No. 672,463. Patented Apr. 23, 1901.

G. N. TOMS.

TURNING MACHINE.

(Application filed June 26, 1899.)

(No Model.)

4 Sheets—Sheet 1.

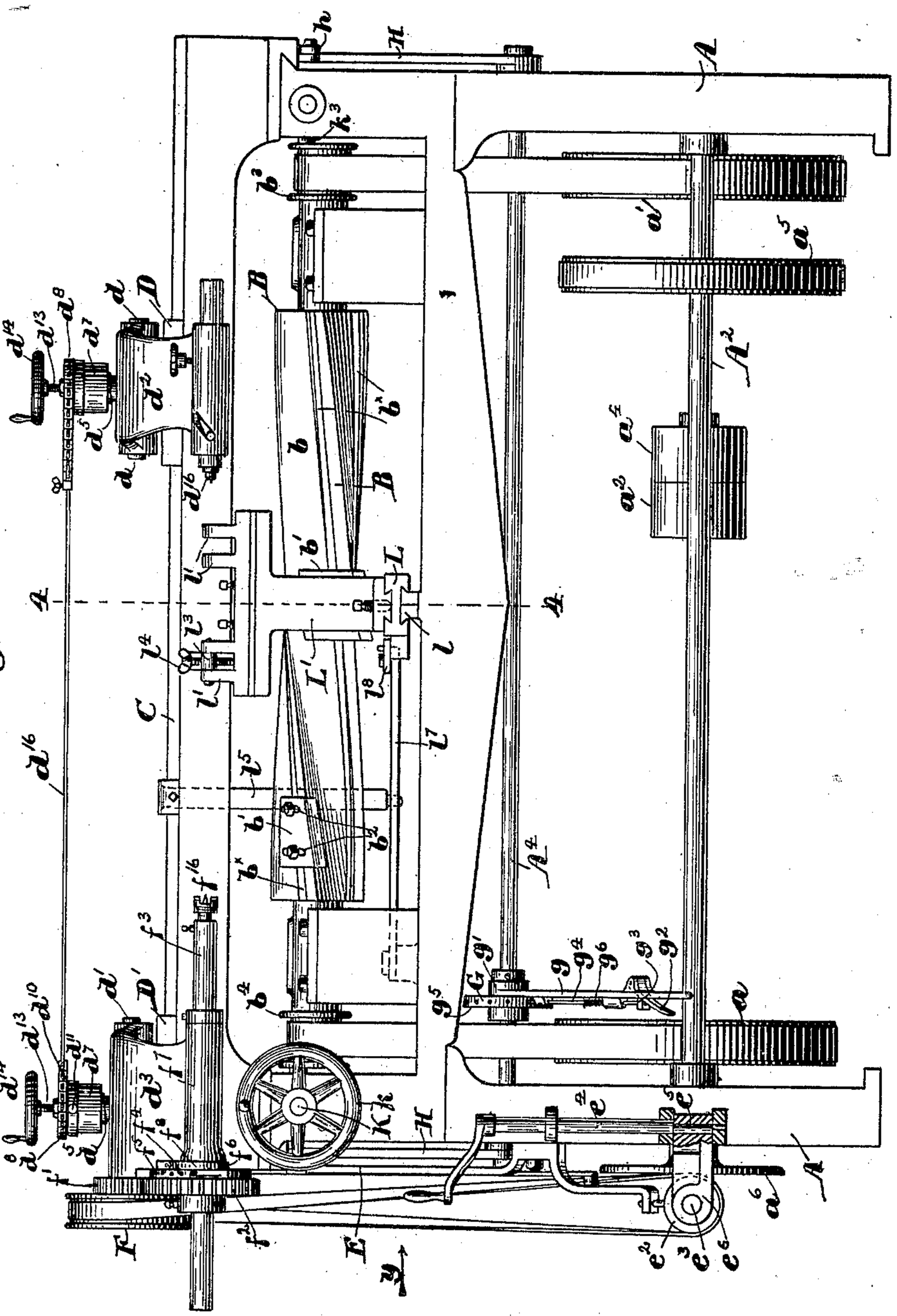

Fig. 1.

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4 Sheets—Sheet 2.

Fig. 2.

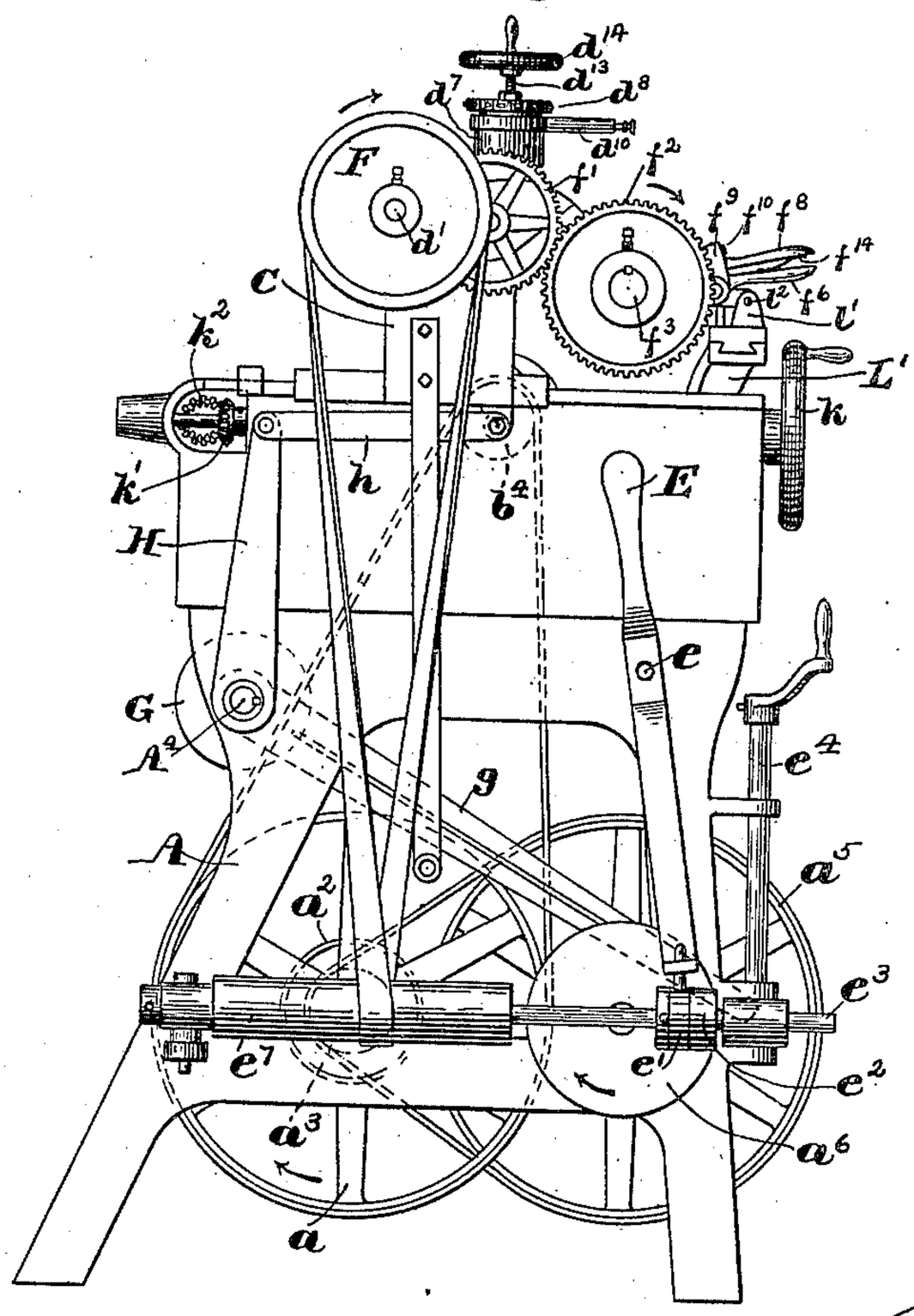


Fig. 10.

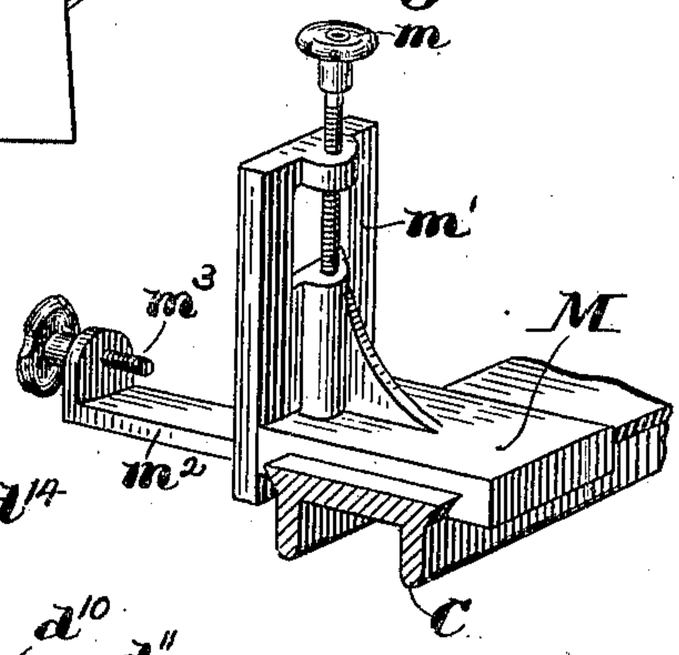


Fig. 6

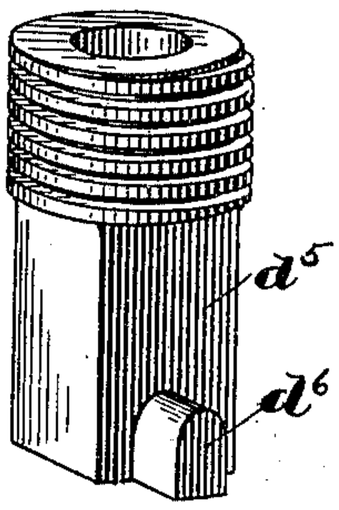
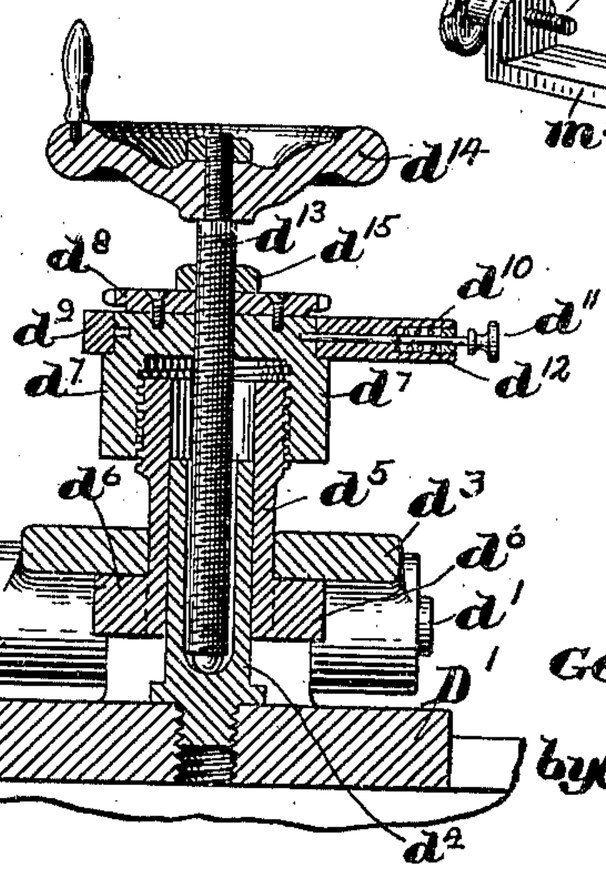


Fig. 5.



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4 Sheets—Sheet 3.

Fig. 3.

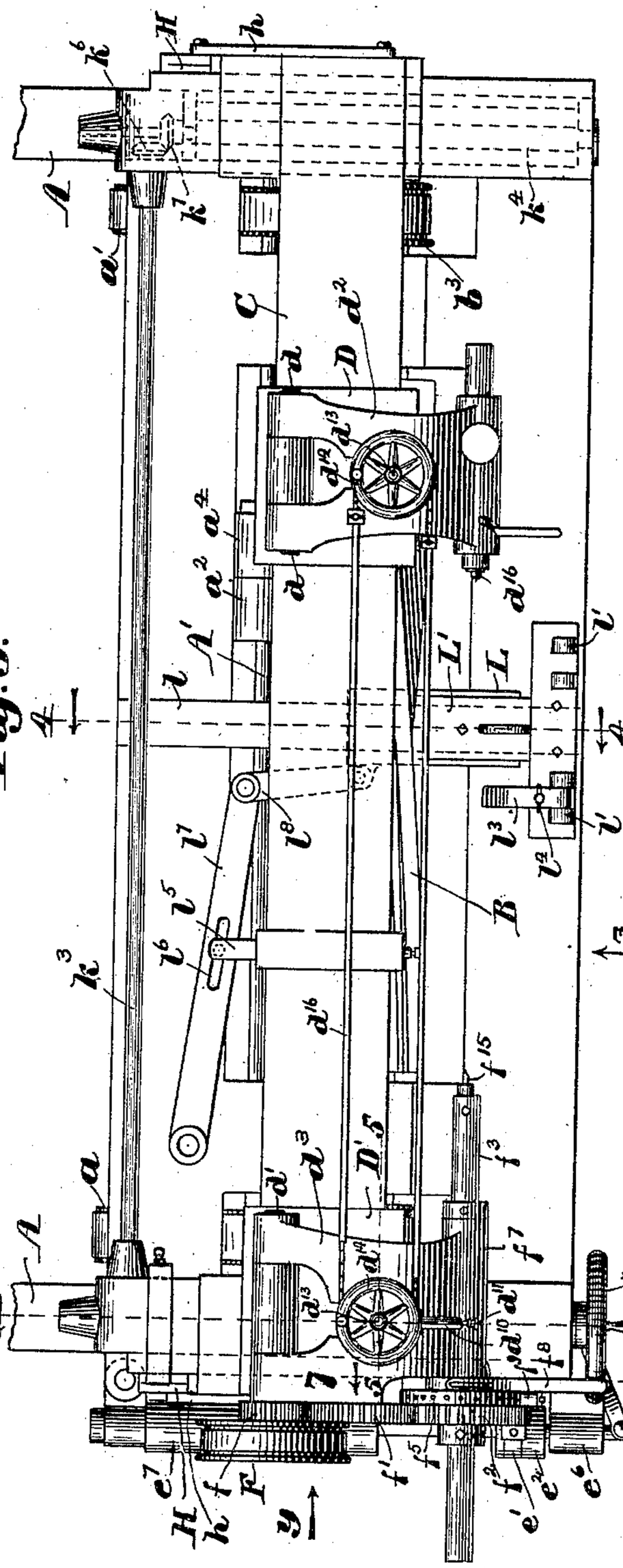
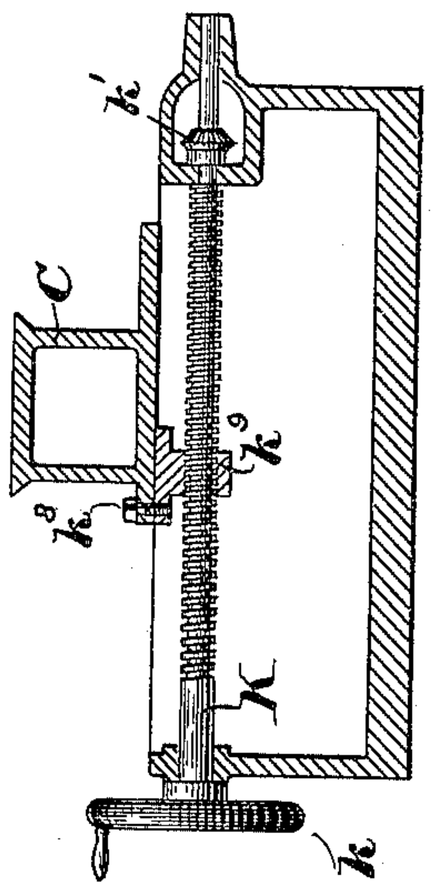


Fig. 9.



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4 Sheets—Sheet 4.

Fig. 4.

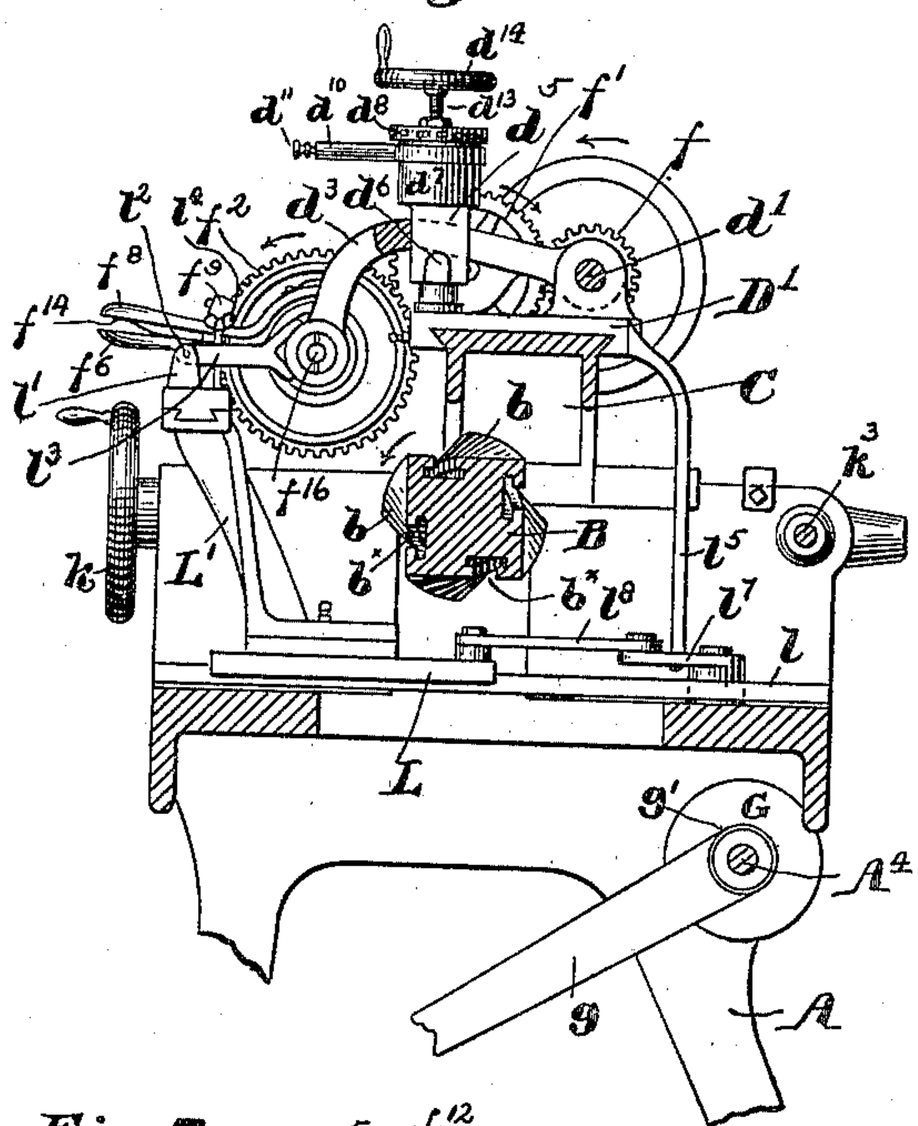


Fig. 7.

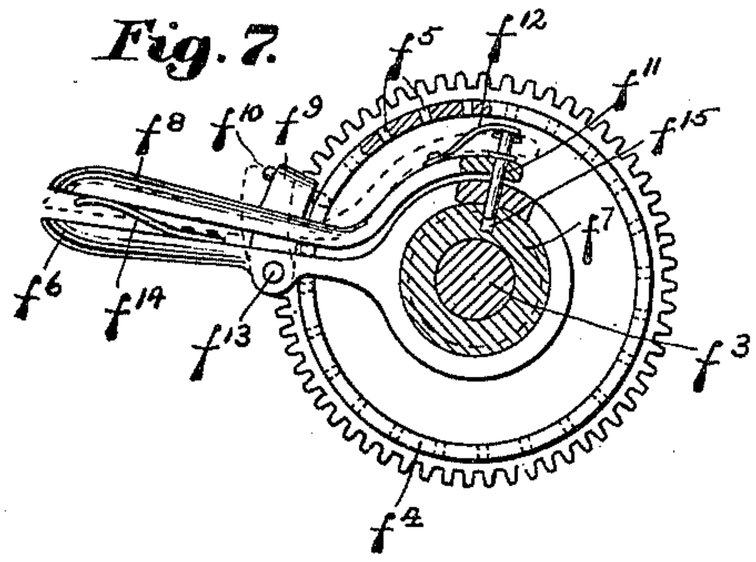
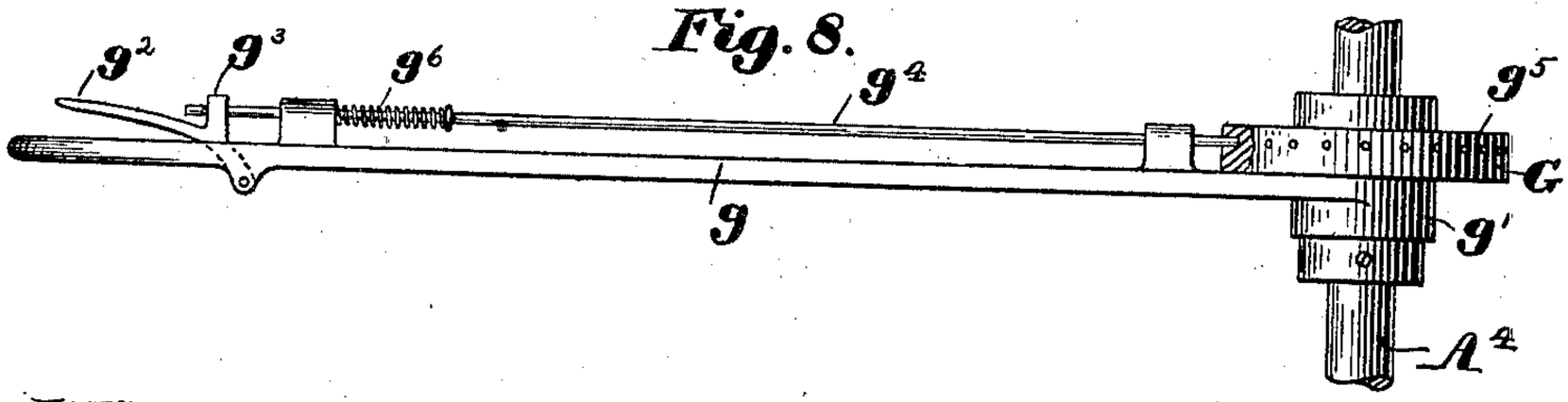


Fig. 8.



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UNITED STATES PATENT OFFICE.

GEORGE N. TOMS, OF REVERE, MASSACHUSETTS, ASSIGNOR TO ASHER A. WHITE, OF BOSTON, MASSACHUSETTS.

TURNING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 672,463, dated April 23, 1901.

Application filed June 26, 1899. Serial No. 721,913. (No model.)

To all whom it may concern:

Be it known that I, GEORGE N. TOMS, a citizen of the United States, residing at Revere, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Turning-Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

Figure 1 is a front elevation of my new turning-machine. Fig. 2 is an end elevation of my new turning-machine looking in direction of arrow *y*, Fig. 3. Fig. 3 is a plan view of my new turning-machine. Fig. 4 is a sectional view on line 4 4 of Fig. 3. Figs. 5, 6, 7, 8, 9, and 10 illustrate details hereinafter referred to.

My invention relates to turning-machines in which the knife-carrier is rotary and in which the stock may be rotated together with the knives or may be kept stationary, as desired; and the objects of my invention are, first, to provide a knife-carrier which will insure the making of a shearing cut by the knives; second, to provide means for carrying the stock completely over the knife-carrier, thereby insuring a perfectly plane cut; third, to provide means for raising one end of the stock independently of the other; fourth, to provide means for raising the stock with relation to the knife-carrier to obtain two or more cuts; fifth, to provide means for rotating the stock a given portion of a complete rotation; sixth, to provide means for preventing vibration of the stock, thereby insuring a smooth even cut, and, seventh, to provide means for holding and cutting stock of great length.

In the drawings illustrating the principle of my invention and the best mode now known to me of applying that principle, (see Fig. 1,) A is the supporting-frame of the machine, in the lower part of which are journaled the shafts A′ and A². Fast upon the shaft A′ are the pulleys *a a′* and *a²* and *a³*, and loose upon the same shaft is the pulley *a⁴*. Fast upon the shaft A² sre the friction-disk *a⁶* and the pulley *a⁵*, which is belt-connected to the pulley *a³*. In the upper part of the frame A is journaled a knife-carrier B, the faces *b* of which are twisted or warped surfaces. In these faces *b* are formed T-shaped slots *b*×, in which are adjustably secured knives *b′*, formed with slots *b²*. These slots *b²* permit the adjustment of the knives for different depths of cut. Fast on the ends of the knife-carrier B are the pulleys *b³ b⁴*, which are belt-connected to the pulleys *a a′*, respectively, on shaft A′. Slidable from front to rear on ways on the top of the side standards of the frame A is the platen C, and slidable on the platen C from side to side of the machine is the saddle D, which carries a shaft *d*, upon which is free to rotate the curved tail-stock plate *d²*. Fast upon the platen C is the saddle D′, which carries a shaft *d′*, upon which is free to rotate the head-stock plate *d³*. The head-stock plate *d³* and tail-stock plate *d²* are rotated upon their respective shafts *d′* and *d* by the mechanism shown in sectional view, which is a section on line 5 5 of Fig. 3, and this mechanism is duplicated in head-stock and tail-stock, except that the arm *d¹⁰*, collar *d⁹*, locking-bolt *d¹¹*, and spring *d¹²* are absent from the tail-stock. Into the saddles D′ and D is secured the socket *d⁴*, over which passes the sleeve *d⁵*, (see Fig. 6,) provided with a square screw-thread at its upper end and with lugs *d⁶ d⁶* at its lower end. Over the upper end of the sleeve *d⁵* screws the capstan-headed screw-cap *d⁷*, to which is secured the sprocket-wheel *d⁸*. Encircling the upper portion of the screw-cap *d⁷* is the collar *d⁹*, from which projects an arm *d¹⁰*, through the central portion of which passes a locking-bolt *d¹¹*, controlled by a spring *d¹²*. The inner end of the locking-bolt *d¹¹* engages in holes recessed at intervals in the upper convex portion of the screw-cap *d⁷*. Passing downward through the sprocket-wheel *d⁸*, screw-cap *d⁷*, and sleeve *d⁵* and with its lower end resting on the bottom of the socket *d⁴* is the screw *d¹³*, to the upper portion of which is secured the hand-wheel *d¹⁴*. A check-nut *d¹⁵* serves to secure the screw *d¹³* to the sprocket-wheel *d⁸*. The two sprocket-wheels *d⁸* are connected by the endless chain and rod *d¹⁶*, Fig. 1. Pivoted on the stud *e*, projecting from the frame A, is the hand-lever E, which controls a collar *e′*, that fits in a circumferential groove in the friction-roll *e²*, keyed to the shaft *e³*. Journaled in lugs projecting from the frame A is a vertical shaft *e⁴*, pro-

vided at its upper end with a handle and with an eccentric e^5 at its lower end. (See Fig. 2.) Under the action of the eccentric e^5 the bearing e^6 of the shaft e^3 slides back and forth to throw the friction-roll e^2 into and out of contact with the friction-disk a^6. Fast on the shaft e^3 is the pulley e^7, which is belt-connected with the pulley F, and fast upon the same shaft with the pulley F is the pinion f, which meshes with the spur-gear f^2 through the intermediate gear f'. (See Fig. 4.) The gear f^2 is secured to the live-spindle f^3 and has formed on its inner side a circular axially-projecting flange or spacing-rim f^4, which is provided with radial holes f^5. (See Fig. 7.) The inner end of a lever f^6 is in the form of a collar which encircles the bearing f^7 of the live-spindle f^3, and fulcrumed at f^{13} on the lever f^6 is a lever f^8, integral with which is a lug f^9, carrying a pin f^{10}. The inner end of the lever f^8 carries the locking-bolt f^{11}, which is controlled by a spring f^{12} and engages in a recess f^{15} in the bearing f^7. The lever f^8 is controlled by a spring f^{14}, secured to the lever f^6. Journaled in the side frames or standards of the machine is the rocker-shaft A^4, fast upon which is the wheel G. (See Figs. 1, 2, and 4.) The inner end of the lever g (see Figs. 1 and 8) is in the form of a collar g', which encircles the shaft A^4. Pivoted on the lever g is the thumb-latch g^2, through a lug g^3 upon which passes the rod g^4. The inner end of the rod g^4 engages in holes g^5, formed in the rim of pulley G, thereby locking the lever g to the wheel G. A spring g^6 tends to force the rod g^4 into the holes g^5. Fast upon each end of the shaft A^4 are the rocker-arms H, (see Figs. 1, 2, and 3,) to the upper ends of which are jointed the links h. The other ends of the links h are pivotally connected with the platen C. Fast upon one end of the screw-shaft K (see Fig. 9, which is a sectional view on line 9 9 of Fig. 3) is the hand-wheel k, and fast upon its other end is the bevel-gear k', Fig. 2, which meshes with a similar bevel-gear k^2, fast upon one end of the transversely-extending shaft k^3, Fig. 3, journaled in the rear portion of frame A. On the other end of the shaft k^3 is a bevel-gear k^6, which is similar to the gear k^2. The screw-shaft k^4 has fast upon its rear end a bevel-gear k^7, which is similar to the bevel-gear k' and which meshes with the bevel-gear on the shaft k^3. Secured to the platen C by screw-bolts k^8 are the lug-nuts k^9, through which pass the screw-shafts K and k^4. To prevent the vibration of the stock, and thus to insure a smooth cut, (see Figs. 1 and 3,) I provide a center-rest L, which slides from front to rear on a way l in the frame of the machine. Free to slide transversely in the upper portion of this center-rest is the saddle L', from which project lugs l'. Pivoted on shafts l^2, mounted in the lugs l', are the clamping-forks l^3, which are adjusted vertically by thumb-screws l^4. Adjustably secured to the platen C is a curved arm l^5, (see Fig. 4,) the lower end of which engages a slot l^6 (see Fig. 3) in the lever l^7. The lever l^7 is pivoted at one end on the frame of the machine and at the other end jointed to one end of a link l^8, the other end of which is pivotally connected to the base of the center-rest L.

In Fig. 10 is shown a perspective view of one of a pair of brackets which are designed to support long stock during the operation of turning. The saddle portion M slides on top of the platen C and has connected to it, by means of the adjusting-screw m, the L-shaped vertical slide m'. The stock rests upon the projecting arm m^2 and is held in place by the clamp-screw m^3.

The operation of my machine is as follows: The stock is secured between the live-center f^{16} and the dead-center d^{16}. One of the features of my machine is the independent vertical adjustability of the two centers, which permits the cut to be varied from end to end of the stock. To raise or lower the center, the check-nut d^{15} is loosened and the hand-wheel turned in the proper direction. The screw-cap d^7 is thus caused to move up or down on the screw d^{13} and draws with it the sleeve d^5, the lugs of which engage under the plate d^3 or plate d^2, depending on which screw d^{13} is turned. Another feature of my machine is that it provides means for cutting shapes of polygonal section or shapes of curved section. If a shape having a polygonal section is to be cut, the live-spindle, and therefore the stock, does not rotate continuously, but is turned by the step-by-step or spacing mechanism shown in Fig. 7. The shaft e^4 is turned so that the eccentric on the end of the shaft e^4 causes the bearing e^6 to slide away from the friction-disk a^6, thereby carrying the friction-roll e^2 out of contact with the friction-disk a^6. The platen C is moved so as to bring the stock against the knives by the following means: The operator grasps the lever g and brings the inner end of the rod g^4 opposite one of the holes in the rim of the wheel G. The thumb-latch g^2 is then released and the rod g^4 engages in the hole g^5 in the wheel G, thereby locking the lever g to the wheel G. By moving the lever g the rocker-shaft A^4 is now turned and the rocker-arms H, through the links h, move the platen C back and forth over the knives. In my new machine the stock may be carried completely over the knives, thus insuring a plane surface instead of a surface which is cylindrical. The means to move the stock completely over the knives is one of the features of my invention. Instead of using the lever g the hand-wheel k may be turned for the same purpose. The bolts k must, however, be first put in place, securing the lug-nuts k^9 to the platen C. The rotation of screw-shaft K, through the bevel-gears k', k^2, k^6, and k^7 and the shaft k^3, causes the screw-shaft k^4 to rotate, and the lug-nuts k^9 move on the screw-shafts K k^4, carrying the platen C with them. As the platen C is moved it

carries with it the curved arm l^5, and through the lever l^7 and link l^8 the center-rest L is moved into a position in which the clamping-forks l^3 press against the stock and hold it firmly against vibration. The clamping-forks l^3 may be adjusted vertically by the thumb-screws l^4 and transversely by the saddle. This reciprocating back-rest is a feature of my invention.

In order to save power, and more especially to prevent the wood from being torn out and an uneven cut being obtained, I provide means by which more than one cut may be obtained with the platen C in the same position. The means so provided are a feature of my invention. To obtain these several cuts, the stock after receiving its first or roughing cut is lowered as a whole by the simultaneous lowering of the live-spindle and the dead-spindle. This lowering is done by tightening the check-nuts d^{15}, thus securing the screw d^{13} to the sprocket-wheel d^8 and screw-cap d^7 and then turning one sprocket-wheel d^8 by means of the arm d^{10}, the rotation being communicated to the other sprocket-wheel d^8 by the chain and rod d^{16}. As the inner ends of the screws d^{13} rest upon the bottom of the sockets d^4, the rotation of the screw-caps d^7 causes the sleeves d^5, which support the plates d^2 d^3, to move downward, carrying the live-spindle and the dead-spindle down.

To form the desired polygonal shape, the stock is, after making the finishing cut on one side, turned by the mechanism shown in Fig. 7. The operator grasps the lever f^6 and presses down the lever f^8, thereby drawing the pin f^{10} out of the hole f^5 in spacing-rim f^4 and the bolt f^{11} out of the recess f^{15}. The lever f^6 is then raised until the pin f^{10} is brought opposite the proper hole f^5, when the lever f^8 is released and the pin f^{10} engages in the hole. The lever f^6 is then lowered, and when the bolt f^{11} is brought opposite the recess f^{15} the spring f^{12} forces the bolt f^{11} into the recess, thereby locking the live-spindle against rotation.

If the live-spindle is to be rotated continuously, the shaft e^4 is turned so as to bring the friction-roll e^2 into contact with the friction-disk a^6. The lever f^8 is secured in any suitable manner with the pin f^{10} out of engagement with the spacing-rim f^4. The brackets shown in Fig. 10 are used when extra long lengths of wood are to be turned, and when these brackets are used the saddles D D′ and their connected mechanism are removed from the platen C.

The advantages of my machine are, first, the shearing cut obtained by reason of the knife-carrier being provided with twist or warped faces; second, a plane cut is obtained by providing means for carrying the stock completely over the knives; third, a smooth cut is obtained by preventing vibration of the stock; fourth, the wood is not torn out, as the total cut may be taken in two or more cuts; fifth, a saving of power; sixth, a shape having a polygonal section or one having a curvilinear section may be obtained on the same machine; seventh, the cut may be varied from one end of the stock to the other by the independent adjustment of the centers, and, eighth, means are provided for turning extra long lengths of wood.

What I claim is—

1. In a turning-machine, the combination of a supporting-frame; a rotatable knife-carrier whose knife-carrier faces are warped surfaces and are formed with T-shaped slots; knives mounted on said carrier; mechanism for rotating said knife-carrier; a reciprocating platen; mechanism mounted on said platen for carrying the stock consisting of two saddles, the first fast upon said platen, a head-stock plate pivoted to said saddle; the second saddle slidable from side to side on said platen; a tail-stock plate pivoted to said second saddle; live and dead centers in respective head and tail stock plates and means to adjust said centers vertically relatively to each other and the rotating knives; mechanism for reciprocating said platen; and mechanism for rotating the stock.

2. As a new article of manufacture, an adjustable rest for turning-machines, comprising a supporting base portion; a saddle mounted in ways in said base, and transversely slidable therein; lugs on said saddle; clamping-forks pivoted on a shaft mounted in said lugs; and means to adjust said clamps vertically.

3. In a turning-machine, the combination of a supporting-frame; a rotatable knife-carrier; knives mounted on said carrier; mechanism for rotating said knife-carrier; a reciprocatory platen; mechanism mounted on said platen for carrying the stock; mechanism for reciprocating said platen; and mechanism for rotating the stock consisting of two saddles, the first, fast upon said platen, a head-stock plate pivoted to said saddle; the second saddle, slidable from side to side on said platen; a tail-stock plate pivoted to said second saddle; live and dead centers in respective head and tail stock plates and means to adjust said centers vertically relatively to each other and the rotating knives.

4. In a turning-machine, the combination of a supporting-frame; a rotatable knife-carrier; knives mounted on said carrier; mechanism for rotating said knife-carrier; a reciprocatory platen; mechanism mounted on said platen for carrying the stock; mechanism for reciprocating said platen completely over the knives; and a step-by-step mechanism for rotating the stock consisting of a spacing-wheel fast to the live-spindle; a lever whose inner end encircles a bearing of the live-spindle; a second lever fulcrumed on said first lever, and carrying a locking-bolt controlled by a spring and engaging a recess in said bearing; a spring controlling said second lever; a lug integral with said lever, and a pin in said lug to engage said spacing-wheel to rotate the stock.

5. In a turning-stock, the combination of a dead-spindle; a live-spindle; a spacing-wheel fast on said live-spindle; a lever whose inner end encircles a bearing of the live-spindle; a second lever fulcrumed on said first lever and carrying a locking-bolt, controlled by a spring and engaging a recess in said bearing; a spring controlling said second lever; and means whereby said second lever may engage said spacing-wheel.

6. In a turning-machine, the combination of a supporting-frame; a knife-carrier; knives mounted on said carrier; mechanism for rotating said knife-carrier; a platen; a live-spindle carried by said platen; a dead-spindle carried by said platen; mechanism for adjusting said live-spindle independently of said dead-spindle consisting of a saddle fast on said platen; a head-stock plate pivoted to said saddle and containing said live-spindle; and means to raise and lower said plate; and mechanism for rotating said live-spindle.

7. In a turning-machine, the combination of a supporting-frame; a knife-carrier; knives mounted on said carrier; a platen; a live-spindle carried by said platen; a dead-spindle carried by said platen; mechanism for adjusting said dead-spindle independently of said live-spindle; and consisting of a saddle slidable from side to side on said platen, a tail-stock plate pivoted to said saddle and containing said dead-spindle, and means to raise and lower said plate; and mechanism for rotating said live-spindle.

8. In a turning-machine, the combination of a supporting-frame; a knife-carrier; knives mounted on said carrier; a platen; a live-spindle; a dead-spindle; and mechanism for raising and lowering said spindles simultaneously, comprising two saddles, the first fast upon said platen, a head-stock plate carrying said live-spindle, and pivoted to said saddle; the second saddle slidable from side to side on said platen, a tail-stock plate pivoted to said second saddle, and carrying said dead-spindle; screws passing through the head and tail plates and bearing upon their respective saddles; sprocket-wheels secured to said screws; an endless chain operatively connecting said wheels, all designed for simultaneously raising and lowering said spindles.

9. In a turning-machine, the combination of a supporting-frame; a knife-carrier; knives mounted on said carrier; a platen; mechanism mounted on said platen for carrying the stock; a reciprocatory rest for preventing the vibration of the stock; said rest comprising a supporting base portion; a saddle mounted in ways on said base, and transversely slidable therein; lugs on said saddle, clamping-forks pivoted on a shaft mounted in said lugs; means to adjust said clamps vertically; and means for reciprocating said rest.

10. The combination of a live-spindle; mechanism carrying said live-spindle; a dead-spindle; mechanism carrying said dead-spindle; and mechanism for adjusting said spindles vertically independently of each other, said mechanism consisting of two saddles, head-stock plate, and tail-stock plate; carrying live and dead spindles, each of said plates having a socket secured therein, a threaded sleeve passing over said socket, a screw-cap screwed over the end of the sleeve; a collar encircling the upper portion of screw-cap and having an arm projecting therefrom; a locking-bolt passing through said arm, holes in upper convex portion of screw-cap which are engaged by said bolt, a screw provided with a hand-wheel and passing down through screw-cap, sleeve and resting on socket in saddle.

11. The combination of a live-spindle; mechanism carrying said live-spindle; a dead-spindle; mechanism carrying said dead-spindle; and mechanism for adjusting said spindles vertically at the same time, said mechanism comprising two saddles, the first fast upon said platen, a head-stock plate carrying said live-spindle, and pivoted to said saddle; the second saddle slidable from side to side on said platen, a tail-stock plate pivoted to said second saddle, and carrying said dead-spindle; screws passing through the head and tail plates and bearing upon their respective saddles; sprocket-wheels secured to said screws; an endless chain operatively connecting said wheels, all designed for simultaneously raising and lowering said spindles.

12. The combination of a supporting-frame; a platen carrying a live-spindle and a dead-spindle; said spindles; a knife-carrier; knives mounted in said carrier; mechanism for rotating said knife-carrier; mechanism under control of the operator for turning the live-spindle a given portion of a rotation; and for locking the live-spindle while the knives are cutting the stock; consisting of a spacing-wheel fast to the live-spindle; a lever whose inner end encircles a bearing of the live-spindle; a second lever fulcrumed on said first lever, and carrying a locking-bolt controlled by a spring and engaging a recess in said bearing; a spring controlling said second lever, a lug integral with said lever, and a pin in said lug to engage said spacing-wheel, to rotate the stock, and mechanism for moving the stock back and forth over the knives, said mechanism comprising a longitudinal screw-shaft provided at its ends with bevel-gears fixed thereto; transverse screw-shafts provided with bevel-gears, and hand-wheels, said bevel-gears on said longitudinal and transverse screw-shafts meshing with each other respectively; and means whereby said platen is operatively connected to said transverse screw-shafts.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE N. TOMS.

Witnesses:
RICHARD P. ELLIOTT,
JAMES HAMILTON.