(No Model.) 2 Sheets—Sheet 1.

E. J. PENNINGTON & A. E. GATCHELL.

MULTIPLEX TURNING LATHE.

No. 310,538. Patented Jan. 6, 1885.

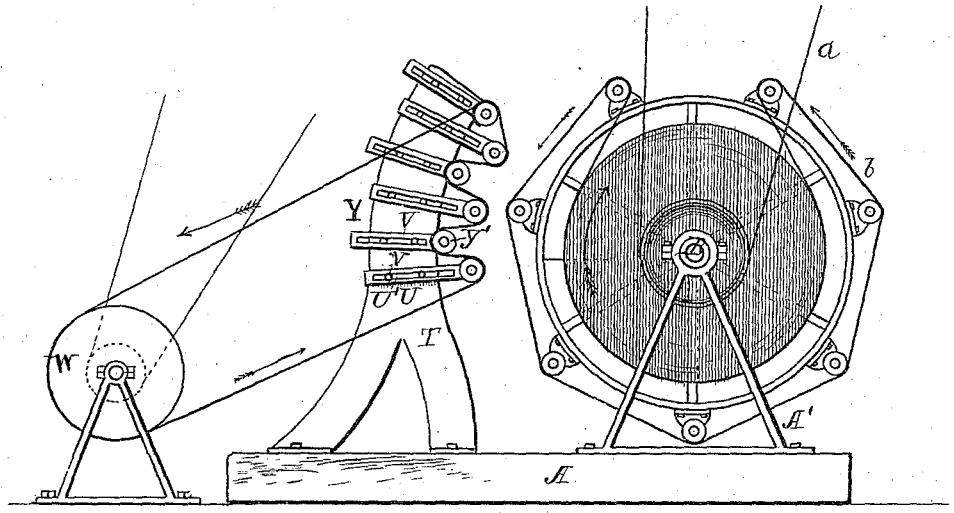

Fig. 1

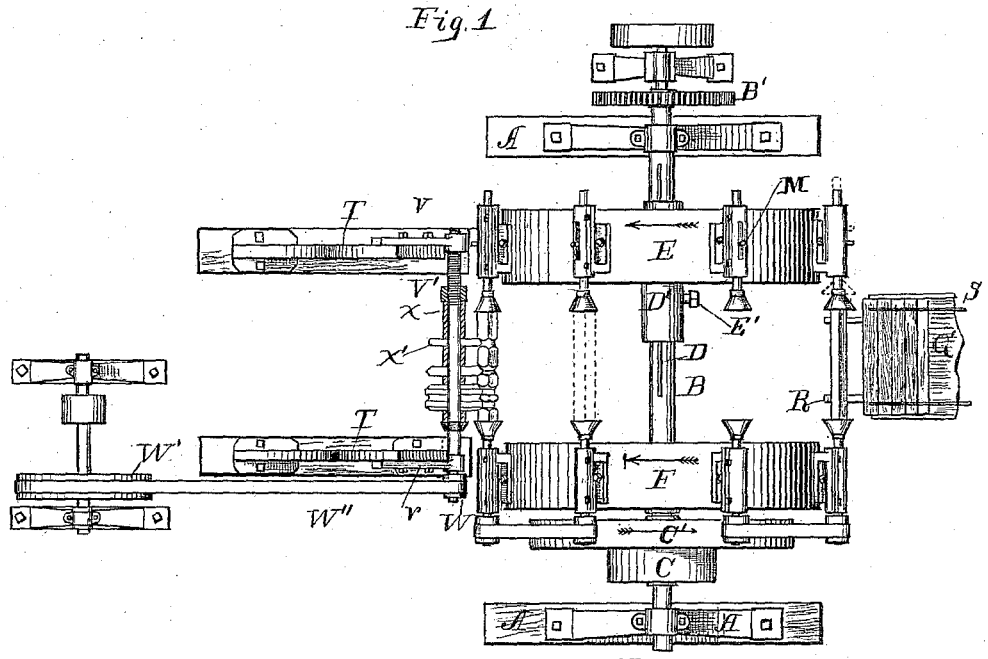

Fig. 2.

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(No Model.) 2 Sheets—Sheet 2.

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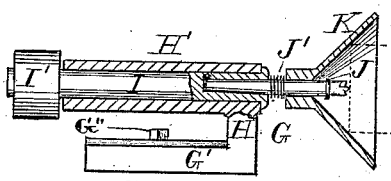

Fig. 3.

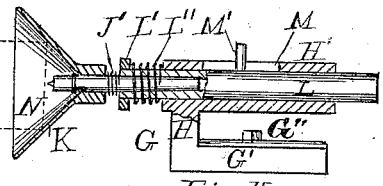

Fig. 4.

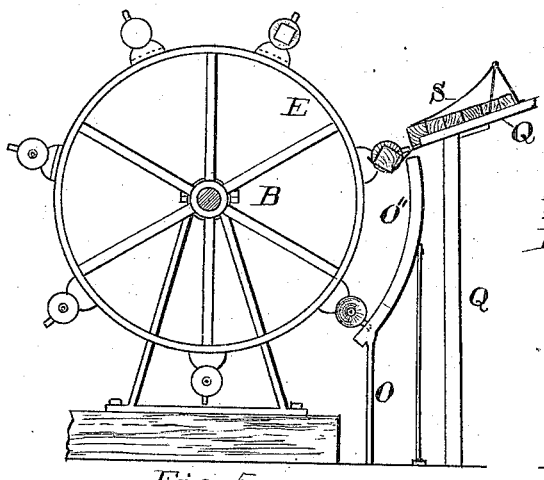

Fig. 5.

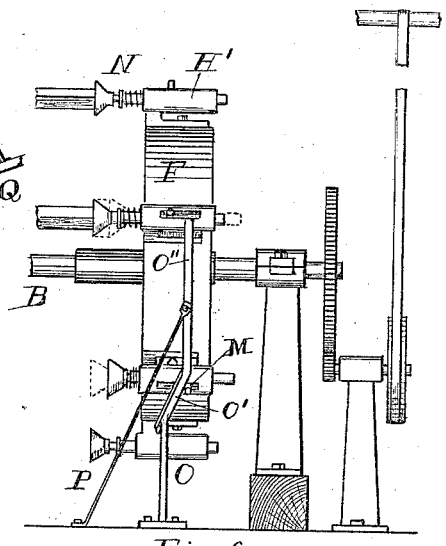

Fig. 6.

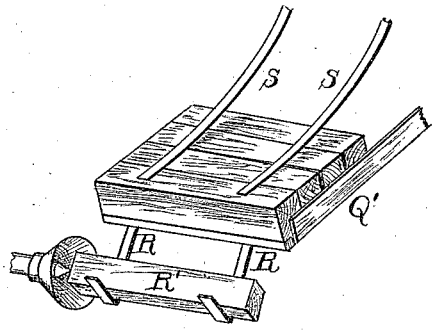

Fig. 7.

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Atto

UNITED STATES PATENT OFFICE.

EDWARD J. PENNINGTON, OF CINCINNATI, OHIO, AND ALBERT E. GATCHELL, OF NEWPORT, KENTUCKY, ASSIGNORS TO H. R. PROBASCO, TRUSTEE.

MULTIPLEX TURNING-LATHE.

SPECIFICATION forming part of Letters Patent No. 310,538, dated January 6, 1885.

Application filed August 2, 1883. (No model.)

To all whom it may concern:

Be it known that we, EDWARD J. PENNINGTON, of Cincinnati, in the county of Hamilton and State of Ohio, and ALBERT E. GATCHELL, of Newport, in the county of Campbell and State of Kentucky, have invented a new and useful Improvement in Multiplex Turning-Lathes, which improvement is fully set forth in the following specification and accompanying drawings, in which—

Figure 1 is an end view of our automatic multiplex turning-lathe. Fig. 2 is a top or plan view of the same; Fig. 3, a vertical longitudinal section of one of the lathe-spindles; Fig. 4, a vertical longitudinal section of one of the centering-chucks; Fig. 5, an end view of machine, showing the feeding device with the dropping or releasing attachment; Fig. 6, a front view showing the cylinders or drums carrying the centering-chucks; and Fig. 7, a perspective view of the chute and fingers for feeding the lathe.

The object of the present invention is to provide a lathe which is capable of automatically feeding the pieces and releasing the product in a rapid and efficient manner, and in so arranging the spindles and cutter-heads that the work can be turned out with the greatest speed in a perfect and workmanlike manner.

It consists in having a shaft equipped with two drums or cylinders a slight distance apart, one being stationary thereon, and the other movable and adjustable. Both cylinders carry on their periphery at regular intervals keepers which carry horizontally-disposed spindles, said spindles on the one cylinder being capable of a limited longitudinal motion, and each has at the inner end a funnel-shaped mouth, and in the mouths of these spindles are centering-points, while the spindles on the opposite cylinder are capable of being rotated only; and the mouths of these spindles are provided with chucks, so that when the block or piece to be turned is placed between two of these oppositely-disposed spindles the chuck at one end will cause the piece to rotate. The spindles on the one cylinder having the chucks have on their outer ends pulleys, by means of which motion is received. The shaft carrying these drums and spindles is disposed to rotate slowly, while the spindles carrying the pieces to be turned revolve rapidly, carrying them past one or more adjustable rotating cutter-heads.

The device is still further provided with a feeding-rack from which the spindles automatically receive the pieces to be turned, the longitudinally-movable spindles having a stud or lug which engages with an inclined face on the frame, so that when the spindle reaches a certain point it is retracted sufficiently to pass over the end of the piece, and then tripped so that a coiled spring will force the spindle toward the piece and grasp it between the chuck and center. When the piece has been turned and reaches a certain point, the chuck is again retracted and the turned piece permitted to drop out, all of which will now be set forth in detail.

In the accompanying drawings, A represents the base of the machine, which may be of any suitable form or size, and A′ the uprights of the frame for carrying the horizontal shaft B. This shaft has at one end a gear-wheel, B′, through which it receives motion, and at the opposite end it has thereon two loose pulleys, C C′, the smaller one, C, being the pulley which receives power direct from the main shaft, and the larger one, C′, being the pulley which transmits the motion to the spindles. These pulleys are attached permanently to each other. Centrally the shaft is provided with a feather, D.

D′ represents the hub of a drum, E, said hub being provided with a groove, (not shown,) so that when the drum is placed on the shaft the feather works in the groove and permits the drum to move longitudinally on the shaft, although causing the drum to rotate with the shaft at all times. Any suitable means may be employed for adjusting or securing the drum to the shaft—such, for instance, as the bolt E′ in Fig. 2.

F represents a similar drum secured permanently to the shaft near the opposite end close to the large transmitting-pulley C′. The drum F carries at suitable intervals the keepers or spindle-holders G. Each holder is constructed substantially as follows: The base-piece G′, which rests on the face of the drum and is secured thereto by means of a bolt, G″,

has at its inner end an upwardly-projecting arm, H, from which extends outwardly a horizontal limb, H′, said limb being directly above and parallel with the base-piece G′. This limb is tubular to receive the spindle I. The outer end of the spindle carries the small pulley I′, and the inner end has a socket to receive the centering-chuck J. K represents a funnel or bell shaped guide-piece, which is placed loosely on the centering-chuck, so that the rim K′ projects beyond the end of the chuck J. A spring, J′, is placed on the chuck J and interposed between the end of the spindle I and the funnel-shaped guide-piece K, for purposes which will hereinafter be set forth. The centering-chucks L on the opposite or movable cylinder E are secured in keepers G, similar to the spindles on the cylinder F. This centering-chuck does not revolve. The upper side of the tubular arm H′ is slotted, as shown at M, and a stud or lug, M′, projecting out from the chuck L, passes through this slot. The inner end of the chuck L has a collar, L′, and a coiled spring, L″, around this chuck is interposed between the head L′ and the end of the tubular arm H′. The centering-piece N is also provided with a funnel-shaped guide-piece, K, which is capable of sliding thereon, and a spring, J′, between the guide-piece and the head or end of the chuck L.

On the forward side of the machine, directly in front of the cylinder E, is a standard, O, secured to the base of the machine in such a manner that it may be moved to the right or to the left to correspond with the position of the cylinder E on the shaft B. This standard has a crook or bend, O′, to the right, and an upwardly-projecting limb, O″, which is curved to conform to the arc of the cylinder F. A brace, P, extending from the base to the limb O″, holds the standard firmly in position. The standard is so located that the tubular arm or keeper H′ of the centering-chuck passes on the inside of the same, as shown more fully in Fig. 5, thereby causing the lug M′ of the centering-chuck L to strike the inclined part O′ of the standard, retracting the spring L″ and causing the said lug to travel up on the right side of the limb O″. When the rotation of the cylinder brings the lug M′ to the upper end of the limb O″, the spring L″ again throws the centering-chuck to the left, as shown in Fig. 6, all of which will hereinafter be more fully described.

In front of the machine, and at such a position when in operation that it is midway between the cylinders E F, is a frame, Q, which carries on its upper end an inclined rack or chute, Q′. The lower end of this chute has two fingers, R, curved, as shown, so that when the blocks or pieces R′ to be turned fall from the chute Q′ the fingers will hold them. To provide for separating the pieces R′ and keep them from crowding each other, so that the centering-chucks can grasp the pieces singly, two flexible fingers, S, are extended down onto the pieces R. They perform the double office of holding the pieces and in also arranging them so that they will follow each other successively. The fingers R are so located with relation to the upper end of the curved limb O″ that when the lug M′ of either of the centering-chucks L is tripped or passes over the end of the said limb O″ the chuck L will spring forward toward the spindle I and secure the piece R′, which rests on the fingers R. Thus the pieces R′ are taken from the chute-fingers without stopping the motion of the cylinders E F.

On the rear side of the machine are two standards, T, having the sides extending toward the cylinders curved to conform with the cylinders a sufficient distance to permit of placing the operating mechanism therein, which will now be explained. The standards may be made adjustable on the base, so they can be moved to or from the machine, along the machine from end to end, as required. We prefer, however, to make the mandrels which carry the revolving cutter-heads adjustable to meet the requirements of turning, as will now be shown.

U represent two or more arms located on the sides of the standards and projecting toward the shaft B. These arms are slotted, and are held adjustably to the standards by means of the headed bolts V, which pass through the slots U′. The inner ends extend beyond the edges of the standards, and are provided with boxes to receive the horizontal mandrels V′. One end of each mandrel has a small pulley, W, to receive motion from the pulley W′, through the medium of the belt W″. Each mandrel is equipped with suitable collars, X, between which are secured the cutters X′.

Located midway between the arms U, on the end having the pulleys W, is an arm, Y, which is also slotted and secured adjustably to the standards. Each of these arms carry at their inner ends the idler-pulleys Y′, so that when the belt W″ is put on the machine it is placed first around the mandrel-pulley W, then back around one of the idler-pulleys Y′, and around over the next mandrel-pulley, and so on, after which the arms carrying the idler-pulleys are adjusted to give the proper tension to the belt.

It is desirable in turning many objects to use more than one revolving cutter for finishing the product. This can readily be accomplished by this machine, as will be observed, since we provide for two or more mandrels, V′, all arranged in the proper arc, or so disposed that they can be independently adjusted to or from the cylinders, or to or from the field of the pieces R′ as they travel around on the cylinders between their respective chucks.

The operation of the machine will now be set forth.

In preparing the machine to accomplish the desired work, the proper cutters are first selected for the mandrels V′, and the cylinder E is then adjusted on the shaft so that the centering-chuck and spindle, when in their normal condition, will grasp and hold by force

of the spring L″ the piece R′. The standard O is then located so that the limb O″ will cause the centering-chucks to retreat from the spindle I, through the intervention of the lug M′, and the chute adjusted so that the fingers R will be in proper position to present the pieces R′ to the bell-mouth guide-pieces when the lug M′ is tripped from the end of the curved limb O″. The machine is now ready for motion.

a represents the belt which transmits motion from the driving-shaft, and *b* is a belt which passes around the pulley C′, and is thence extended around each spindle-pulley I′, as shown in Fig. 1, thereby giving a direct motion to each of the pulleys I′ in an opposite direction to the pulley C′. The cylinders E F rotate toward the rear frame or standards, and the spindles rotate in the same direction. The cutter-heads on the mandrels V′ revolve from the cylinders, thus producing a high speed without causing either the spindles or the mandrels to rotate with such a high velocity.

We are aware that heretofore have been used in devices of this general character cylinders carrying chucks, one adjustable toward and from each other, and carrying chucks with spring centering-pieces operated by an incline, the spring-actuated chuck, and a fixed and an adjustable chuck carrying cylinders supported directly upon the central shaft.

What we claim as new is—

1. In a lathe of the character described, the combination of two cylinders with a driving and supporting shaft having a feather, D, one of said cylinders being fixed to said shaft and the other having a grooved hub endwise movable thereon, but revolving therewith, and both cylinders bearing spring-actuated centering-chucks and spindle, as described, adapted to be actuated at different intervals by an inclined plane, and springs for the purpose of automatically gripping and releasing the stuff, substantially as set forth.

2. The combination of the bell-mouth guide-piece K, and the chuck I, having pin M′, and actuated by the encircling spring J′, with the hollow keeper G, constructed as described, and having the tubular and slotted arm H′, substantially as described.

In testimony that we claim the foregoing we have hereunto set our hands, this 7th day of July, 1883, in the presence of witnesses.

EDWARD J. PENNINGTON.
ALBERT E. GATCHELL.

Witnesses:
J. S. ZERBE,
O. J. BAILEY.