

(No Model.)

4 Sheets—Sheet 1.

H. B. STILLMAN & W. F. PATTERSON.
MACHINE FOR INTERCHANGABLY PLANING OR TURNING.

No. 327,968.

Patented Oct. 6, 1885.

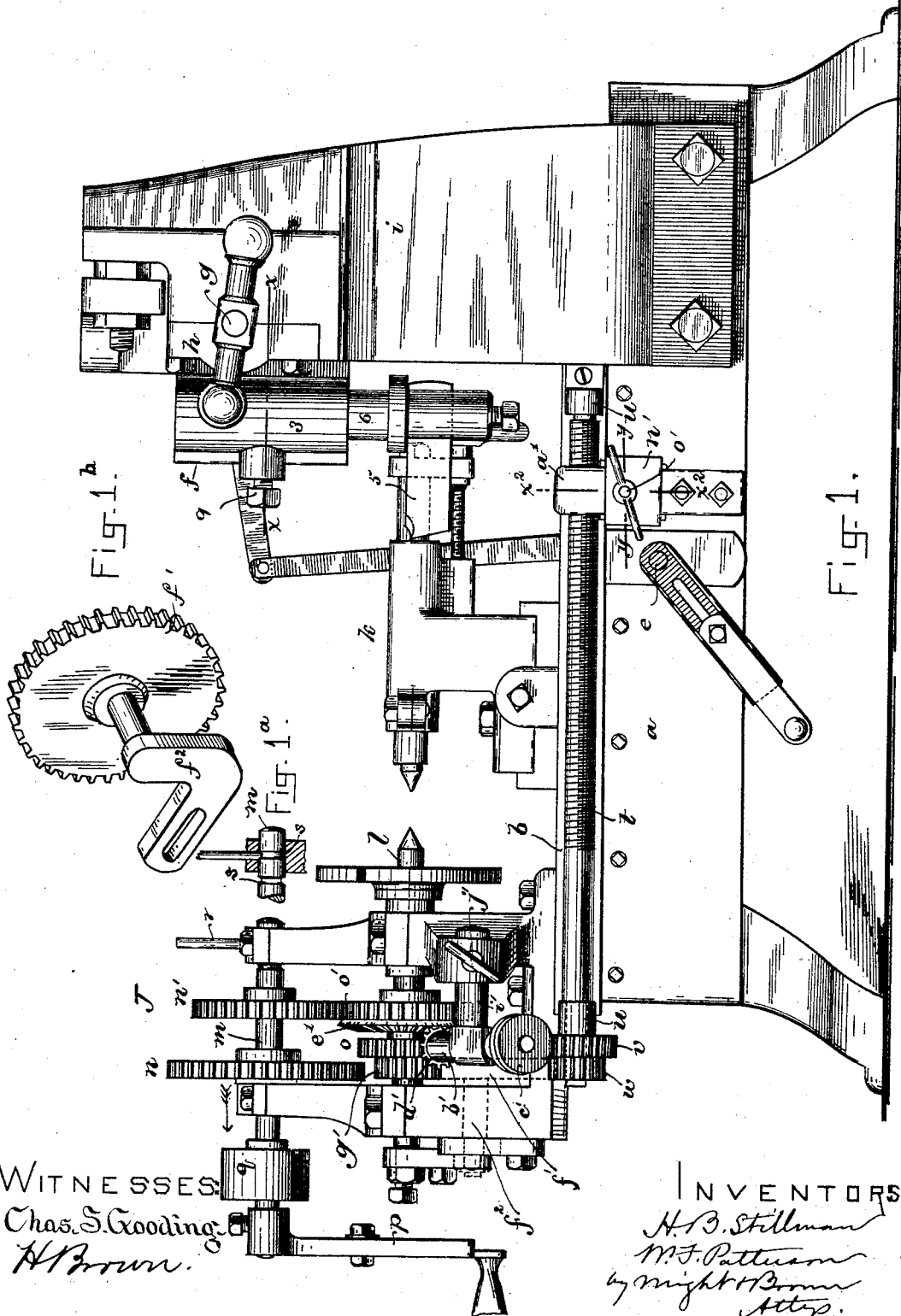


Fig. 1.

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WITNESSES:
Chas. S. Gooding
H. Brown.

INVENTORS
H. B. Stillman
W. F. Patterson
by night H. Brown
Atty.

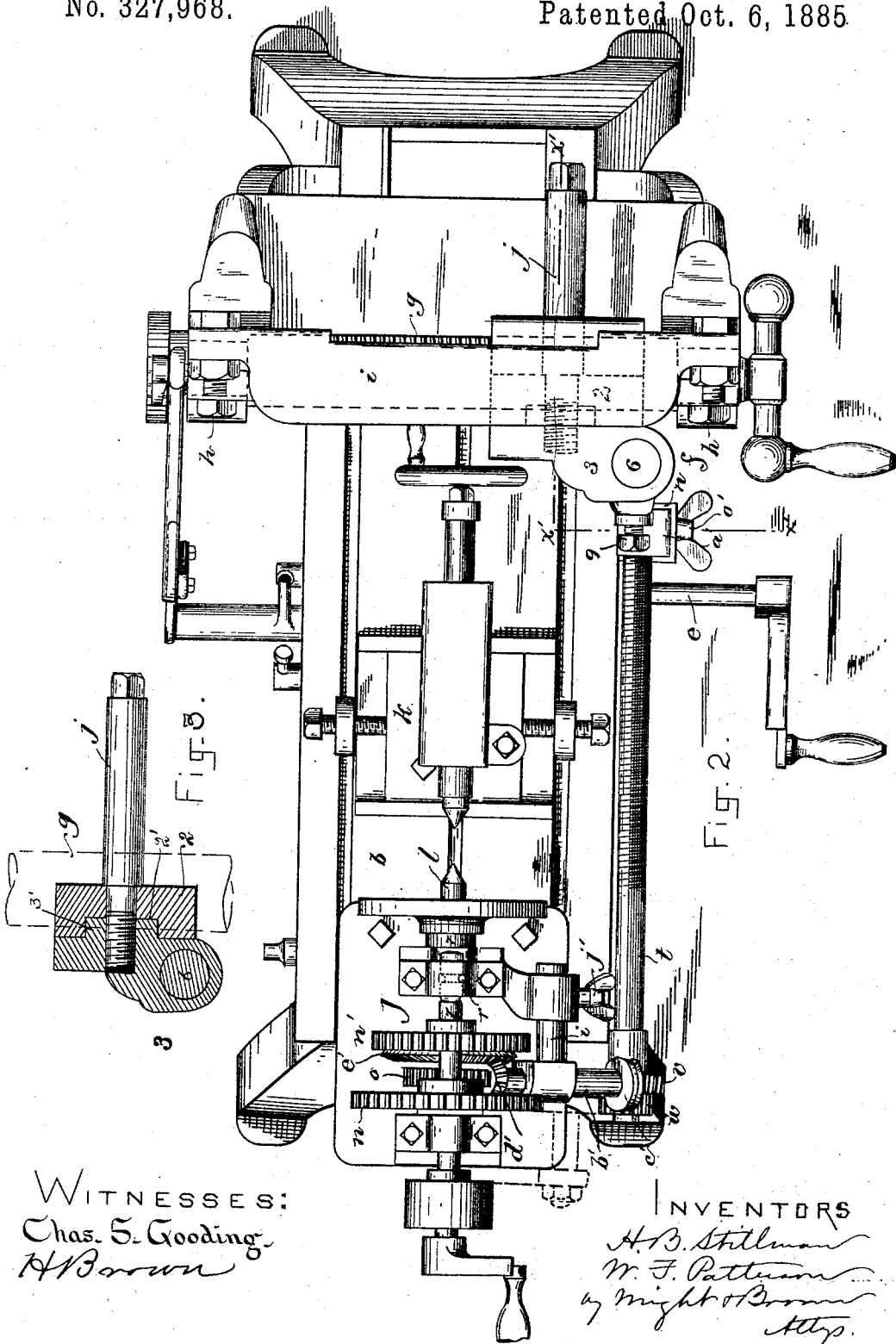
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Chas. S. Gooding
H. Brown

INVENTORS
H. B. Stillman
W. F. Patterson
by *Night & Brown*
Atty.

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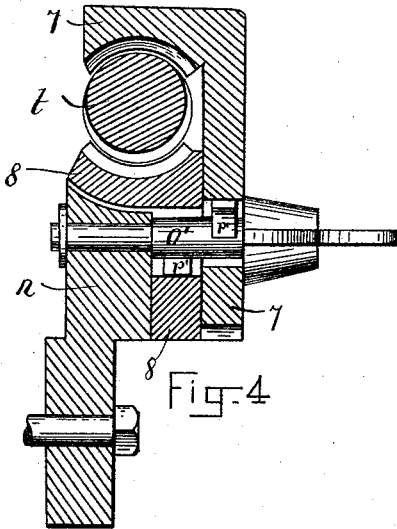


Fig. 4

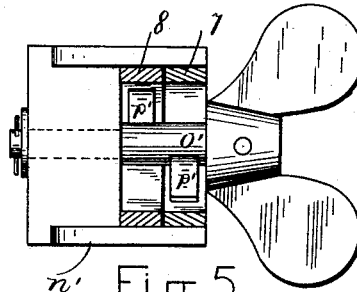


Fig. 5.

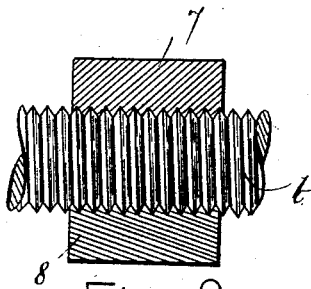


Fig. 9.

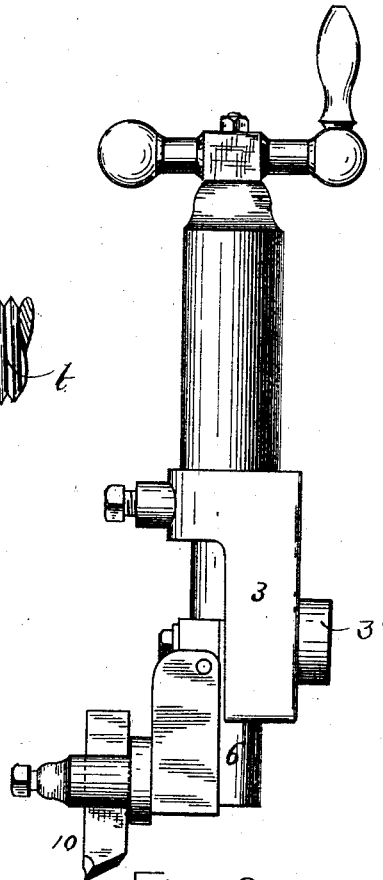


Fig. 6.

WITNESSES:
Chas. S. Gooding.
H. Brown.

INVENTORS
H. B. Stillman
W. F. Patterson
by *Myght & Brown*
Atty.

(No Model.)

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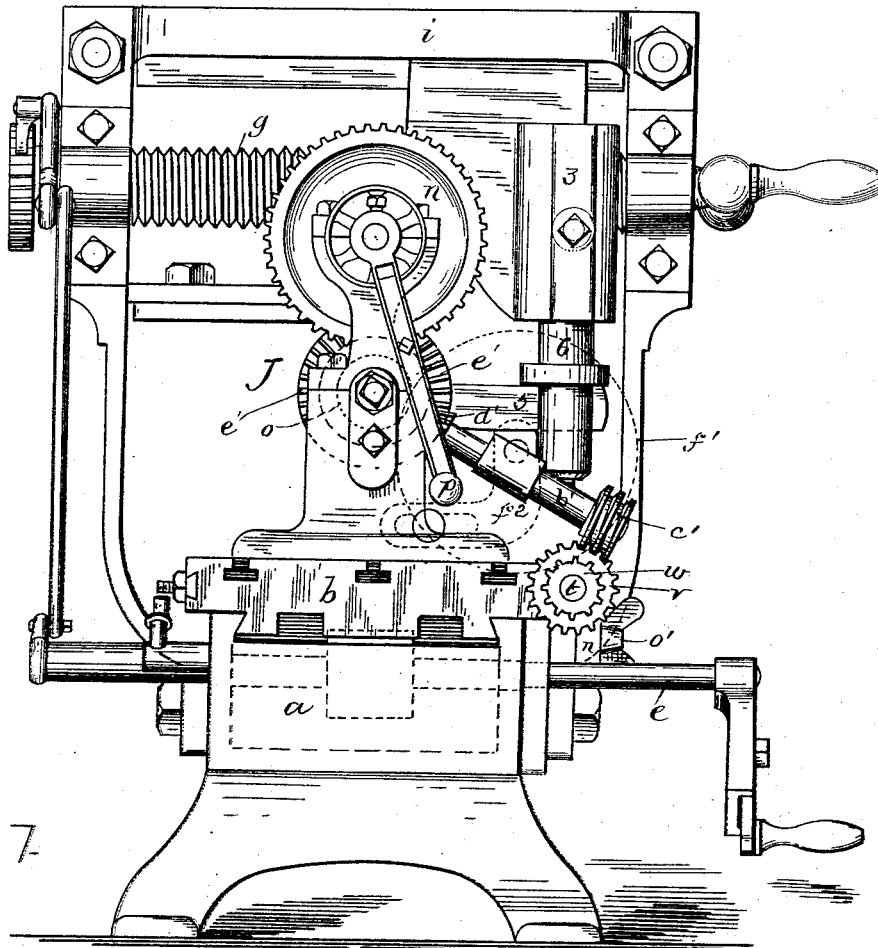


Fig. 7.

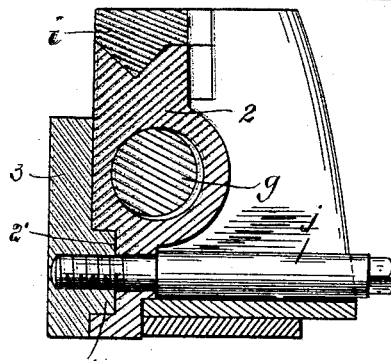


Fig. 8.

WITNESSES:
Chas. S. Gooding.
H. Brown.

INVENTORS
H. B. Stillman
W. F. Patterson
By Wright & Brown
Attys

UNITED STATES PATENT OFFICE.

HENRY B. STILLMAN, OF NEW YORK, N. Y., AND WILLIAM F. PATTERSON,
OF BOSTON, MASSACHUSETTS.

MACHINE FOR INTERCHANGEABLY PLANING OR TURNING.

SPECIFICATION forming part of Letters Patent No. 327,968, dated October 6, 1885.

Application filed June 1, 1885. Serial No. 167,139. (No model.)

To all whom it may concern:

Be it known that we, HENRY B. STILLMAN, of the city, county, and State of New York, and WILLIAM F. PATTERSON, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Machines for Interchangeably Planing or Turning, of which the following is a specification.

This invention has for its object to provide an improved machine adapted to be operated either by hand or power, and to serve either as a planer for metal or other material or as a lathe for screw-cutting and ordinary turning. To these ends the invention consists in the improvements which we will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a side elevation of the improved machine. Fig. 1^a is a detail sectional view showing the means for locking the main driving arbor or shaft in its bearing. Fig. 1^b represents a perspective view of one of the gears. Fig. 2 represents a top view of the machine. Fig. 3 represents a section on line $x x$, Fig. 1. Fig. 4 represents a section on line $x^2 x^2$, Fig. 1. Fig. 5 represents a section on line $y y$, Fig. 1. Fig. 6 represents a side view of the tool used for metal-planing and a part of its holder. Fig. 7 represents an end view of the machine. Fig. 8 represents a section on line $x' x'$, Fig. 2.

The same letters of reference indicate the same parts in all the figures.

In the drawings, a represents the frame of a planer, and b represents the bed, which is movable on guides on the frame, as usual, the bed being provided with a rack on its under side with which meshes a pinion on an arbor, e , to which power may be applied by hand or otherwise to propel the bed in either direction.

f represents the tool-carriage, which is mounted on a screw, g , passing through a tapped socket in the tool-carriage. Said screw is journaled at its ends (which are not threaded) in bearings $h h$ in a frame, i , secured to the frame a . The screw g serves both to support and move the tool-carriage. The carriage is composed of two general parts—viz., the part 2, through which the screw g passes, and

the socket 3, which is detachably secured to the part 2 by a bolt, j , (see Figs. 8, 2, and 3,) and contains the vertical tool-spindle 6, holding the tool 5. The socket 3 may be detached from the part 2, and another socket having a different tool may be substituted for it in adapting the machine for different kinds of work. The parts 2 and 3 have flat surfaces in contact with each other, and the part 3 has a circular boss or trunnion, $3'$, which projects into a socket, $2'$, formed in the part 2. The bolt j , that connects said parts, passes through said trunnion, as shown in Figs. 3 and 8. The flat bearing-surfaces and the trunnion and its socket enable the part 3 with the tool-holding spindle to be inclined at any desired angle, the bolt j , by clamping said flat surfaces together, holding the part 3 at any angle to which it may be adjusted. The spindle 6 is also vertically adjustable in the part 3, and is held at any desired height by a set-screw, 9. It will be seen, therefore, that the tool can be adjusted in either of three ways—viz., by turning the screw g so as to move the carriage bodily, by turning the part 3 on the part 2, and by raising or lowering the spindle 6.

When the machine is used as a metal-planer, a tool, 10, such as is shown in Fig. 6, is used, and the screw g is partially rotated at the end of each forward movement of the bed to move the tool-carriage laterally and thus feed the tool across the surface being planed. Suitable mechanism for this purpose is shown in an application for Letters Patent of the United States, Serial No. 146,456, a full description of said mechanism being deemed unnecessary, since it forms no part of our present invention.

In adapting the machine for use as a screw-cutting or a metal-turning lathe, we provide a tool, 5, projecting laterally from the tool-holding spindle, as shown in Fig. 7, disconnect the screw g from the mechanism that rotates it automatically, so that the tool will not feed, and apply to the platen b a detachable head-stock, J , and a detachable tail-stock, k , said parts being capable of being placed at any desired distance apart within the limit of the length of the bed, so as to receive between their centers a piece of work of any desired length.

The center l of the head-stock is rotated by means of an arbor, m , mounted in bearings on the head-stock, and connected by either of two gears, $n n'$, with either of two gears, $o o'$, on the center l , said arbor being capable of being rotated either by hand (by means of a crank, p ,) or by power (by means of a belt applied to a pulley, Q .) The gears $n o$ and $n' o'$ are differently proportioned, as shown, and the gears $n n'$ on the arbor m are placed farther apart than the gears $o o'$ on the center l , so that a longitudinal movement of the arbor in the direction indicated by the arrow in Fig. 1 will disconnect the gear n from the gear o , and connect the gear n' with the gear o' , while the movement of the arbor in the opposite direction will reverse said connection. The speed of the center is decreased and its power increased by connecting the gears $n' o'$, as shown in Fig. 1, while the speed will be increased and the power decreased by connecting the gears $n o$. The arbor m is held in either position by a pin, r , entering one of its bearings and projecting into either of two grooves $s s$, formed in the arbor m , as shown in Fig. 1^a.

t represents a screw-threaded feeding-rod journaled in bearings $u u$ at the edge of the bed, and provided at one end with a worm-wheel, v , and a pinion, w . Said rod is rotated by a connection with the head-stock center l , and is engaged with a sectional nut, a' , affixed to the bed a , so that its rotation causes the bed to move progressively. The rate of such movement is governed by the nature of the connection between the center l and the screw t . This movement of the bed is to present the work carried by the lathe to the cutter on the tool-carriage.

In Figs. 1, 2, and 7 we have shown the connection as an arbor, b' , having at one end a worm, e' , meshing with the worm-wheel v on the rod t , and at its other end a bevel-pinion, d' , meshing with a bevel-gear, e' , on the center l . When a more rapid rate of movement is desired, the arbor b' may be moved so as to disconnect its pinion and worm from the bevel-gear and worm-wheel, and a gear, f' , may be substituted for it, as shown in dotted lines in Figs. 1 and 7, said gear being journaled on an arm, f^2 , attached to the frame of the head-stock and meshing with a pinion, g' , on the center l , and with the pinion w , on the rod t . For ordinary metal-turning the arbor b' is used as the connection; but when the machine is to be used for screw-cutting the gear f' is used. The arbor b' is journaled in the end of a rod, z' , which is adapted to move endwise in a socket on the head-stock and is held in said socket by a set-screw, j' .

It is well known that in screw-cutting the cutter has to move or progress more rapidly than the cutter in ordinary turning. The mechanism just described, instead of moving the cutter more rapidly, moves the work more rapidly, the action of the cutter on the material or work being just the same.

When it is desirable to move the arbor b' so as to make it inoperative as a connection between the center l and the screw-rod t , the screw j' is loosened and the rod z' is turned in its socket until the pinion d' and worm e' clear the gear e' and worm-wheel v , and then the rod is moved endwise to remove the arbor b' and its bearing from the space which the gear f' occupies.

The size of the pinion w may be varied to give any desired variation to the movement of the bed when the screw t is rotated by the gear f' and pinion w .

The nut a' is made in two sections, 7 8, adapted to move in opposite directions in a guide or casing, n' , affixed to the frame a . A stud, o' , is journaled in said casing and is provided with oppositely-projecting wings or cams $p' p'$, standing the one in a slot in the jaw-section 7 and the other in a slot in the jaw-section 8. When the stud o' is turned a quarter of a rotation from the position shown in Fig. 5, its cams simultaneously raise the sections 7 and depress the section 8, thus separating said sections from the screw t and stopping the movement of the bed.

It will be seen that this machine combines in one a planer, a turning-lathe, and a screw-cutting lathe, and may be readily adapted for use in either capacity. It can be operated wholly by hand, and is therefore very useful in a small shop where there is no power, or for doing small jobs which do not require a power-driven machine.

The use of a single screw to feed the bed for turning and for screw-cutting materially simplifies the construction of the machine.

It will be understood that the tool-holder shown in Fig. 1 is that used for turning, and that by this machine the work or article operated upon is progressed by the screw t moving the platen which carries the head and tail stocks of the lathe.

When the machine is used for planing, the detachable tail-stock or both the tail and head stocks are removed and the work for planing secured to the platen. The tool-holder shown in Fig. 6 is that used for planing, and is secured in the tool-carriage in the place of that shown in Fig. 1.

We claim—

1. A frame, a bed, and a tool-carriage combined with a lathe supported by said bed, and mechanism, substantially as described, whereby motion is communicated from the lathe to the bed, as set forth.

2. The combination of the frame, the movable bed thereon, the adjustable tool-holder, the head and tail stocks detachably secured to the said bed, the screw journaled in bearings on the bed, a movable or sectional nut secured to the frame and adapted to be engaged with the screw, mechanism for rotating the center of the head-stock, and a connection, substantially as described, between the head-stock center and the bed-screw, whereby the latter is rotated and the bed moved at a rate pro-

portioned to the rate of rotation of said center, as set forth.

3. The combination of the frame, the movable bed, the adjustable tool-holder, the head and tail stocks secured to the bed, the screw journaled in bearings on the bed, a nut secured to the frame and engaged with the screw, and interchangeable connections, substantially as described, between the head-stock center and the bed-screw, whereby the rate of movement of the bed relatively to the rate of rotation of the center may be regulated, as set forth.

4. In a lathe, the combination of a frame, a bed movable thereon, head and tail stocks on the bed, a single screw supported by the bed and engaged with an attachment on the platen, and devices, substantially as described, whereby rotary motion is imparted to the screw from the head-stock center, the same screw being adapted to move the bed either for screw cutting or turning purposes, as set forth.

5. The combination of the head-stock, the center *l*, journaled therein and having the gears *o o'*, and the longitudinally-moving driving-arbor *m*, having the gears *n n'* placed farther apart than the gears *o o'*, so that by an endwise movement of said arbor its connection with the center may be changed from one pair of gears to the other, as set forth.

6. The combination of the head-stock hav-

ing the center and suitable gears and means for rotating them, the bed and screw-rod *t* supported thereon, and removable means, substantially as shown, connecting the rotating gears of the head-stock and the gears of the screw-rod *t* for imparting rotary motion to the screw, as and for the purpose set forth.

7. The combination of the bed, the head-stock and its center, the screw supported by the bed, the arbor *b'*, adapted to communicate motion from the head-stock center to the screw, the rod *i'*, having the bearing for said arbor, said rod being detachably connected to the head-stock and capable of being turned and moved endwise to move the arbor to and from its operative position, as set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

HENRY B. STILLMAN.
WILLIAM F. PATTERSON.

Witnesses to signature of Henry B. Stillman:

FRANKLIN OVERBAGH,
CHAS. T. LUNT.

Witnesses to signature of William F. Paterson:

H. W. MERRITT,
C. F. BROWN.