

No. 747,043.

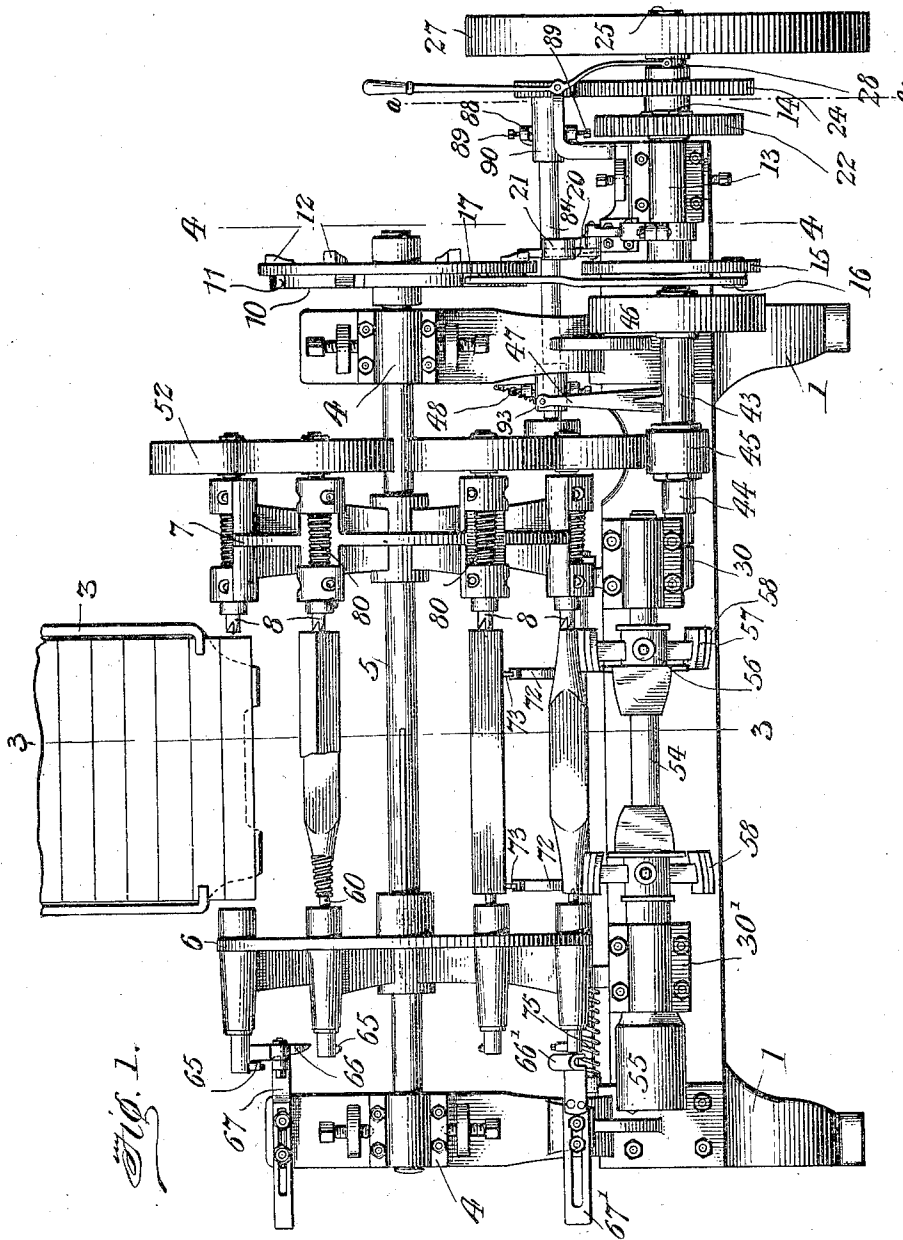
PATENTED DEC. 15, 1903.

A. L. BROWN.
AUTOMATIC LATHE.

APPLICATION FILED JAN. 27, 1903.

NO MODEL.

5 SHEETS—SHEET 1.



Witnesses
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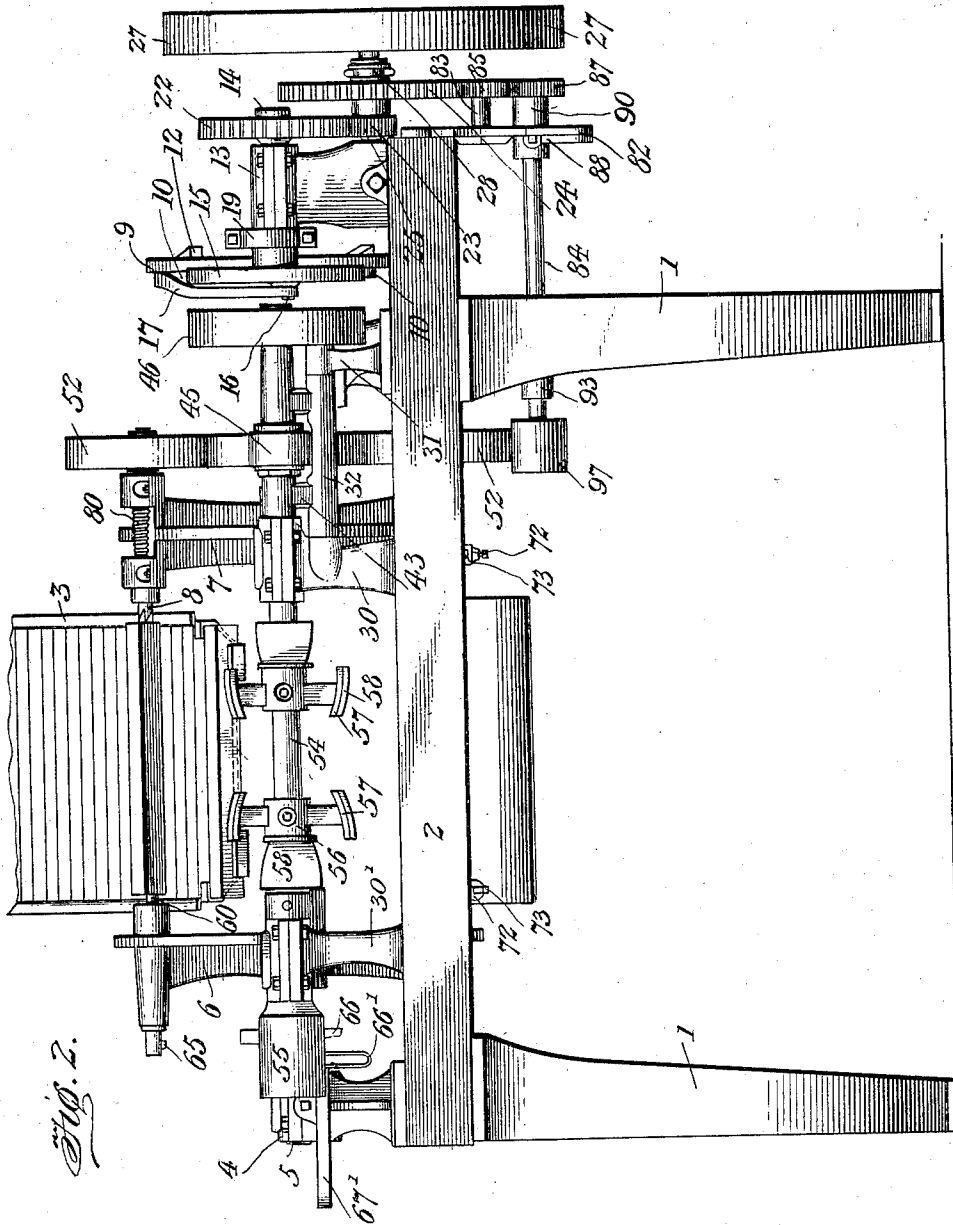
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5 SHEETS—SHEET 2.



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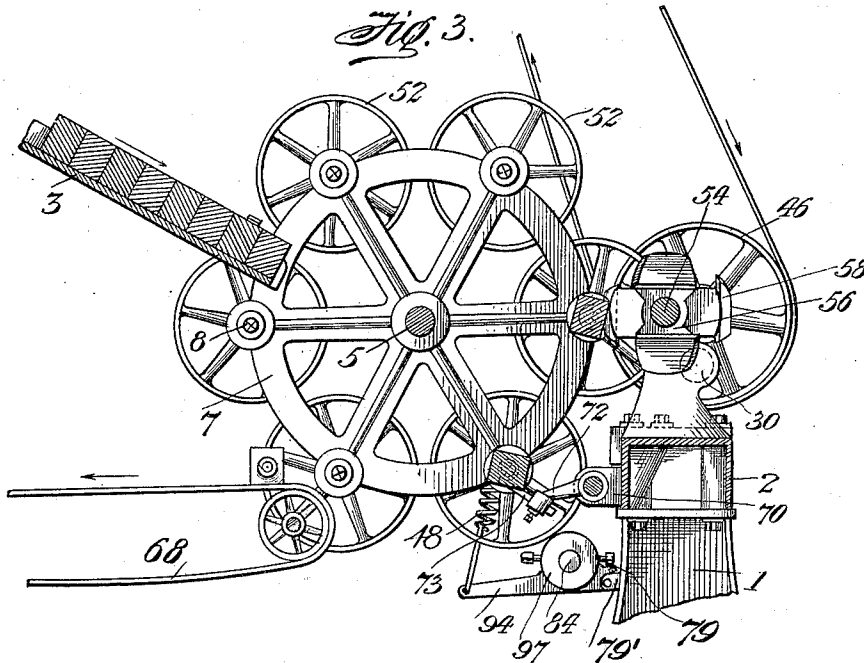
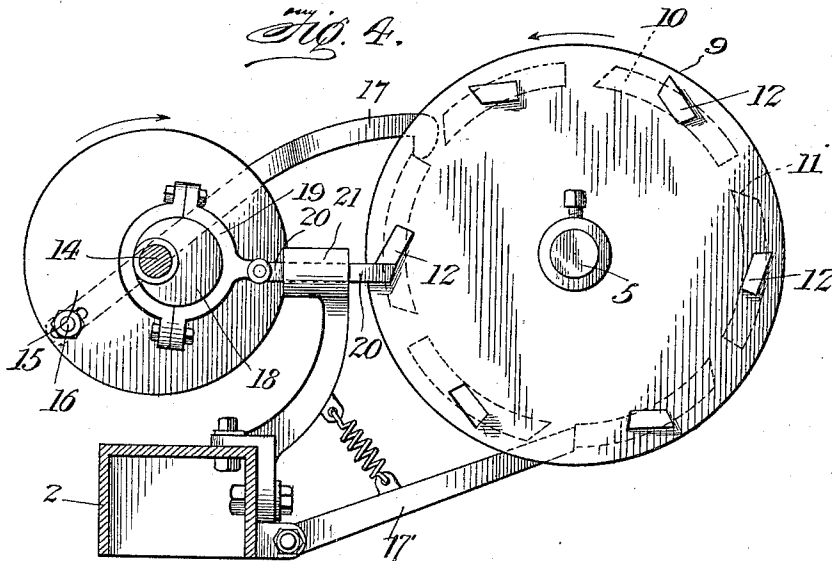
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5 SHEETS—SHEET 3.



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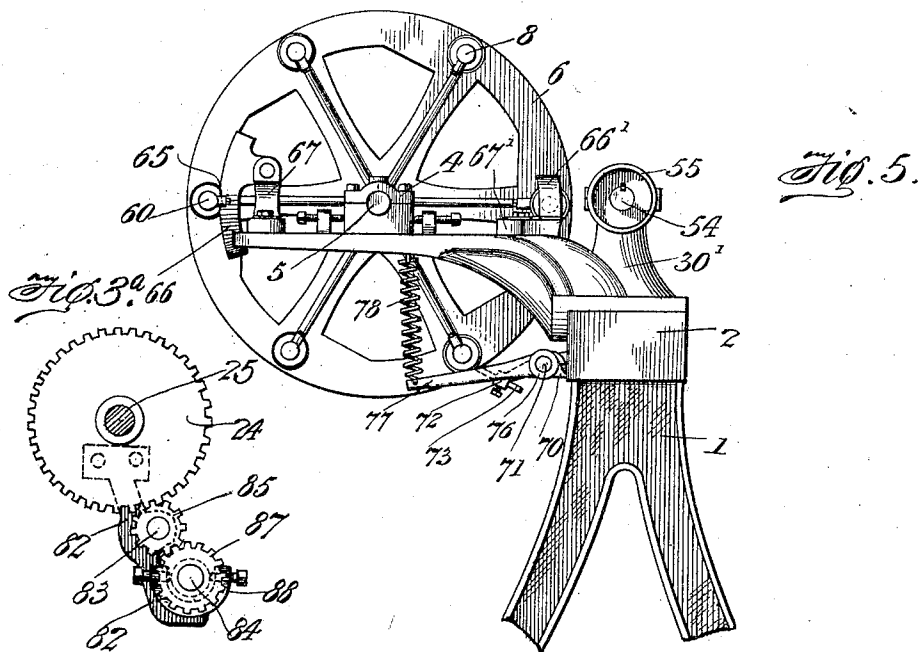
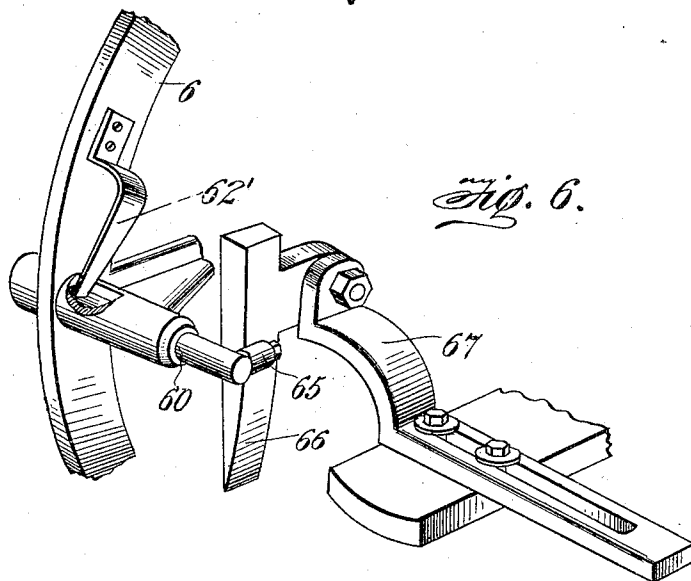
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5 SHEETS—SHEET 4.



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No. 747,043.

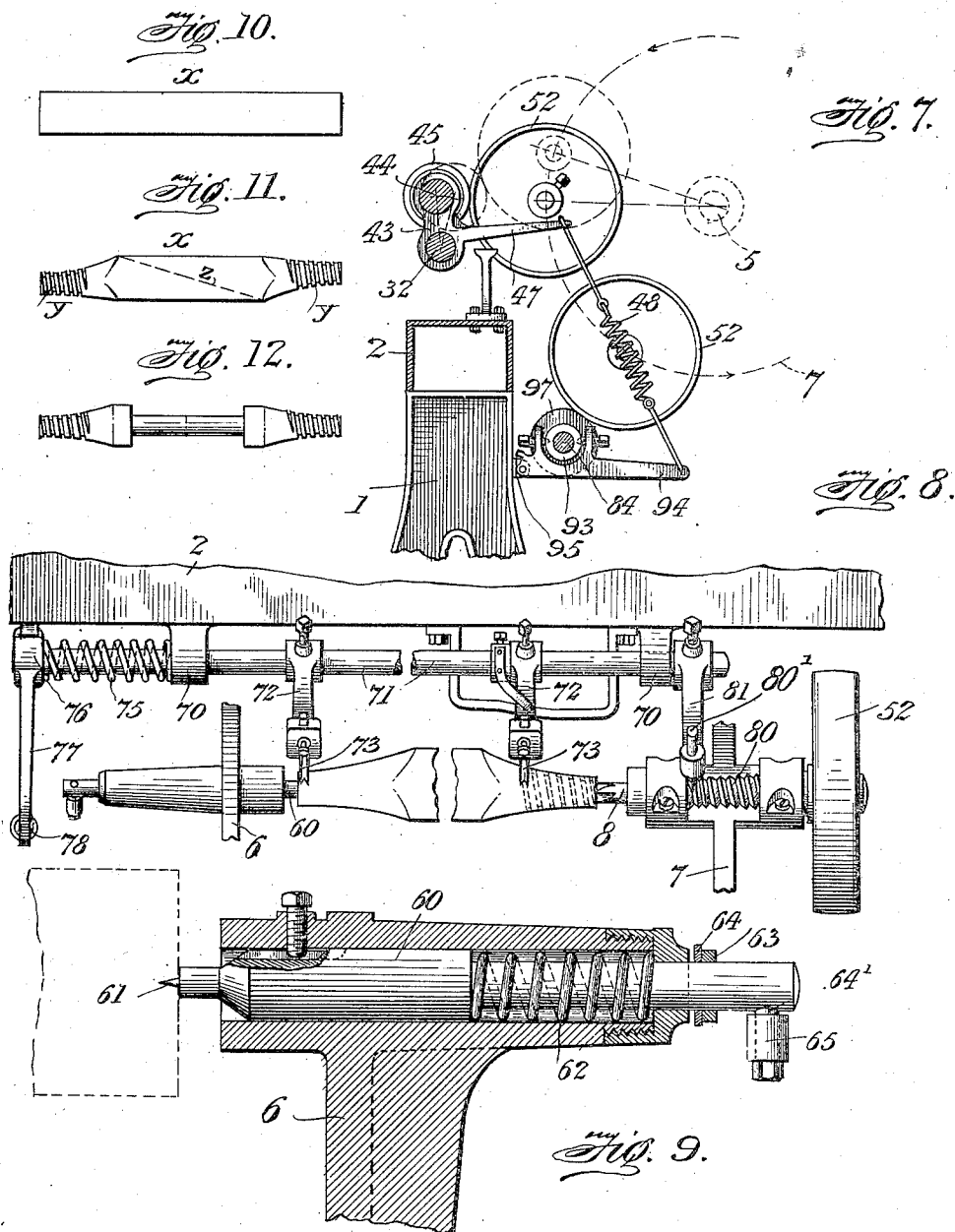
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NO MODEL.

5 SHEETS—SHEET 5.



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UNITED STATES PATENT OFFICE.

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AUTOMATIC LATHE.

SPECIFICATION forming part of Letters Patent No. 747,043, dated December 15, 1903.

Application filed January 27, 1903. Serial No. 140,792. (No model.)

To all whom it may concern:

Be it known that I, ABNER L. BROWN, a citizen of the United States, residing at Elkin, in the county of Surry and State of North Carolina, have invented a new and useful Automatic Lathe, of which the following is a specification.

This invention relates to certain improvements in lathes, and has for its principal object to provide a lathe for automatically turning insulator-supports and devices of similar nature, although it may be used in the manufacture of circular objects of any character, such as spools, bobbins, and the like.

A further object of the invention is to construct a lathe entirely automatic in its action and provided with suitable mechanism for feeding blanks to the chucks and for discharging the finished articles from the machine.

A further object of the invention is to provide an automatic lathe in which the blanks fed to the machine are first turned and afterward threaded or grooved for the reception of the glass insulators employed in telegraph and other lines.

With these and other objects in view the invention consists in the novel construction and arrangement of parts hereinafter described, illustrated in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that various changes in the form, proportions, size, and minor details of the structure may be made without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings, Figure 1 is a plan view of an automatic lathe constructed in accordance with the invention. Fig. 2 is a front elevation of the same. Fig. 3 is a transverse sectional elevation of the machine on the line 3 3 of Fig. 1. Fig. 3^a is a transverse sectional elevation on the line *a a* of Fig. 1. Fig. 4 is a similar view on the line 4 4 of Fig. 1. Fig. 5 is an end elevation of the machine. Fig. 6 is a detail perspective view of the mechanism for discharging the finished articles from the machine. Fig. 7 is a detail sectional view illustrating the mounting of the friction drums or rollers. Fig. 8 is an inverted plan view, on an enlarged scale, of the

grooving or threading tools and mechanism for operating the same. Fig. 9 is a transverse sectional elevation through one of the chuck-carriers, illustrating the construction of one of the tail-stocks. Figs. 10 and 11 illustrate, respectively, a blank and the double insulator-pin as discharged from the machine. Fig. 12 is a view similar to Fig. 11, showing another form of pin which may be manufactured by the machine.

Similar characters of reference are employed to indicate corresponding parts throughout the several figures of the drawings.

The general framework of the machine is of the character commonly employed in machines of the class, and comprises standards 1, united by a horizontal bed-plate 2, and at the rear end of the machine is a support for an inclined platform 3, to which blanks are supplied in quantity and fed by gravity to the chucks. On the standards are bearings 4, supporting a shaft 5, to which are secured two chuck-carrying disks or spiders 6 and 7, the chucks carried by the disks 6 being longitudinally movable in order to receive and discharge the blanks, while each of the chucks 8, carried by the disk 7, is provided at its outer end with a small friction-wheel, which when brought into contact with a constantly-revolving friction drum or roller at the front of the machine serves to impart movement to the chuck and the blank.

On one end of the main shaft is secured a feed-disk 9, from one side of which projects a flange 10, having spaced openings or notches 11 of a number equal to the number of sets of chucks, while on the opposite face of the disk are arranged an equal number of lugs 12, forming stops for limiting the intermittent rotary movement of the shaft. At the front of the machine is a bearing 13 for the reception of a shaft 14, having at one end a crank-disk 15, provided with a pin 16, from which projects a pawl 17, engaging the notches of the flange and serving at each rotation of the crank-disk to effect an intermittent rotary movement of the shaft and chuck-carrying disks. The carrier is further held from backward movement by a spring-actuated

stop 17', pivoted to the bed-plate, as shown in Fig. 4. The shaft 14 is further provided with an eccentric 18, on which is an eccentric-strap 19, connected to a strap-bar 20, which extends through an opening in the guiding-bracket 21, projecting from the bed-plate, and successively engages with the stop-lugs 12. On the opposite end of the shaft 14 is a gear 22, intermeshing with a pinion 23, which is secured to a gear-wheel 24, both the pinion and gear being rigidly secured to a shaft 25, having bearings near one end of the frame. On the end of the shaft 25 is a large belt-wheel 27, and between the belt-wheel and the gear 24 is arranged a clutch 28, of ordinary construction and through which the rotations of the belt-wheel are imparted to the shaft.

On the bed of the machine are brackets or standards 30 and 31, supporting a small spindle or pin 32, forming a fulcrum for a frame 43, the upper portion of which is provided with bearings for a shaft 44, carrying a friction-roller 45 and a small belt-wheel 46. The frame 43 is further provided with an approximately horizontal arm 47, extending toward the rear of the machine and to the outer end of which is secured one end of a helical tension-spring 48, the lower end of the spring being secured to a second lever 94, hereinafter described. The friction-roller 45 is arranged in the path of movement of friction disks or wheels 52 on the outer ends of the spindles, which carry or form part of the chucks 8, and as the two chuck-carrying disks 6 and 7 are revolved these friction-disks 52 are successively brought into contact with the friction-roller 45 and are turned at any desired speed in order to revolve the chucks and the blank from which the finished article is to be made.

The standard 30 and mating standard 30' are provided with bearings for the support of a cutter-shaft 54, provided at one end with a driving-pulley 55, and on said shaft are secured cutter-blocks 56, two being shown in the present instance in order that the blank may be cut or shaped at its opposite ends. Each cutter-block is of the construction best shown in Figs. 1 and 2 and is provided with oppositely-disposed inclined plates 57, to which are secured the cutting-knives 58, the shape of the knives varying with the character of the work to be performed.

The chucks or head-stock 8, which forms the driving member, may be of any ordinary construction where the device is intended simply for turning or shaping pins, spools, bobbins, and the like, while the tail-stocks of carrier 6 are of the construction best shown in Fig. 9. The tail-stocks 60 are in the form of spindles provided with centering-pins 61 for engaging the ends of the blank and normally held in engagement with the work by means of springs 62, or in some cases a plate-spring 62' may be employed for the purpose, as shown in Fig. 6. Excessive inward movement of the tail-stocks is prevented by

a collar or nut 63, a washer 64, of yieldable material, such as leather or rubber, being introduced between the collar and the bearing in order to lessen the shock between the parts when the spindle is thrown inwardly by the spring. At or near the outer end of the spindle 60 is secured a pin 64', on which is mounted a small antifriction-roller 65, adapted to engage a cam 66, carried by a bracket 67, projecting from one end of the frame. The length of the cam 66 is approximately equal to or somewhat less than the distance between two of the chucks, and the cam is arranged in such position with respect to the inclined feed-board as to permit the returning or inward movement of the tail-stock when the latter comes to a point slightly above the lower end of the feed-board. The cam is so arranged as to engage the small antifriction-roller 65 at a point under the feed-board and by moving the tail-stock outwardly from the blank allow the blank to fall by gravity to an endless belt 68, by which the finished articles may be carried to any desired point.

At a point in alinement with the position assumed by the tail-stock during the operation of the cutters 56 is a bowed spring 66', carried by an adjustable bracket 67' and serving to engage the outer end of the tail-stock in order to firmly hold the same in position with the blank during the operation of the cutting tool or tools.

In the operation of the machine as thus far described the blanks are fed by gravity down the feed-board or hopper and are successively engaged between the head and tail stocks after each intermittent rotative movement of the carriers 6 and 7. The pawl-feeding mechanism is so arranged as to stop each of the chuck members in such position that the friction-disk of the head-stock will be engaged by the friction-roller 45 of the driving-shaft and revolved in one direction, while the cutter-shaft and cutters are turned in the opposite direction, and during this movement the tension-spring connected to the frame 43 will hold the roller and friction-disk tightly together. After allowing sufficient time for the shaping operation the feeding mechanism again acts and after one or two movements brings the tail-stock opposite the cam 66, the latter serving to move the tail-stock from engagement with the finished article and delivering the same from the machine.

In the present instance the lathe is designed especially for the manufacture of insulator-supporting pins or brackets of the character shown in Fig. 11, wherein the ends of a preferably rectangular blank *x* are first reduced to circular form and then threaded, as indicated at *y*, to receive the threaded glass insulators in common use. To accomplish the threading operation, the frame is provided with a pair of brackets 70, supporting the shaft 71, to which are secured two arms 72, provided at their outer ends with cutting-

tools 73, which are held in engagement with the circular portions of the blanks as the latter are rotated, while the shaft receives longitudinal movement in order that the cutters 5 may form spiral or helical threads on the end portions of the blanks. On the shaft 71 is a helical compression-spring 75, extending between one of the shaft-bearings and an enlarged head or collar 76, arranged near the 10 end of the shaft and serving at the completion of the cutting operation to return the shaft to its initial position. The shaft is further provided with an arm 77, which may form an integral part of the collar 76, and the 15 outer end of said arm is connected by a tension-spring 78 to a fixed portion of the frame, the spring being of sufficient strength to hold the cutters up to their work, while permitting slight yielding movement, which may be necessary in some cases, while excessive movement in the direction of the blanks is prevented by a projecting lug 79, secured to or forming a part of the collar 76 and adapted to engage a shoulder 79' on the frame. The 25 spindles or head-stocks are provided with helical grooves 80 of a pitch corresponding to the desired pitch of the threads to be formed on the blanks, and when the head-stocks reach the proper position a pin 80', carried by an arm 81 on the shaft 71, is engaged in the grooves of the head-stock, being held firmly in position by the spring 78, and the proper longitudinal movement is thus imparted to the shaft 71 and the other cutting- 30 tools carried thereby.

In order to impart the necessary slow rotative movement to the blanks during the threading operation, a train of gearing is employed, the initial gear being the toothed 40 wheel 24, mounted on the shaft 25. Near one end of the frame is a depending and rearwardly-extending bracket 82, carrying a stud 83, on which is mounted a pinion 85, intermeshing with the gear-wheel 24. The bracket 45 82 supports an adjustable bracket 88, bifurcated at its upper end and provided with suitable openings for the reception of trunnions 89, which support a bearing-sleeve 90, the sleeve receiving a shaft 84, on one end of which is secured a pinion 87, intermeshing with the pinion 85. Near the opposite end of the shaft 50 84 is a bearing-sleeve 93, mounted on an arm 94, having its inner end pivoted to lugs 95, projecting from the frame, while the outer end of said arm is connected by the helical tension-spring 48 to the arm 47, previously described, the spring normally tending to elevate the arm and the shaft which said arm supports. The shaft 84 carries a friction 60 driving-roller 97, with which the friction disks or wheels 52 of the head-stocks are engaged when the latter reach a position opposite the threading mechanism, the tail-stocks and the blanks being turned at a comparatively slow speed, while the shaft 71 and the thread-cutting tools are slowly moved longitudinally of the blank.

During the intermittent rotative movement of the chuck-carriers the two friction-drums which serve to impart rotative movement to 70 the friction-disks of the head-stock are projected within the plane of movement of the disks, and each disk comes into contact with the drum and starts its rotative movement in advance of the cutting operation, so that 75 the disk and the blank are rotating as they approach the cutting-tool. This permits of a gradual cutting operation similar to that followed in all lathes, with the exception that the work is gradually advanced toward the 80 tool in place of moving the tool toward the work. By the time the friction-drum is moved to the full limit of its outward movement the cutting operation is complete, and the blank is then gradually moved away from 85 the cutter, while the friction-drum, following the contour of the friction-disk, is again moved by its spring toward the shaft which supports the chuck-carriers. This operation occurs at both the cutting-tools and in the 90 case of the grooving-tool may be employed to advantage in the cutting of a thread on a tapering surface, the tool being started in operation on that portion of the blank of greatest diameter and being gradually moved 95 toward the portion of smallest diameter during the cutting operation.

While the springs 48 and 96, which move the friction-drums into engagement with the disks, are described as separate elements and 100 will be employed as such if the lathe has a single cutter, it would be understood that a single spring may be employed to connect both of the drum-carriers, as shown in Fig. 7.

The bearings which support the chuck-carrier shaft and the cutter-shaft are adjustable 105 on the frame in order to permit the lathe to operate on blanks of different size, and the chuck-carriers may be freely adjusted longitudinally of the shaft in order to permit the 110 reception of blanks of different length.

It will be understood that the finished article has its circular end portions slightly offset from the center, the one being disposed to one side of a central longitudinal line at one 115 end of the blank, while the opposite reduced circular portion is on the opposite side of the center at the other end of the blank, so that when the blank is severed on the line z two insulator-supporting pins will be formed, and 120 the circular portions will be so situated as to afford ample room for the insulator without contact with the wall or other support to which the pin is attached. In some cases the machine may be supplied with central cut- 125 ters to form a reduced circular portion at the center of the blank, so that by simply dividing the blank in two a pair of pins will be formed having circular end portions to fit in sockets formed in the cross-arms or telegraph- 130 poles or other supports.

While the lathe has been described as intended principally for the manufacture of insulator-supports having opposite end portions

reduced and threaded, it is to be understood that the machine may be employed for the formation of insulator - pins shaped and threaded at one end only or for the manufacture of spools, bobbins, and other circular objects of different shape and size by proper adjustment of the parts and changing the shape of the cutting-tools.

Having thus described the invention, what is claimed is—

1. In an automatic lathe, a pair of chuck-carriers, a plurality of chucks carried thereby, means for imparting an intermittent rotative movement to the chuck-carriers, means for moving one set of chucks to disengage the finished articles and permit the entrance of a blank, a cutter, and a stationary plate-spring disposed adjacent to the cutter and adapted to engage the movable chucks and force the same into positive engagement with the blanks during the cutting operation.

2. In an automatic lathe, the combination with a pair of chuck-carriers, of a plurality of chucks, means for imparting an intermittent rotative movement to the carriers, a cutter, friction - disks secured to one set of chucks, a revoluble friction-drum disposed adjacent to the cutter for engagement with successive disks, a shaft carrying said friction-drum, a pivotally-mounted frame supporting the shaft, and a spring connected to the frame and serving to force the friction-drum into engagement with the disks to be driven.

3. In an automatic lathe, the combination with a pair of chuck-carriers, of a plurality of chucks, means for imparting an intermittent rotative movement to the carriers, a cutter, friction-disks secured to one set of chucks, a friction-drum disposed adjacent to the cutter for engagement with successive disks, a shaft carrying said drum, a pivotally-mounted frame supporting the shaft, a projecting arm extending from the frame, and an adjustable spring extending between the arm and a fixed point and serving to force the friction-drum into engagement with the disks.

4. In an automatic lathe, a pair of chuck-carriers, a plurality of chucks, means for imparting intermittent rotative movement to the carriers, friction-disks secured to one set of chucks, means for engaging and rotating the disks, a cutter for reducing the blanks to circular form while rotated by said friction-disks, a secondary cutter spaced from the first for a distance equal to the distance between two adjacent chucks and adapted to

form a thread or groove in the blanks, means for moving the cutter into contact with the blank, means for moving the cutter lengthwise during the cutting operation, and a secondary friction-disk for engaging the friction-disks of the chucks and imparting thereto a rotative movement at a speed less than the rotative movement at the preliminary cutting operation.

5. In an automatic lathe, the combination with a pair of carriers, of head-stocks and tail-stocks supported thereby, the spindles of the head-stocks being each provided with a helical groove, means for imparting intermittent rotative movement to the carriers, a rock-shaft, mounted independently of the carrier, an arm carried by the rock-shaft, a spring normally holding said arm in the path of movement of the head-stocks to thereby permit automatic engagement of the arm with the head-stock grooves, and insure longitudinal movement of the rock-shaft and the arm and a cutter secured to and movable with the rock-shaft, said cutter serving to form a helical groove or thread on the blank.

6. In an automatic lathe, the combination with a pair of chuck-carriers, a plurality of chucks, means for imparting an intermittent rotative movement to the carriers, revoluble spindles secured to or forming part of one set of chucks, said spindles being provided with helical grooves, friction-disks secured to the spindles, a revoluble friction-drum for engaging successive disks, a cutting-tool, a movable supporting member for said tool, and an arm projecting from the tool-supporting member and engaging the helical grooves of successive spindles.

7. In an automatic lathe turning-machine, the combination with a frame, of a carriage, chucking means carried by said carriage, feeding means, a shaping-cutter, and a further tool arranged on the frame in the path of travel of said chucking means, means operated from the carriage for traversing such tool to cut a thread and means on the frame for rotating said chucking means relatively with said shaping-cutter and threading means.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

ABNER L. BROWN.

Witnesses:

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J. H. JOCHUM, Jr.