

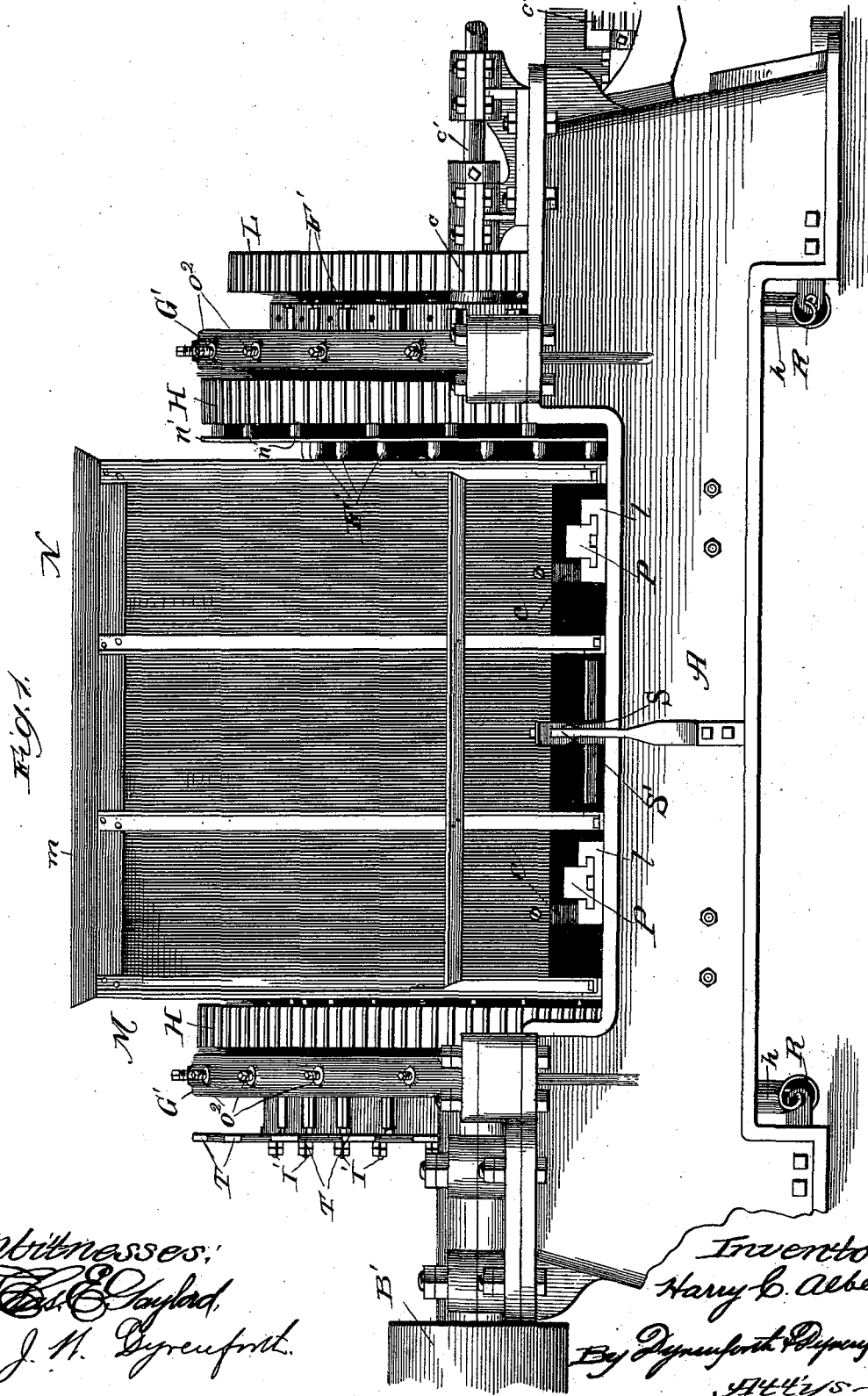
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5 Sheets—Sheet 1.

H. C. ALBEE. LATHE.

No. 429,297.

Patented June 3, 1890.



Witnesses:
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Inventor:
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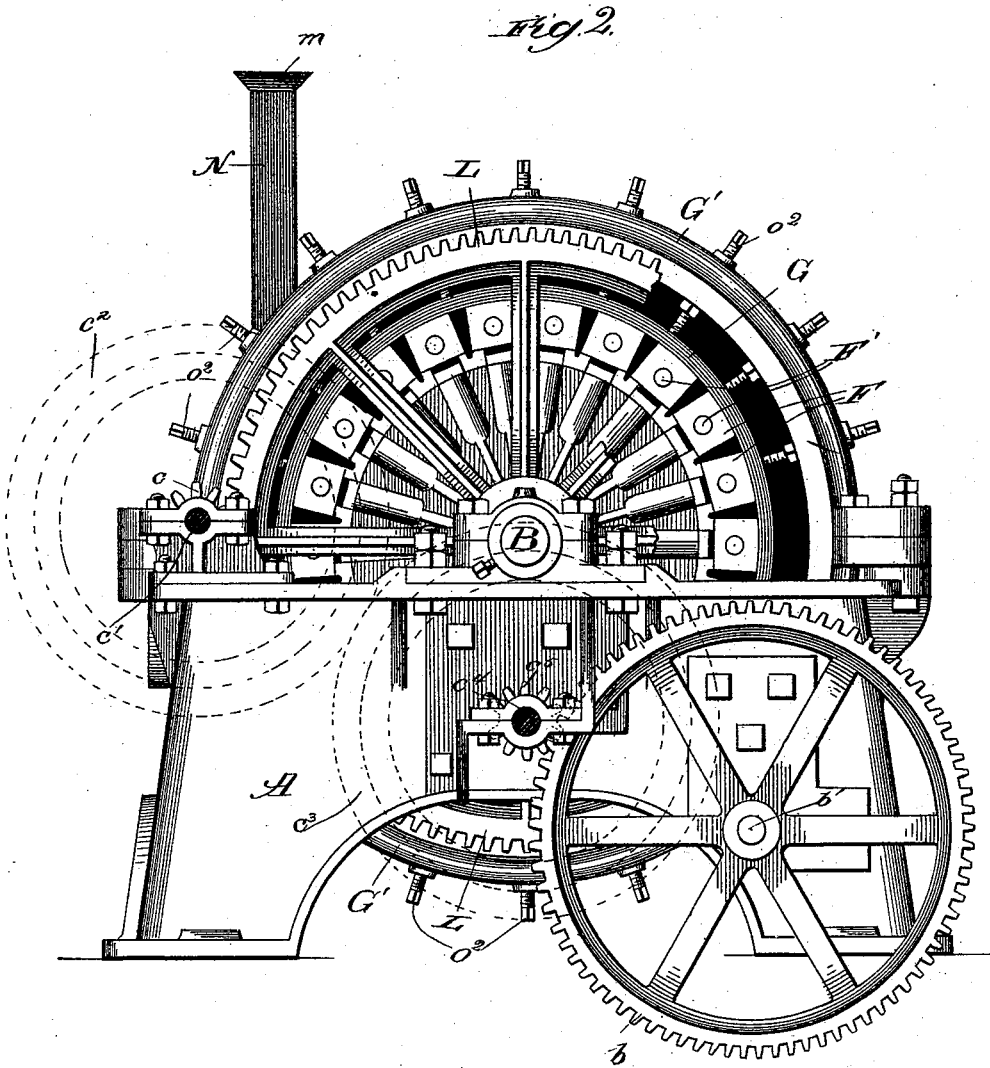
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5 Sheets—Sheet 2.

H. C. ALBEE.
LATHE.

No. 429,297.

Patented June 3, 1890.



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(No Model.)

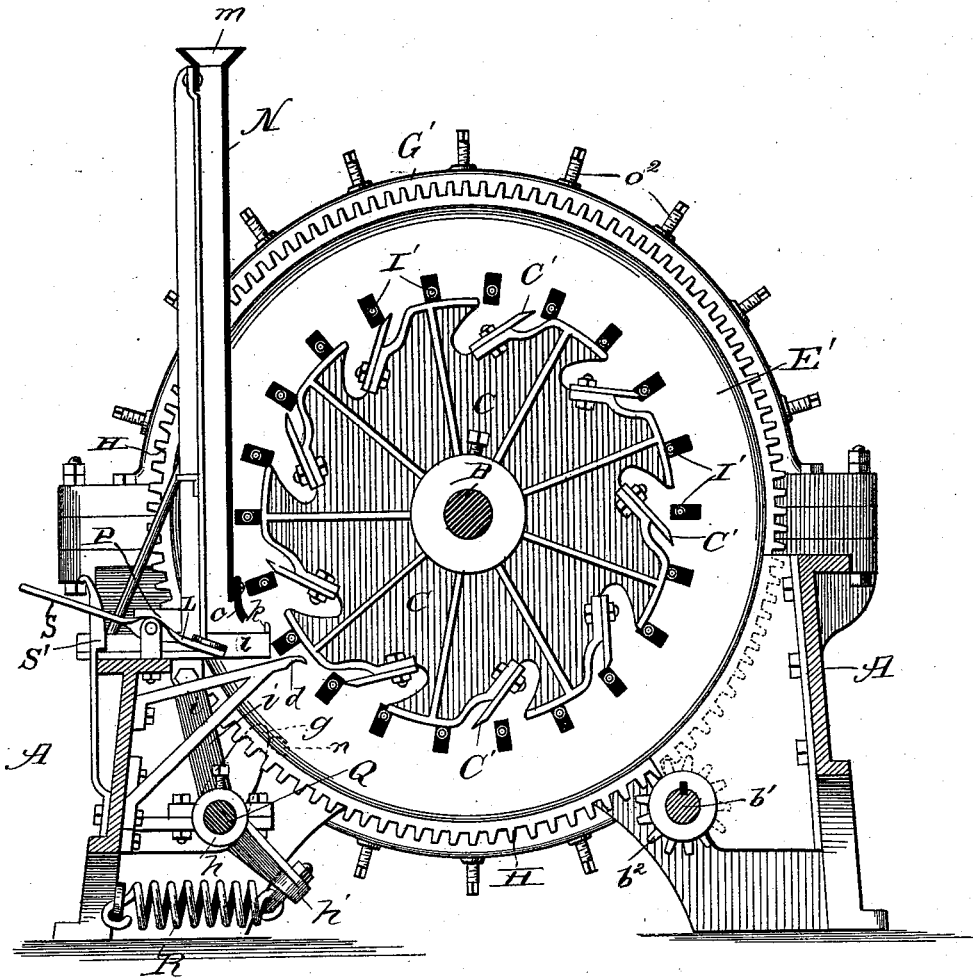
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Fig. 3.



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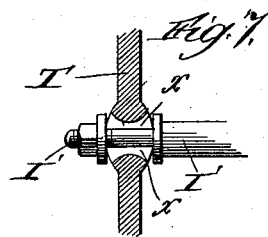
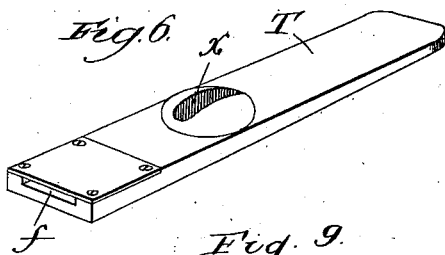
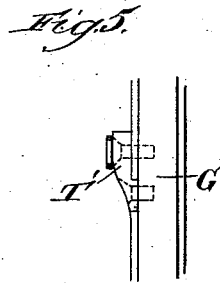
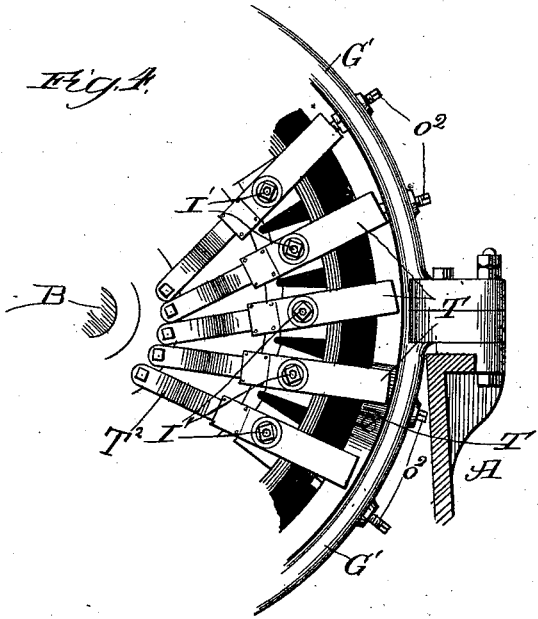


Fig. 9.

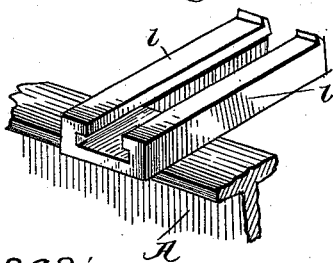
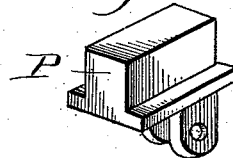


Fig. 10.



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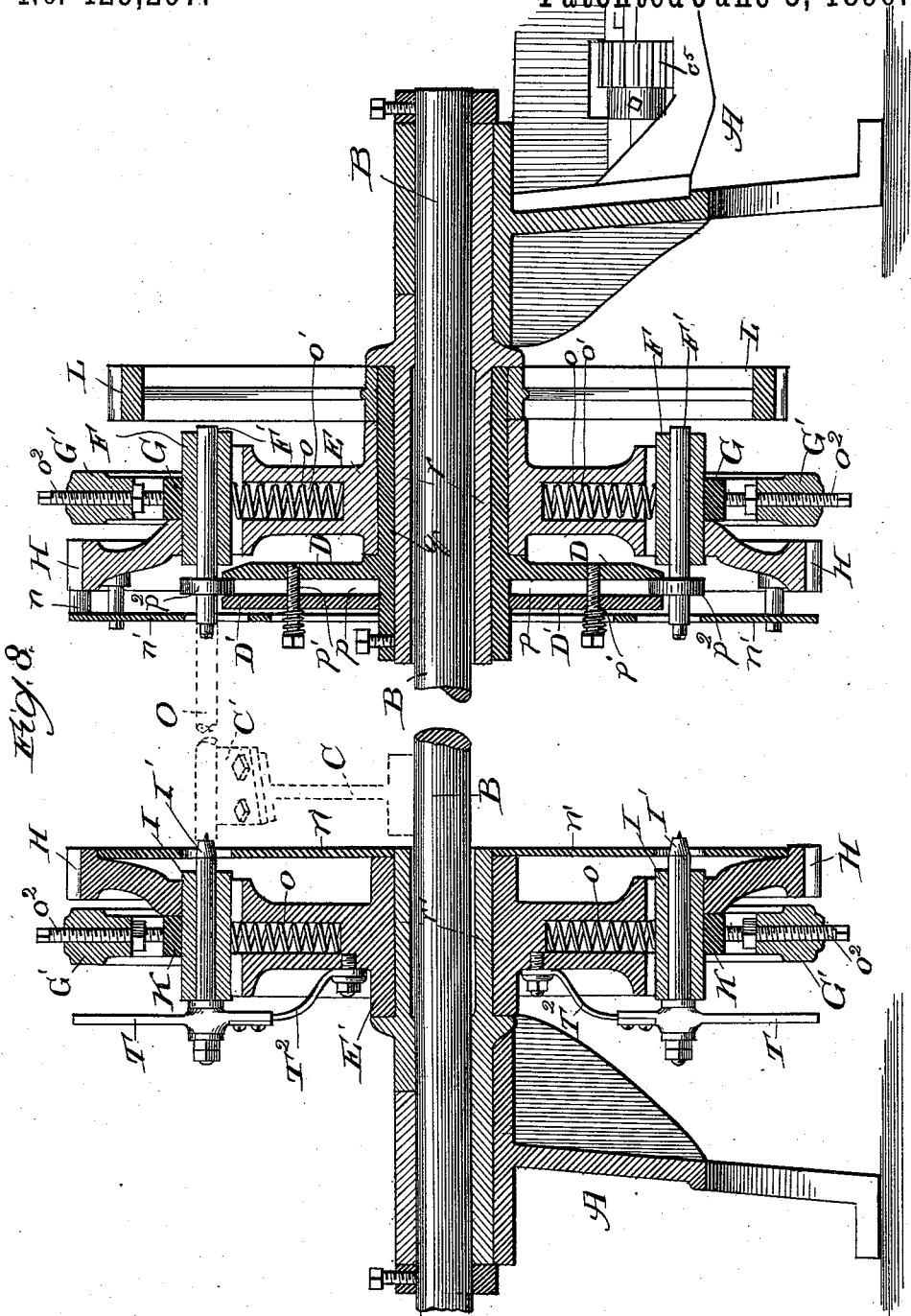
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5 Sheets—Sheet 5.

H. C. ALBEE. LATHE.

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UNITED STATES PATENT OFFICE.

HARRY C. ALBEE, OF CHICAGO, ILLINOIS.

LATHE.

SPECIFICATION forming part of Letters Patent No. 429,297, dated June 3, 1890.

Application filed June 25, 1889. Serial No. 315,548. (No model.)

To all whom it may concern:

Be it known that I, HARRY C. ALBEE, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Lathes, of which the following is a specification.

My invention relates to improvements in the class of lathes whereby a wooden blank of any regular, irregular, or geometrical form in cross-section may automatically—that is, by the mere operation of the machine and without requiring handling of the blank after it has been fed to the lathe—be turned to any desired form of cross-section. A machine of the class referred to is shown and described in Letters Patent of the United States No. 302,644, granted me on the 29th day of July, 1884, and entitled "Improvement in Concentric Lathes;" and it involves a construction and operates in a manner briefly stated as follows: A rotary horizontally-disposed shaft carries sets of properly-arranged cutters. At each end of the system of cutters and around each projecting end of the shaft is a stationary "guide-rail" or cam-ring of any desired shape, and on sleeves loosely incasing the shaft toward its opposite ends are supports for the spindle-boxes, which are disposed radially around the shaft and are also movable radially, being confined by the guide-rails, against the inner peripheries of which they extend and the shape of which they follow in rotation with their supports, which are revolvable independently of the cutters. The spindle-boxes carry spindles extending, of course, parallel with the cutter-shaft, those at one end of the machine being live-spindles, which, besides turning with their support, are also turned on their own axes by providing them near their inner ends each with a friction-disk, rigidly secured to it and confined against an annular revolving friction-plate, which, owing to its contact with surfaces of the friction-disks on the several live-spindles, produces revolution of the latter on their axes, the spindles at the opposite end of the machine being non-rotary on their own axes or dead-spindles, and besides their rotary movement with their support being movable, slightly longitudinally of their axes against a spring resistance to withdraw them from

and thus release the work when the latter is finished. A blank to be cut to the desired shape is fed against the cutter and grasped at its opposite ends between a coincident pair of the live and dead spindles, which, besides carrying the blank around the cutters, (rotated preferably, but not necessarily, in the direction opposite that of the rotation of the spindle-carriers, and much more rapidly than the latter,) also revolve it on its axis against the knives. The blank is presented to the cutters, which gradually reduce its diameter and also its form according to the shape of the guide-rails, since the latter (through the radially-movable spindle-boxes, which follow in their rotation the shape or shapes of the guide-rails) guide certain portions of the surface of the blank into closer or deeper contact with the cutters, and others into less close or shallower contact therewith, according to requirement for which the shaping of the guide-rails is predetermined.

The objects of my present improvement are to provide more particularly the machine involving the general construction thus set forth with an automatic feed which will automatically compensate for variation in the diameters of the blanks from the diameter for which the machine is prearranged, and, further, to provide different other novel features of construction tending to increase the efficiency of the lathe.

My invention consists in providing a geometrical lathe involving a revoluble cutter, a desired number of radially-movable revolving spindles, and a guide-rail for directing the movement of each spindle and controlling the position of the blank with relation to the cutter, with an automatic feed, self-compensating for difference in the diameters of the blanks; and my invention further consists in details of construction and combinations of parts.

In the accompanying drawings, Figure 1 is a view in elevation of the machine regarded from the front or side at which the feed is provided; Fig. 2, a view of the end provided with the live-spindles; Fig. 3, a transverse section of the machine, looking toward the end provided with the dead-spindles; Fig. 4, a broken sectional view showing the springing and cam details for withdrawing the

dead-spindles to release the finished blanks and clasp the newly-fed blanks; Fig. 5, a side view of the cam detail; Fig. 6, a perspective view of a part of the spring-wing; Fig. 7, a
5 broken sectional view showing the connection between a spring-wing and a dead-spindle; Fig. 8, a broken longitudinal sectional view of the machine, showing a blank being turned; and Figs. 9 and 10 are perspective views showing,
10 respectively, a guide and a pusher.

A is the frame of the machine, in which is supported a rotary shaft B, carrying a belt-pulley B' at one end and the substantially disk-shaped cutter-heads C for the cutters C',
15 Fig. 3. Toward its opposite ends the shaft B is provided with stationary sleeves r and r' , Fig. 8, forming extensions of the journal-boxes, the sleeve r being loosely surmounted by a sleeve q , carrying adjacent to the end of
20 the cutter-heads two friction-plates D and D', having a space p between them and yieldingly held against spreading toward their edges by spring-bolts p' . The sleeve q is loosely surrounded by a wheel-like support
25 E for the live-spindle boxes F, which are disposed radially around the support and are confined against springs o in pockets o' , provided radially in the support E, one for each spindle-box, by an immovable guide-rail or cam-ring G,
30 firmly secured on the frame of the machine, and which is surrounded by an annular head G', through which set-screws o^2 are inserted against the outer periphery of the guide-rail and serve to adjust the latter with relation to
35 the work. The support E also carries, rigidly secured to or integral with it, the cog-wheel H, from the inner side near the periphery of which extend horizontally-rounded lugs n , equidistant apart around the wheel,
40 and to which may be secured a disk n' to shield the spindle mechanism from the shavings and dust resulting from the operation of the machine. Each box F carries a live-spindle F', extending at its engaging end beyond
45 the inner face of the disk-shield n' and carrying a friction-disk p^2 , which extends between and in contact with the rotary friction-plates D and D'. The stationary sleeve r' is loosely surrounded by a support E', of a construction
50 like that of the support E, and carrying radially-disposed spindle-boxes I, which are confined against springs o in pockets o' by an immovable guide-rail K, of suitable form, and, like the guide-rail G, surrounded by a head G' for set-screws o^2 , which, like
55 those in the head G' of the guide-rail, serve, by forcing them against parts of the guide-rail, to compress the latter and thus bring parts thereof closer to the spindle-boxes. The
60 spindles I' in the boxes I are the dead-spindles, being non-rotary on their axes, and are disposed, as also the boxes carrying them, to coincide with the live-spindles opposite them, and the support E' carries, like the support
65 E, a cog-wheel H and a disk-shield n' . A cog-wheel L, secured to the sleeve q , is driven by a pinion c , meshing with it on a rotary shaft

c' , carrying also an ordinary cone-pulley c^2 (indicated by dotted lines in Fig. 2,) and which
70 has an ordinary belt-connection (not shown) with a similar cone-pulley c^3 , (also indicated by dotted lines,) on a shaft c^4 , (connected with the driving-power and therefore affording a driving-shaft.) The shaft c^4 carries a pinion
75 c^5 , meshing with a cog-wheel b on a counter-shaft b' , extending near the base of the machine across both cog-wheels H, at each of which and in mesh therewith it carries a pinion
80 b^2 . It will therefore be observed that the cog-wheel L, which is thus geared through the pinion c on the shaft c' with the driving-power, serves to rotate the friction-disks D and D' rapidly in one direction, while simultaneously the supports E and E' are rotated
85 in the opposite direction and slower than the friction-disks from the shaft c by the pinions b^2 on the shaft b' , which are actuated through the cog-wheel b by the pinion c^5 , and the belt-connection of the cone-pulleys c^2 and c^3 permits the relative speeds of the shafts c' and
90 c^4 to be regulated. The shaft B is connected with the driving-power at the belt-pulley B'.
The parts thus far described (except the lugs n) correspond substantially with the construction shown and described in my
95 aforesaid patent.

As hereinbefore mentioned, my present improvements relate, besides to certain novel details of construction, to the provision of an automatic self-compensating feed for the machine, and of which the following is a description.
100

At one side of the machine, and extending lengthwise parallel with the shaft B, a feed M is provided. N is a vertical receptacle of desired
105 height, supported on the frame A, and which may as a simple construction comprise an open rectangular frame with a hopper-shaped mouth m , and the width of which should be sufficient to accommodate blanks O, Fig. 8, of
110 the largest diameter. Underneath the receptacle N, preferably near each of its opposite ends, is provided on the frame A a pusher P in the form of a block, caused to reciprocate transversely to the cutter-heads on a suitable
115 stationary guide l , provided at its inner extremity with an upwardly-projecting stop k . Each pusher P is connected with a rock-shaft Q, Fig. 3, below it by an arm i on a collar h , secured to the shaft and having a crank-extension
120 h' , connected with the lower part of the frame by a coiled spring R, normally compressed and tending when distended to force the pushers P inward to the limit of their play toward the stops k . A cam-finger g extends
125 toward the stops k . A cam-finger g extends from the collar h into the path of the lugs n on a wheel H, whereby when in the rotation of the said wheel H a lug n (one of which is provided for each live-spindle F') strikes the cam-finger the rock-shaft Q is
130 actuated to turn the arms i connecting it with the pushers outward, and thus the pushers P are forced outward against the resistance of the springs, thereby as the cam-fin-

ger is being passed over by a lug n gradually allowing the springs to resume their normal compressed condition, and in resuming it force the pushers inward by inducing the turning of the arms i in the inward direction or from the side of the machine at which the feed is provided.

To operate the machine with my automatic feed the receptacle N is supplied with blanks O , which are preferably of uniform length and as nearly of the same diameter as practicable, but which in the rectangular blanks from which to turn broom-handles (a use to which I have more particularly applied my machine) is found to vary up to about one-half an inch.

In filling the receptacle in order to prevent the blanks from being fed to the cutting mechanism, as hereinafter described, until it shall be desired to start the feed, I provide an ordinary form of pivotal support S , comprising a lever of the first class, having a cross-piece, as shown, on its inner end, which may be raised on the pivot and there held above the guides l to stop the blanks from falling by their own gravity upon the guides. To hold the inner or supporting end of the lever S in its raised position I provide a catch S' , Figs. 1 and 3, located to be engaged for the purpose by the outer or handle end of the lever when lowered. As soon as the machine is set in motion, by revolving the shaft c^4 to actuate the supports E and E' carrying the spindles and the friction-plates D and D' to rotate the live-spindles on their own axes in the desired direction, and by revolving the shaft B , carrying the cutter-heads, the support S may be released, when the lowermost blank O will sink (by its own weight and that of the other blanks imposed upon it) upon the guides l in front of the pushers P , while a lug n is passing over the cam-finger g and has forced the pushers outward against the resistance of the springs R . As the lug passes over the end of the cam-finger, it releases the latter, allowing the springs R to act to force the pushers inward, which push the blank in front of them against the stops k , where it coincides at its extremities with a live-spindle at one end and a dead-spindle at the opposite end. As each live-spindle in the rotation of the support E reaches the point coincident with the adjacent end of a blank O fed to the machine, the corresponding dead-spindle coincident with the opposite end of the blank is withdrawn, in a manner hereinafter described, just before reaching the point of taking up a new blank to release a finished blank which has been revolved around the cutter-heads; and just as it comes coincident with the respective end of the blank last fed it recoils against it, thereby confining its ends between the pair of spindles. This withdrawal and recoil of the successive dead-spindles I is produced by the mechanism of which the following is a description: At the rear end of each radially-movable spindle I , projecting beyond

the support E' , it has fastened upon it a wing T , preferably of the shape illustrated, and having an internally-convex opening α larger than the diameter of the part of the spindle over which it fits, the outer end of the wing extending into the path of a stationary cam T' on the annular head G' , near the point of release of a finished blank and take-up point for a new one. When in the rotation of the spindle-carrying supports E and E' a finished blank reaches the point of its discharge, the cam T' is engaged by the wing T of the respective dead-spindle, thereby throwing the latter back and withdrawing it from the finished blank, against the resistance of a leaf-spring T^2 , entering a socket f , Fig. 6, in the lower end of the wing T , (which connection permits the radial movement of the spindle-boxes I without impediment from the spring-wing detail,) the spring being secured at one end to the rotary support E' . The spindle is held out by the cam until it reaches the point coincident with the adjacent end of a newly-fed blank, when the wing passes the cam and permits the resilience of the spring to force the spindle into its normal position and thereby also into engagement with the new blank, which is carried around and turned into the geometrical shape produced by the guiding effect due to the shape of the guide-rails upon the radially-movable spindle-boxes.

The air-currents generated by the rapid rotation of the cutter-heads are so strong that they tend to throw upward the blank as it approaches the knives in the feeding, and thus bring it out of line with the spindles brought into position to grasp it. To prevent this I provide at one or more points along the inner side of the lower edge of the receptacle N flexible stops c , preferably of stiff rubber, which extend beyond the said lower edge, and, while they do not impede the feeding, operate as holders to hold the blank down against the guides l in opposition to the air-currents.

A stripper d , Fig. 3, extending just below a guide l at both ends, or, and by preference, only on the live-spindle end of the machine, (though illustrated on the dead-spindle end,) affords, also, a desirable adjunct to insure separation from the live-spindle of the finished blank when released at the opposite end by the withdrawal from it of the dead-spindle in case it shall stick to the live-spindle.

The springs R or equivalents thereof—such as weights or cams—constitute a very important improvement on my machine, inasmuch as they permit compensation for variation in the diameters of the blanks, which variation, if excessive beyond the diameter for which the mechanism is adjusted, as hereinafter described, would tend to disorganize and even break the machine. As hereinbefore mentioned, the blanks as they are furnished vary, unavoidably, more or less in diameter.

Owing to the nature of the feed mechanism the pushers P (or pusher, if only one be pro-

vided; as may be, near the center) can have only limited reciprocating play, and they must operate to bring each blank into proper position, which should be against the stops or stop *k*. Accordingly, to illustrate, with the rectangular blanks *O* to be turned by the lathe into broom-handles, and the common diameter of which, as provided, is one and a quarter inch, I set the cam-finger *g* to permit the springs *R* to force the pushers inward, as the limit of their inward movement, to within an inch and a quarter of the stops *k*. Blanks, among those piled in the receptacle *N*, of smaller diameter will not be pushed into contact with the stop, but short of them, and will be grasped eccentrically at their ends by the spindles, whereby they will also be presented eccentrically to the cutters, causing the latter to cut off more at a time from one side of the blank than from another, but without impairing the working of the machine or injuriously affecting it. In the case, however, of the presentation of blanks greater in diameter than those for which the feed is set, without the springs *R* or their equivalent there would be no give to the pushers, which in being forced inward would be obstructed short of the limit of their play, and would therefore disorganize the machine and probably produce breakage of parts. The springs *R*, against the resistance of which the pushers are withdrawn, overcome this tendency by affording compensation for the increased diameter, since when the pushers meet the obstruction presented by such increase the action upon them of a lug *n*, through the cam-finger in turning the shaft *Q*, is to distend the spring, causing the latter to give and thus avoiding the exertion of unyielding pressure against the pushers.

I do not limit my improvement to the particular construction of compensating mechanism for the feed herein shown and described, as it can be readily changed and still produce the same result.

It should be further remarked that my improvements herein described are not necessarily limited in their application to a machine constructed in accordance with my aforesaid patent, but may be used with machines of different general construction for the same purpose—as, for example, in such as confine cams on the ends of the radially-movable spindles yieldingly against the outer peripheries of the guide-rails—the shape of the cams producing that to which the blanks are to be turned. It will also be within the spirit of my invention to apply any or all of my improvements to a machine of the class referred to, employing only one each of the live and dead spindles, or having a guide-rail at only one end and to arrange other parts of the mechanism to correspond.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a lathe, substantially as described, and involving a revoluble cutter, a desired num-

ber of radially-movable revolving spindles, and a guide-rail for directing the movement of each spindle and controlling the position of the blank with relation to the cutter, the combination therewith of an automatic self-compensating feed for the blanks, substantially as set forth.

2. In a lathe, substantially as described, and involving a revoluble cutter, a desired number of radially-movable revolving spindles, and a guide-rail for directing the movement of each spindle and controlling the position of the blank with relation to the cutter, the combination therewith of an automatic feed having a receptacle *N*, and a reciprocating pusher *P*, near the base of the receptacle, actuated by intermediate mechanism from a revolving spindle-support, substantially as set forth.

3. In a lathe, substantially as described, and involving a revoluble cutter, a desired number of radially-movable revolving spindles, and a guide-rail for directing the movement of each spindle and controlling the position of the blank with relation to the cutter, the combination therewith of an automatic feed, comprising a receptacle *N*, a reciprocating pusher *P* on a guide *l*, provided with a stop *k*, a shaft *Q*, connected with and actuated to reciprocate the pusher from a revolving spindle-support, and a spring *R* or the like tending normally to actuate the pusher to feed the blanks to the cutter, substantially as set forth.

4. In a lathe, substantially as described, and involving a revoluble cutter, a desired number of radially-movable revolving spindles, and a guide-rail for directing the movement of each spindle and controlling the position of the blank with relation to the cutter, the combination therewith of an automatic feed comprising a receptacle *N*, a reciprocating pusher *P* on a guide *l*, provided with a stop *k*, a shaft *Q*, connected with and actuated to reciprocate the pusher from a revolving spindle-support, a spring *R* or the like tending normally to feed the blanks to the cutter, and a stripper *d*, substantially as set forth.

5. In a lathe, substantially as described, and involving a revoluble cutter, a desired number of radially-movable revolving spindles, and a guide-rail for directing the movement of each spindle and controlling the position of the blank with relation to the cutter, the combination therewith of an automatic feed for the blank having a receptacle *N*, and a reciprocating pusher *P*, and one or more yielding holders *c* in the path of the blank and adjacent to the cutter, substantially as and for the purpose set forth.

6. In a lathe, substantially as described, and involving a revoluble cutter, radially-movable revolving live-spindles *F*' and dead-spindles *I*', a guide-rail for directing the movement of the spindles and controlling the positions of the blanks with relation to the

cutter, and an automatic feed for the blanks, the combination, with the dead-spindles and the automatic feed, of an extensible spring-wing on each dead-spindle, and a cam T' in the path of the spring-wings, substantially as and for the purpose set forth.

7. In a lathe, substantially as described, and involving a revoluble cutter, radially-movable revolving live-spindles F' and dead-spindles I', a guide-rail for directing the movement of the spindles and controlling the positions of the blanks with relation to the cutter, and an automatic feed for the blanks, the combination, with the dead-spindles and the

automatic feed, of an extensible spring-wing 15 on each spindle, comprising a wing T, having an opening x , and secured thereat upon the spindle toward its outer end, a socket f in one end of the wing, and a spring T², inserted at one end into the socket and fastened to- 20 ward its opposite end, and a cam T' in the path of the wings T, substantially as and for the purpose set forth.

HARRY C. ALBEE.

In presence of—

J. W. DYRENFORTH,
M. J. BOWERS.