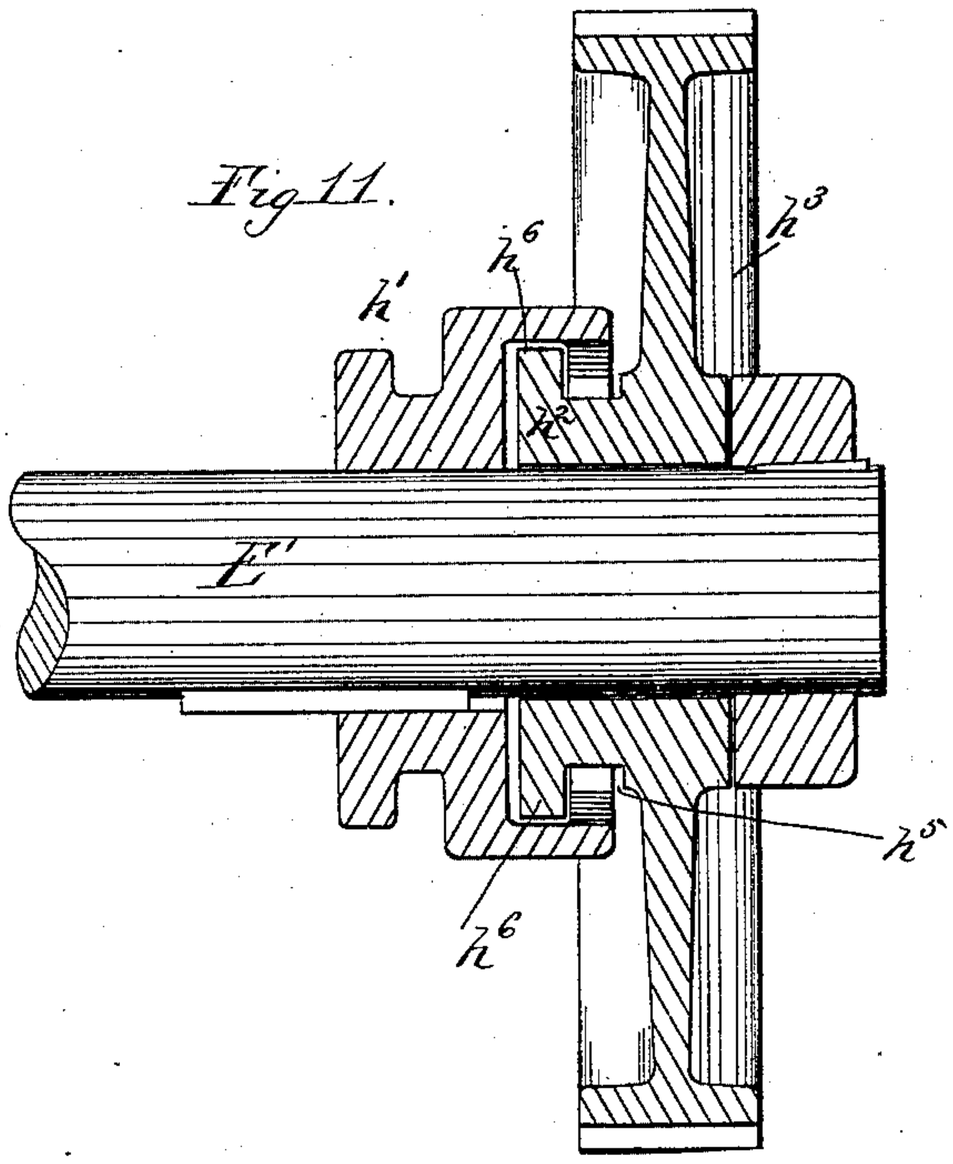


Fig. 12.

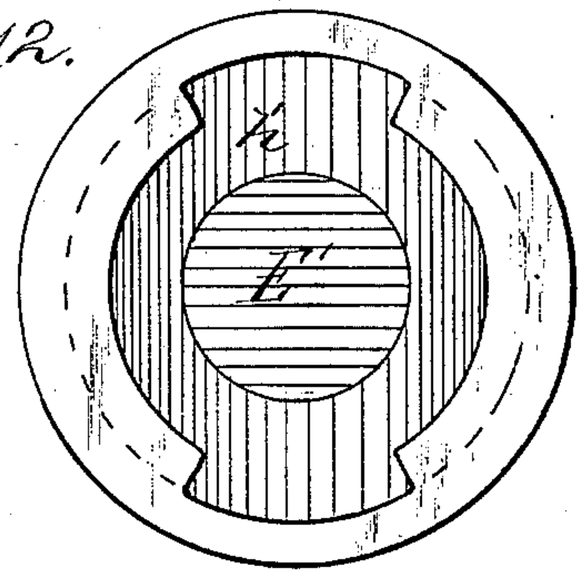
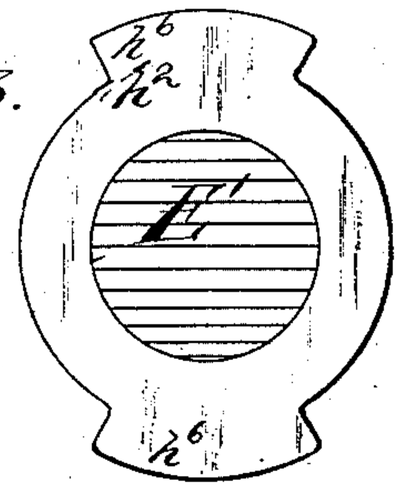


Fig. 13.



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UNITED STATES PATENT OFFICE.

JOHN J. CLAUSE, OF CHICAGO, ILLINOIS, ASSIGNOR TO HENRY W. LYMAN AND JAMES W. VAIL, BOTH OF PORT WASHINGTON, WISCONSIN.

MACHINE FOR CUTTING SCREW-THREADS UPON CONICAL ARTICLES.

SPECIFICATION forming part of Letters Patent No. 302,239, dated July 22, 1884.

Application filed December 3, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN J. CLAUSE, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Machines for Cutting Screw-Threads upon Conical Articles, of which the following is a specification.

The object of this invention is to provide a simple and durable machine for rapidly cutting screw-threads upon the exterior conical surface of bung-bushes for barrels. These bung-bushes are ordinarily made of cast or malleable iron, and repeated cuttings are required to give the threads the requisite depth.

In my invention the thread-cutting tool reciprocates from one end of the bung-bush to the other as the thread is being cut, and the bung is secured upon an inclined revolving shaft or spindle, the inclination of the shaft to the guide or shaft upon which the tool-holder reciprocates being the same as that of the conical surface of the bush to its axis, so that the surface of the bush which is presented to the cutting-tool will always be parallel to the line in which said tool reciprocates, thus obviating the necessity of employing any device to rock or move the tool-holder transversely for the purpose of causing the tool to describe a line parallel to the conical surface of the bush as said tool reciprocates. The depth of each successive cut is gaged by a revolving cam having a graduated series of operating-faces, which in turn press or hold the cutting-tool against the work while each cut is being made, each successive face causing the tool to cut deeper. This cam also moves the holder or carriage upon which the tool is mounted, alternately first in contact with the leading-screw, by which the forward reciprocation of the tool is made while cutting the thread, and then in contact with a reversing-screw, by which the tool-holder and tool are moved back into position for the next cut. The tool-holder is of course provided with threads or followers to engage alternately with the leading and reversing screws, both of which revolve constantly, as well as the inclined shaft upon which the bush is secured or chucked. The cam-wheel has as many operating-faces as it is desired to make cuts upon the bush, so that each revolution of the cam-wheel finishes a bush, and the cam-wheel is provided with an inclined projection or cam on its side, which at each complete revolution of the cam-wheel engages a slide operating a clutch to stop the machine, so that the finished bush may be removed and another placed in its stead.

Other features of my invention consist in the novel construction and combinations of devices, as hereinafter more fully described, in connection with the accompanying drawings, which form a part of this specification.

In the drawings I have shown what I deem to be the best means of practicing my invention or of embodying it in a working machine,

In the accompanying drawings similar letters of reference indicate like parts wherever used.

Figure 1 represents a plan view of my machine. Figs. 2 and 3 are side elevations looking from opposite sides of the machine. Fig. 4 is an end view. Fig. 5 is a cross-section showing the tool-holder and cam-wheel for operating the same in elevation. Figs. 6, 7, and 8 are sections on lines 6 6, 7 7, and 8 8, respectively, of Fig. 5. Fig. 9 is a central longitudinal section of the inclined shaft, showing means of chucking the bush upon its end. Fig. 10 is a cross-section on line 10 10 of Fig. 9. Fig. 11 is a central longitudinal section of the clutch, and Figs. 12 and 13 are detail face views of the same.

In the drawings, A represents the frame of the machine, which may be of any suitable construction.

B is a shaft journaled in suitable bearings on the standards A′. Loosely mounted on this shaft B is the driving-pulley B′, provided with the spur-gear B^2, integral therewith.

C is the tool-holder, mounted on the shaft C′ so as to reciprocate thereon, and thus carry the cutting-tool *c* from one end of the bush to the other, and also having a pivotal movement thereon to permit of the tool being set closer to its work to increase the depth of each successive cut.

D is the inclined shaft or spindle, on the end of which the conical bush D′, to be threaded, is secured or held while the thread is being cut thereon. The inclination of this shaft D is such that the surface or side of the bush

D′ which is presented to the tool *c* as said shaft revolves will be parallel to the line in which the tool *c* reciprocates—that is to say, parallel to the shaft C′, on which the tool-holder reciprocates. By this means, it will be seen, though the thread is to be cut upon a conical surface, the cutting-tool may reciprocate in a right line, which very much simplifies the construction and operation of the machine, as well as increases its efficiency, and enables it to perform its work at all times with positive certainty and perfection. The tool and tool-holder are reciprocated or carried forward, while the thread is being cut, by means of a leading-screw, *b*, on the shaft B, which engages with a follower or threaded block, *b′*, secured adjustably to the tool-holder by bolts b^2, when the tool-holder is moved or rocked, so as to bring the tool in contact with the bush. When one cut is finished, the tool-holder is reciprocated in the opposite direction, so as to bring the tool into position for the next cut, by means of a reversing-screw, E, on the shaft E′, engaging with a follower or threaded block, *e*, secured to the tool-holder on its under side. The tool is held or pressed against its work by means of a cam-wheel, G, having a graduated series of operating faces or lugs, *g*, upon which the rear end of the pivoted tool-holder rests, the tool-holder being provided with a leg or projection, *g′*, curved to conform to the circular faces *g* on the cam-wheel. The cam-wheel is provided with as many faces or lugs *g* on the periphery of the cam-wheel as it is desired to make successive cuts upon the bush to finish its thread to the requisite depth. The lugs *g* are each of such length in relation to the projection *g′* on the tool-holder, the length of the bush to be threaded, the timing of the leading-screw *b*, the spindle D, and the cam-wheel, that each of said lugs or cam-faces *g* will hold the tool in contact with the bush just the time required to make one complete cut from one end of the bush to the other, when, by the revolution of the cam-wheel, the lug *g* will be carried past the projection *g′*, and said projection will then drop down into the notches or spaces g^2, between the lugs *g*, and thus raise the tool *c* away from its work, and at the same time disengage the follower *b′* from the leading-screw, and engage the follower *e* with the reversing-screw E, and thus cause the tool-holder to be moved back into position for the next cut. This rear end of the pivoted tool-holder is made heavier than the other, in order to cause it to drop down of its own weight off the cam-faces *g* as the cam-wheel revolves. The next suceeding lug or cam face *g*, being slightly higher than the first one, causes the tool *c* to cut a little deeper, and so on until the operation is completed.

The inclined spindle D is made hollow, and to its end is secured, by means of screw-threads or otherwise, a conical chuck-piece, *d*, adapted to fit the interior conical surface or hole in the bush. The chuck-piece *d* is provided with four radial slots, *d′*, in which fit four wedges, d^2, the outer edges of said wedges conforming to the conical hole in the bush, and the inner edges of said wedges conforming to the conical pin d^3, by means of which the wedges are forced outward against the bush, so as to hold or chuck the same firmly in position on the revolving spindle D. The conical pin d^3 is provided with screw-threads d^4, which engage with corresponding screw-threads in the end of the hollow shaft D, and the pin is operated or turned by means of a hand-wheel, d^5.

In order to adapt the machine to thread-bushes or other conical-surfaced articles of different lengths, I split the cam-wheel G or its operating-faces *g* into two parts, *g* and g^3, secured together by bolts g^4 passing through slots g^5, so that by turning the one upon the other the operating-faces *g* may be lengthened, so as to increase the length the threads will be cut upon the bush before the tool-holder projection *g′* drops off the faces *g*.

The cutting-tool *c* is adjustably secured in its holder C by means of a slotted bolt, *c′*, through the slot c^2 of which the tool *c* and its socket c^3 is inserted, so that the tool is firmly clamped between its socket c^3 and the cap c^4 of the bolt by means of the threaded nut c^5.

The cam-wheel G is provided on one side with an inclined projection or cam, H, which engages at each complete revolution of the cam-wheel, after the bush has been repeatedly cut and finished, with a slide, *h*, operating a clutch, *h′*, that engages with the clutch-hub h^2 of the loose gear-wheel h^3 on the shaft E′, by which means the machine is automatically stopped, so that the finished bush may be removed from the spindle D and be replaced by another. When a new bush has been secured upon the spindle D, the machine is set in motion by pulling the lever h^4, which operates to draw back the slide *h* and the clutch *h′* from the annular recess h^5 in the hub, so that the clutch *h′* will engage the clutch-projection h^6 on the hub, and thus cause the shaft E′ to revolve with the gear-wheel h^3. The shaft B is driven from the shaft E′ by means of the spur-gears K and K′, fixed to said shafts respectively, and the inclined shaft D, on the end of which the bush is secured, is driven from the shaft B by means of the spur-gears *k* and *k′*, the teeth of which are cut slightly askew to accommodate them to the inclination of the shaft D. The shaft G′, to which the cam-wheel G is secured, is driven from the shaft B by means of the bevel-gear k^2 on the shaft B, which meshes with a bevel-gear, k^3, on the upright shaft k^4, which is provided with a worm, k^5, that meshes with a worm-wheel, k^6, on the cam-shaft G′.

To facilitate the operation of the machine, the shaft E′, to which the reversing-screw E is secured, is timed to make two revolutions to one of the shaft B, to which the leading-screw *b* is secured, so that the backward re-

ciprocation of the tool-holder is effected in half the time of its forward movement when the work is being done.

The shaft C′, on which the tool-holder C reciprocates and rocks slightly, is a mere stationary shaft or guide. If preferred, this shaft may be loose in its bearings, so as to rock and reciprocate therein, and the tool-holder be secured rigidly to it.

In order to adjust the cutting-tool and tool-holder to bushes of different thicknesses or exterior diameters, I make the leg or projection g', which fits against the cam-faces g, adjustable on the tool-holder. The leg g' is therefore formed on a separate block, M, which is secured to the tool-holder by bolts m, one of which passes through a hole and the other through a slot in said block, so that said block may be raised or lowered by means of the set-screw m'.

I claim—

1. In a thread-cutting machine, the combination of reciprocating pivoted tool-holder C and tool mounted thereon, with inclined chuck-spindle D, for the conical article to be threaded, the inclination of said spindle to the shaft or line on which said tool-holder reciprocates being the same as the inclination of the conical surface of said article to its axis, so that said tool will reciprocate in a line parallel to the conical surface of said article without rocking said tool-holder, substantially as specified.

2. The combination of inclined chuck-spindle D, with a cutting-tool mounted on tool-holder C reciprocating in a line parallel to the surface of the conical article to be threaded held on said chuck-spindle, and screws and followers for reciprocating said holder back and forth to make successive cuts, and cam having a series of operating-faces—one higher than the other—for rocking the tool-holder to increase the depth of cut at each successive cut until the thread is completed, substantially as specified.

3. The combination of an inclined chuck-spindle with a cutting-tool and a reciprocating pivoted tool-holder provided with a follower, a leading-screw engaging with said follower to produce the forward reciprocation of the tool-holder, a reversing-screw, and a follower on the tool-holder adapted to engage with said reversing-screw and cam for moving the tool-holder alternately in contact with said leading and reversing screws, substantially as specified.

4. The combination of inclined revolving chuck-spindle D with reciprocating pivoted tool-holder C and a cam for rocking the tool-holder at the beginning and end of each reciprocation or cut, substantially as specified.

5. The combination of an inclined spindle provided with a chuck for holding the article to be threaded, with a thread-cutting tool, a reciprocating rocking tool-holder on which said tool is mounted, said tool-holder reciprocating on a shaft parallel to the conical surface of the article secured on said chuck-spindle to be threaded, a leading-screw and follower secured to said tool-holder, and adapted to engage with said leading-screw when the forward reciprocation is made, and a cam-wheel provided with a series of operating-faces for rocking said tool-holder so as to present the tool to its work, and at the same time cause said follower to engage with the leading-screw, said operating-faces being graduated so as to cause the tool to cut deeper at each successive cut as the cam-wheel revolves, substantially as specified.

6. The combination of inclined revolving spindle D, provided with a chuck for holding the conical article to be threaded, with reciprocating pivoted tool-holder C, provided with thread-cutting tool c, and cam-wheel G, provided with series of operating-faces g, for holding the tool in contact with its work, said operating-faces being graduated so as to cause the tool to cut deeper at each successive cut, substantially as specified.

7. The combination, with an inclined revolving spindle provided with a chuck for holding the conical article to be threaded, of a thread-cutting tool, a tool-holder, leading-screw. and follower for reciprocating the tool-holder in a line parallel to the conical surface of the article secured upon said chuck-spindle to be threaded, and a cam-wheel provided with a series of operating-faces—one higher than another—for holding the tool in contact with its work so as to cut deeper at each successive cut, the length of said operating-faces being adjustable to adapt the machine to thread conical articles of different lengths, substantially as specified.

8. The combination, with an inclined revolving spindle provided with a chuck for holding the conical article to be threaded, of a thread-cutting tool, a tool-holder, screws and followers for reciprocating said tool-holder back and forth in a line parallel to the conical surface of the article secured upon said chuck-spindle to be threaded, a cam-wheel provided with a graduated series of operating-faces to rock the tool-holder at each successive cut and hold the tool to its work, and a cam or projection on the side of said wheel for operating a clutch to stop the machine when the thread is completed, substantially as specified.

9. In a machine for cutting threads upon conical articles, the combination of a reciprocating rocking tool-holder with a cam-wheel provided with a series of operating-faces—one higher than the other—for holding the tool in contact with its work so as to cut deeper at each successive cut, said cam-wheel having also notches or spaces g^2 between said operating-faces, to permit said tool-holder to rock and withdraw the tool from its work at the end of each successive cut, substantially as specified.

10. In a machine for cutting threads upon conical articles, the combination of a reciprocating rocking tool-holder with a cam-wheel provided with a series of operating-faces—one

higher than the other—for holding the tool in contact with its work so as to cut deeper at each successive cut, said cam-wheel or its operating-faces being split or divided into two parts, so that the length of said operating-faces may be extended to adapt the machine to thread articles of different lengths, substantially as specified.

11. The combination of rocking tool-holder C, provided with adjustable block M, having leg or projection g', cam-wheel G, provided with operating-faces g—one higher than another—and intervening spaces g^2, substantially as specified.

12. The combination of tool-holder C, provided with projection g', with cam-wheel G, provided with operating-faces g, having sliding part g^3, so that said operating-faces may be extended, substantially as specified.

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