No. 636,248.

Patented Nov. 7, 1899.

W. H. FAUBER.

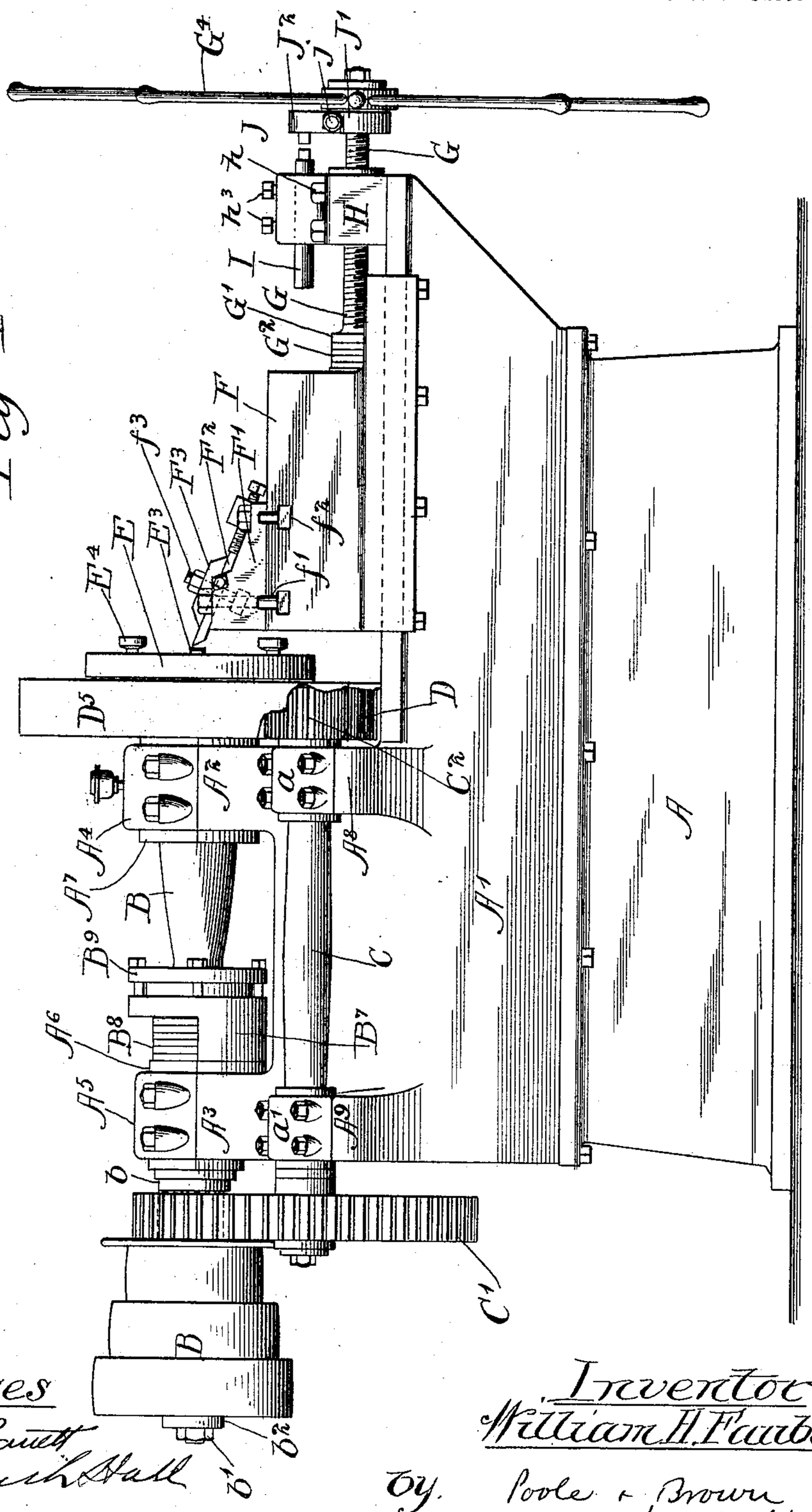
LATHE.

(Application filed Nov. 1, 1897.)

(No Model.)

5 Sheets—Sheet 1.

Fig. 1.



Witnesses

Harold G. Bartlett

William L. Hall

Inventor

William H. Fauber

by. Poole & Brown

his Attys.

No. 636,248.

Patented Nov. 7, 1899.

W. H. FAUBER.

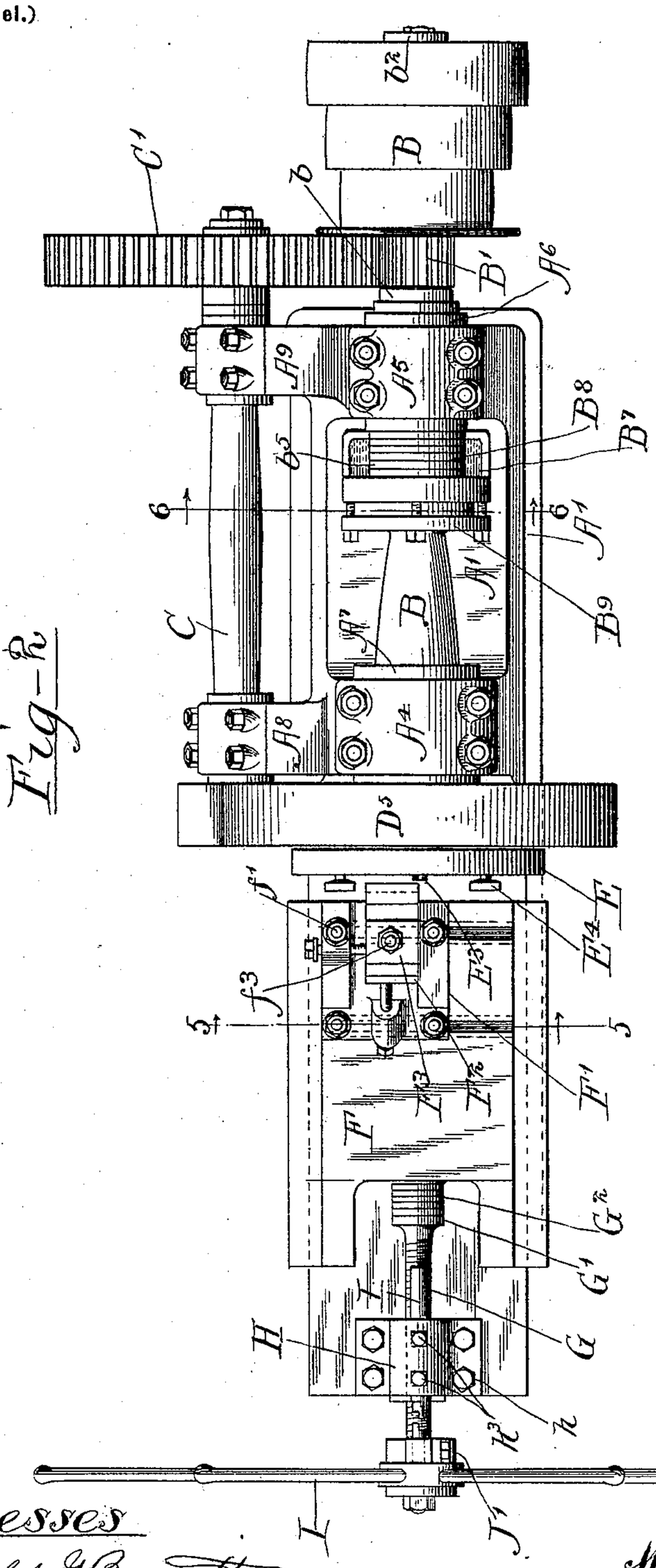
LATHE.

(Application filed Nov. 1, 1897.)

(No Model.)

5 Sheets—Sheet 2.

Fig. 2.



Witnesses
Harold G. Barrett,
William L. Hall.

Inventor
William H. Fauber.
by Poole & Brown,
His Atty's.

No. 636,248.

Patented Nov. 7, 1899.

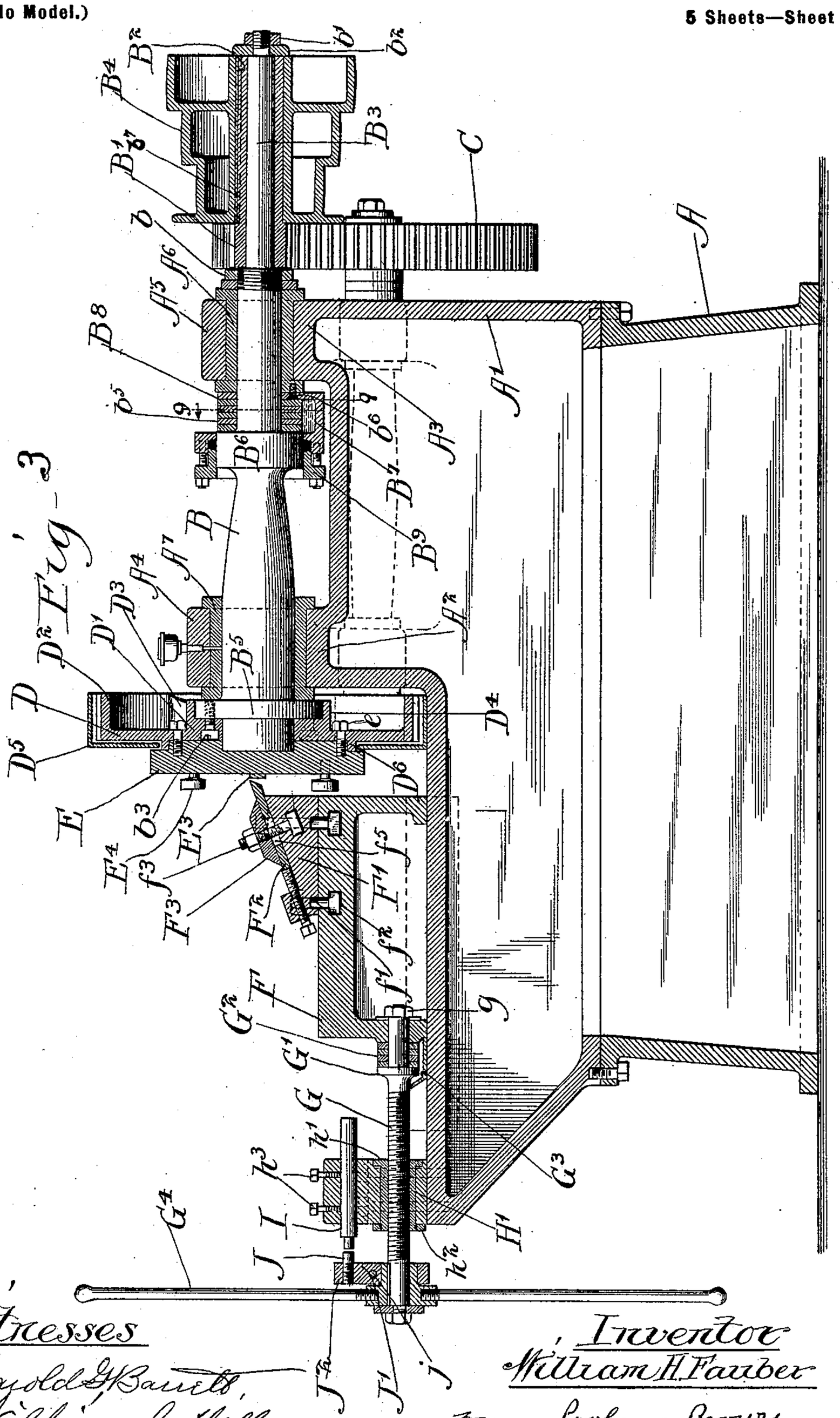
W. H. FAUBER.

LATHE.

(Application filed Nov. 1, 1897.)

(No Model.)

5 Sheets—Sheet 3.



Witnesses

Harold G. Barrett.

William H. Hill

Inventor

William H. Fauber

by Poole & Brown

his Attys

No. 636,248. Patented Nov. 7, 1899.

W. H. FAUBER.

LATHE.

(Application filed Nov. 1, 1897.)

(No Model.) 5 Sheets—Sheet 4.

Fig-4

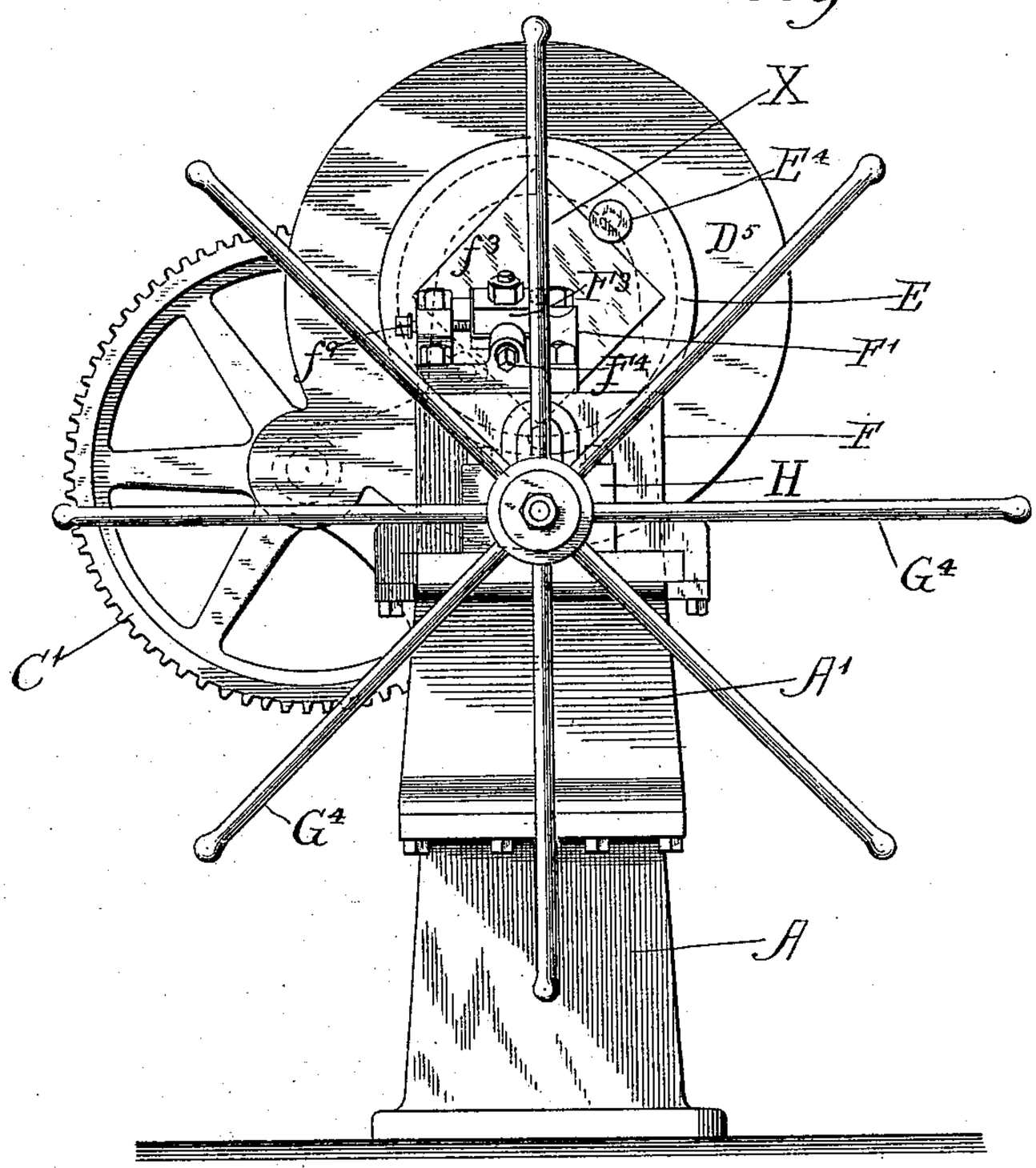
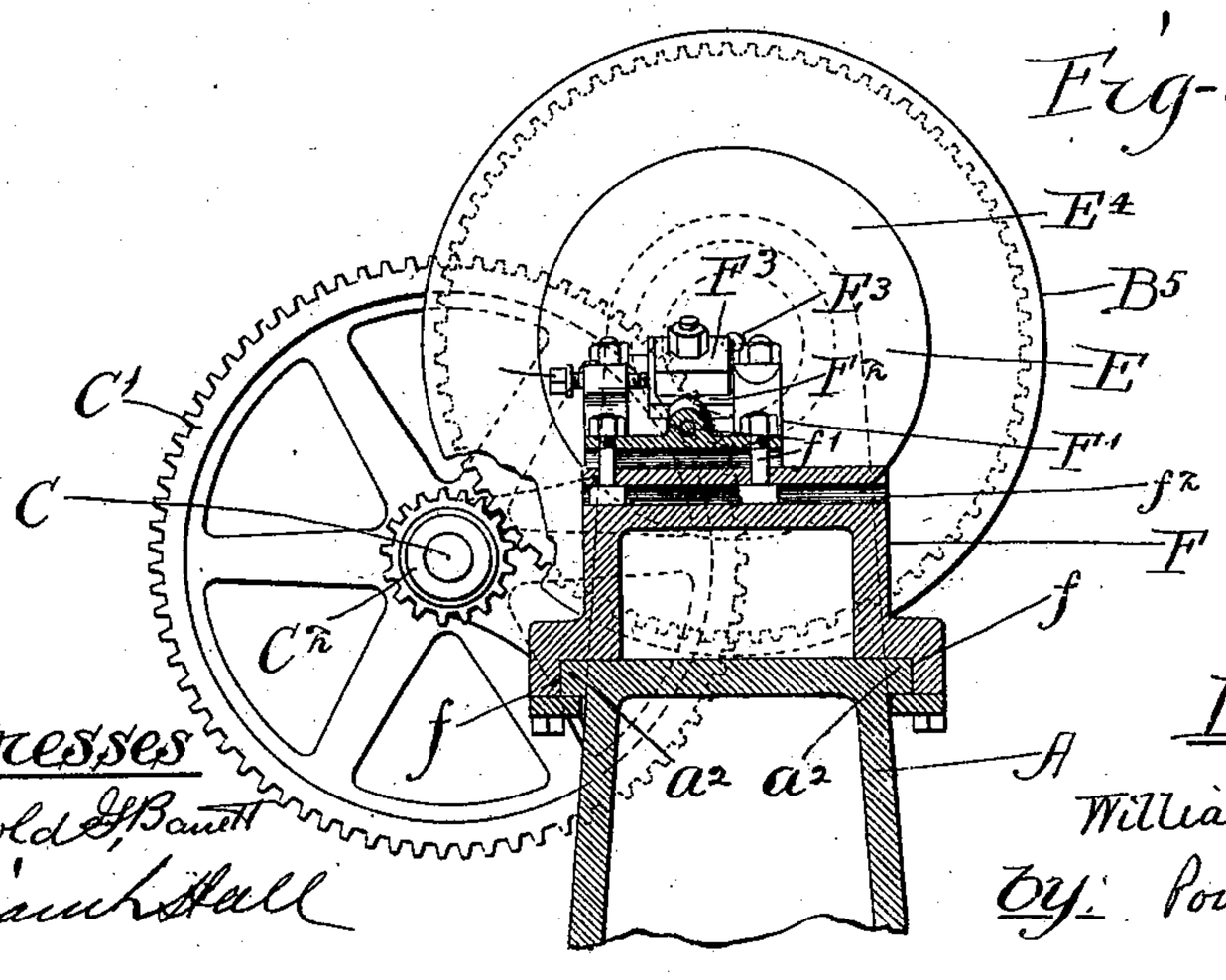


Fig-5



Witnesses
Harold D. Bamett
William H. Hall

Inventor
William H. Fauber
By: Poole & Brown
his Attys.

No. 636,248.

Patented Nov. 7, 1899.

W. H. FAUBER.

LATHE.

(Application filed Nov. 1, 1897.)

(No Model.)

5 Sheets—Sheet 5.

Fig-7

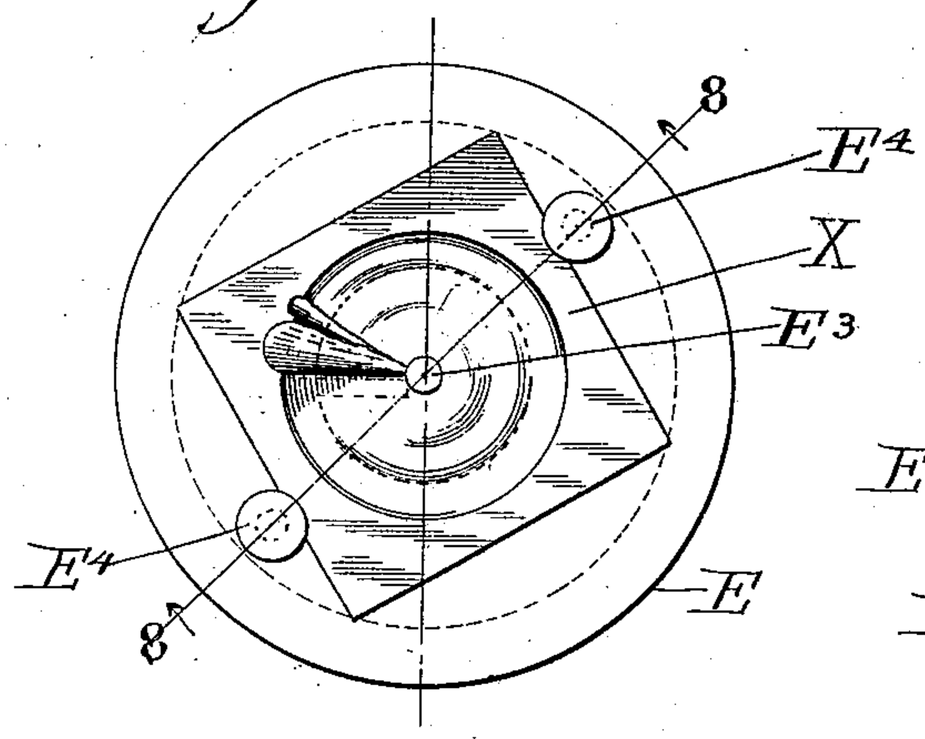


Fig-8

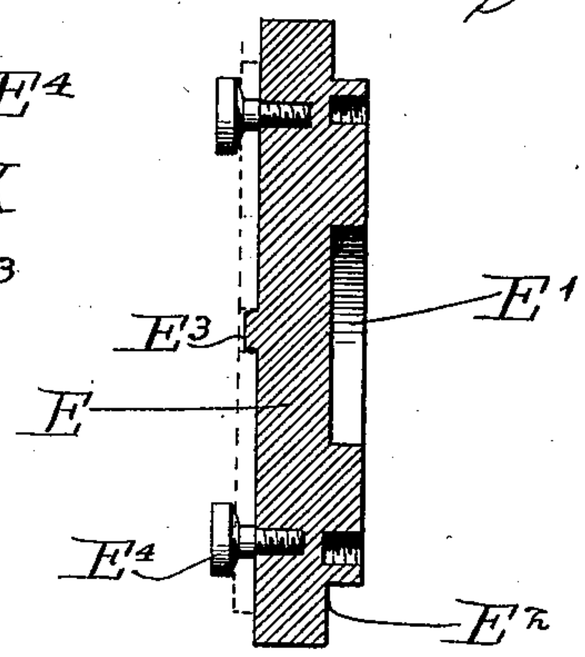


Fig-6

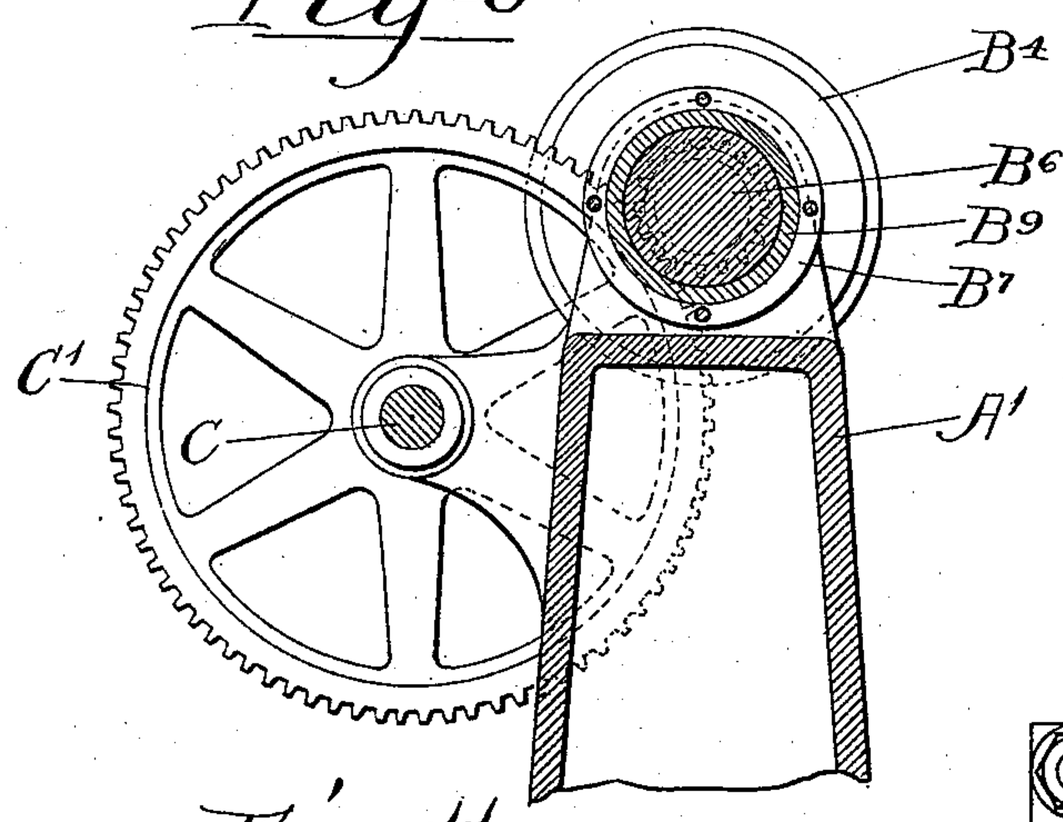


Fig-9

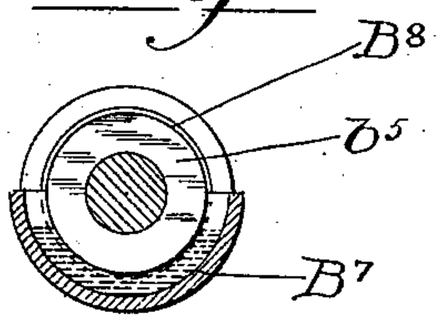


Fig-10

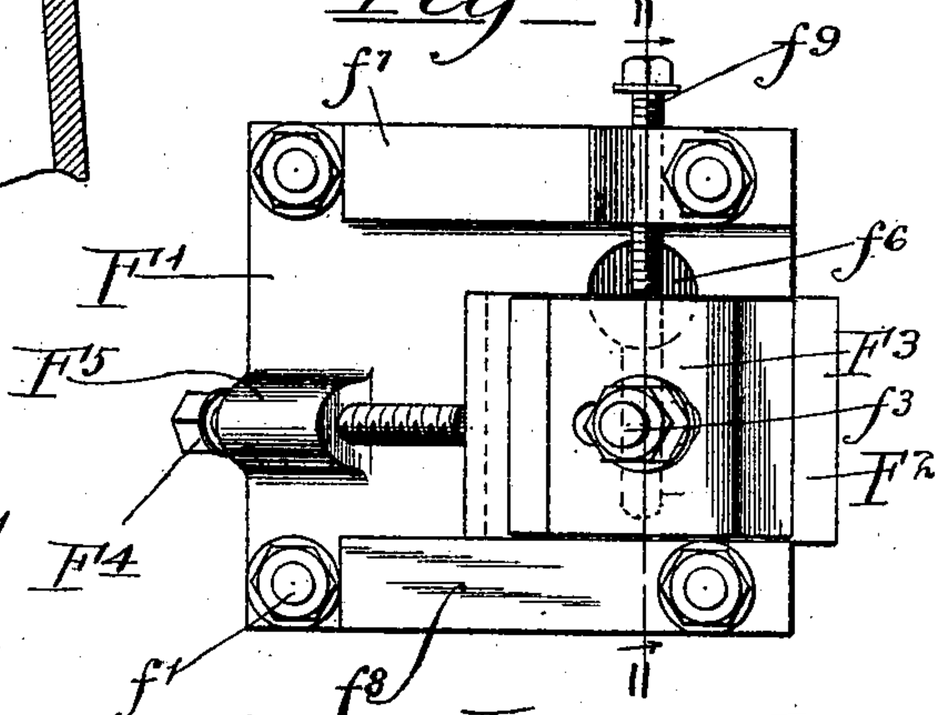
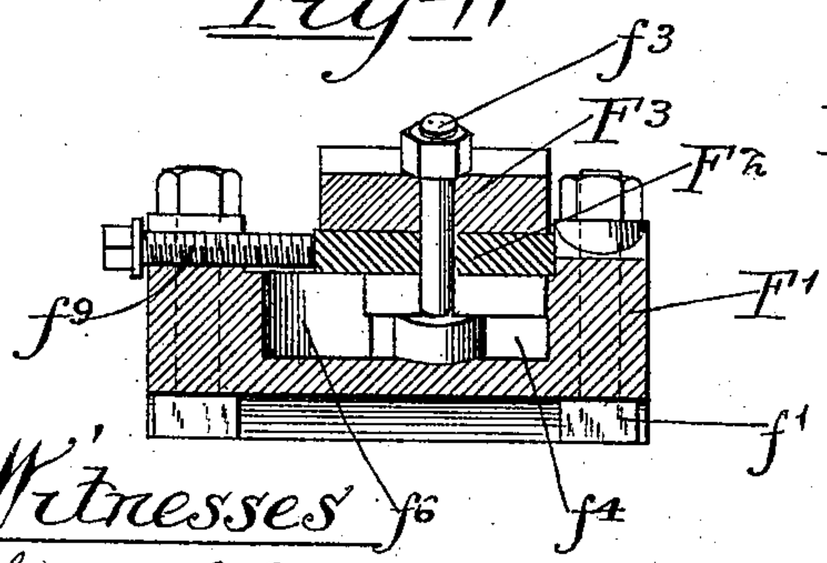


Fig-11



Witnesses
Harold G. Barrett,
William L. Hall.

Inventor
William H. Fauber
By Poole & Brown
his Attys.

UNITED STATES PATENT OFFICE.

WILLIAM H. FAUBER, OF CHICAGO, ILLINOIS.

LATHE.

SPECIFICATION forming part of Letters Patent No. 636,248, dated November 7, 1899.

Application filed November 1, 1897. Serial No. 657,052. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. FAUBER, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Lathes; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to an improved machine for turning or dressing, by the use of a cutting tool or knife, the side or face of a flat metal plate, so as to reduce the thickness thereof, and is herein illustrated and described as used in one stage of the manufacture of sprocket-wheels for velocipedes and the like for the purpose of forming therein a circular recess, and thereby giving a dished shape thereto.

The invention consists in the matters hereinafter described, and set forth in the accompanying claims.

Figure 1 is a side elevation of a machine embodying my invention. Fig. 2 is a top plan view thereof. Fig. 3 is a central longitudinal section of the same. Fig. 4 is an end view of the machine. Fig. 5 is a cross-sectional view taken on line 5 5 of Fig. 2 looking in the direction indicated by the arrows. Fig. 6 is a cross-sectional view taken on line 6 6 of Fig. 2 and looking in the direction indicated by the arrows. Fig. 7 is a face view of the chuck-disk of the machine, showing a metal plate mounted thereon and the action of the cutting-tool on the plate. Fig. 8 is a cross-section of said chuck-disk, taken on line 8 8 of Fig. 7. Fig. 9 is a detail section taken on line 9 9 of Fig. 3. Fig. 10 is a top plan view of the tool-holding devices. Fig. 11 is a detail section of the same, taken on line 11 11 thereof.

As shown in said drawings, A indicates a hollow base-casting, which is of oblong rectangular shape, and A′ a hollow supporting-casting, which rests upon said base-casting A and immediately supports the working parts of the machine. Said casting A′ is secured to the base-casting by means of bolts and projects beyond or overhangs said base-casting at the end thereof which will hereinafter be termed the "front" end. Said supporting-casting is provided with an elevated rear part on which are mounted the driving parts of the machine, while upon the lower front part are mounted the tool carrying and actuating parts of the device.

B designates the main shaft of the machine, which is mounted longitudinally thereof upon the rear end of the upper portion of the casting A′ in journal-bearings A^2 A^3, located adjacent to the forward and rearward ends of said upper portion and provided with caps A^4 A^5 and with tubular bearing-sleeves A^6 A^7, provided with flanges at their ends to hold them from endwise movement in the bearings. The forward end of the main shaft or that engaging the bearing-block A^2 is preferably made of greater diameter than the rear end thereof to resist the lateral or flexing strains coming thereon in the operation of the machine, as will hereinafter more fully appear, so that said bearing A^3, as shown, is made of a greater diameter than the bearing A^2. This construction gives to the shaft in the part thereof between said bearing-blocks a tapered shape, as clearly seen in the drawings. Said shaft B is prevented from moving in its bearings toward the forward end of the machine by means of check-nuts *b*, which are engaged with a screw-threaded portion of the shaft at the rear of the bearing A^3 and bear against the rear end of the latter. The shaft will be provided with a thrust-bearing to receive the backward thrust thereof in the operation of the machine, as will hereinafter more fully appear.

C designates a counter-shaft, which is mounted upon the rear portion of the casting A, with its axis of rotation parallel with the axis of rotation of the shaft B. Said shaft is herein shown as located below the level of said shaft B in bearings A^8 A^9, formed by means of integral brackets on the side of said casting A′ and provided with removable caps *a a′*. Said shaft C extends at its rear end beyond the supporting-casting A′, and affixed to its rear end is a large gear-wheel C′. Said gear-wheel C′ meshes with and receives motion from a smaller gear-pinion B′, which is mounted upon and rigidly attached to a short sleeve B^2, which latter is rotatively mounted upon a rearwardly extending portion B^3 of the shaft B, said sleeve being secured upon the shaft from endwise movement between

shoulders formed by the check-nut b and a washer b^2, which is secured to the shaft by a nut b', having screw-threaded engagement with the extreme end of the shaft. A rotary motion is imparted to the sleeve B^2 by means of a cone-pulley B^4, which is mounted on the sleeve B^2 between said check-nut b' and the washer b^2, said cone-pulley being held non-rotatively upon the sleeve by means of a key or spline b^7, as shown in dotted lines in Fig. 3. Said cone is shown as provided with three working faces each having a different radius. Said counter-shaft C extends at its forward end slightly beyond the forward end of the upper plane of the supporting-casting and is provided on said forward end with a small gear-wheel C^2, Fig. 5, which meshes with and gives motion to a large gear-wheel D, mounted rigidly on the forward end of the main shaft B. Said wheel D is shown more clearly in Fig. 3 and comprises a central portion or hub D', a marginal rearwardly-extending flange D^2, upon the periphery of which gear-teeth are formed, and radial stiffening-flanges D^3, which extend from the rim to the central hub D'. Said wheel is provided with a central circular opening, through which the forward end of the shaft B projects. Said shaft is provided adjacent to its end with a radial flange B^5 of considerable thickness, which engages an annular concentric recess in the inner face of the hub D' of the wheel D, and said wheel is secured to the shaft by means of tap bolts or screws b^3, which pass through said wheel and the flanges B^5. Said screws b^3 are countersunk in the outer face of the wheel, so that their heads are flush therewith. Said gear-wheels D and C^2 are herein shown as provided with a gear-casing D^5, which is secured to the supporting-casting in any suitable manner and which serves to protect the said parts from dust and cuttings. Said wheel D is employed to carry the chuck by which the plate to be operated upon is centered and held, as will hereinafter more fully appear.

With the construction described it will be seen that when power is applied to rotate the pulley B^4 said power will be transmitted through the sleeve B^2 and pinion B' to the gear-wheel C' and thence through the counter-shaft C to the small gear-wheel C^2, which meshes with and drives the wheel D, secured to the forward end of the shaft B. Said shaft B serves, therefore, as a bearing-shaft only for the wheel D to receive the lateral thrust brought thereon by the tool in the operation of the machine and has no part in driving said wheel or the devices carried thereby, the shaft being of relatively large diameter to give it stiffness and prevent flexure or bending thereof under the pressure of the cutting-tool against the work. It is also obvious that by the construction illustrated the initial speed given to the pulley B^4 will be greatly reduced before reaching the wheel D and the chuck carried thereby, so that the rotary speed of said chuck is comparatively slow, while at the same time permitting the power to be taken from an overhead counter-shaft having a rotative speed such as is usual in machine-shops.

The shaft B is provided between its ends with a thrust-bearing of a common type, which serves to take up the longitudinal thrust transmitted thereby from the wheel carrying the chuck. These parts are constructed as follows:

B^6, Fig. 3, designates a radially-extending ring or annular flange mounted upon or formed integral with the shaft B. Said flange is located upon the shaft in front of the bearing A^3, and upon said shaft between the flange and bearing are arranged a plurality of annular rings b^5, which fill the spaces between the same. Said rings, as usual in such constructions, are made alternately of soft and hard metal—as, for instance, of steel and brass—so as to lessen the wear between the parts forming the bearing. In order to provide means for lubricating said bearing-rings, said bearing is provided with an oil-receptacle, which in the instance shown consists of a cylindric cup or pan B^7, mounted under and embracing the lower portions of said rings, so that when the receptacle is filled with oil the lower edges of said rings are immersed therein. Said receptacle is secured to the bearing A^3 by being provided on the rear end thereof with a ring B^8, which embraces the shaft and is secured to the end of the adjacent bearing-sleeve A^6 of the bearing A^3 by means of screws which pass through the receptacle and into said bearing-sleeve. Said screws are countersunk in the outer face of said ring, so as to give the latter a flat bearing-surface, against which rests the end ring of the several bearing-rings. In order to prevent the oil from escaping from the receptacle past the flange B^6, said receptacle is provided with a stuffing-box B^9 of common form, said stuffing-box being provided in its forward end with a ring which encircles the flange B^6 and forms one of the members of said stuffing-box.

The chuck herein shown consists of a disk E, which is provided with a flat front face and is secured to the front face of the wheel D by means affording rigid engagement therewith. As herein shown, said chuck-disk is provided in its rear face with a concentric annular recess within which the extreme forward end of the shaft B extends when the disk is in place upon the wheel, said shaft projecting beyond the wheel and serving as a means for centering the disk. As an additional means for securing the disk from movement with relation to the axis of rotation of the wheel, said wheel is provided in its outer face with a forwardly-extending annular flange D^6, which interfits with an annular rabbet D^2 in the rear face of the disk. Said chuck-disk is rigidly secured to the wheel by means of bolts e, which pass through the wheel from the rear thereof and have screw-

threaded engagement with the disk. The disk is provided centrally on its outer face with a centering-stud E^3, which engages a central aperture in the plate or blank X to be operated upon and serves to center the same. The plate X is held upon the chuck-disk by means of holding-studs E^4, which are affixed to and project from the outer face of said disk and are provided with laterally-projecting heads which engage the outer face of the blank, so as to hold the same closely against the flat front face of the disk. As herein shown, said studs are screw-threaded apertures of the outer face of said disk. Said studs E^4 are located upon opposite sides of the center of the disk, as more clearly seen in Fig. 7, and are adapted to engage projecting parts of the blank to be operated upon, which will be of other than circular shape. When the blank is square, the said studs will engage the diagonally opposite corners thereof, the distance between said corners being greater than the distance between the holding-studs, which latter will be arranged at a distance from the center of the chuck greater than the smallest but less than the largest radius of said plate. The corners of the blank which engage said studs are located in advance of the studs with relation to the direction of rotation of the disk, so that when the disk is rotated and the cutting-tool applied to the plate the movement of the disk serves to tighten the grip of the bolts upon the blank and to hold the latter more firmly in place. In order that said action of the chuck-disk will tend to hold or clamp the plate firmly against the same, the inner sides of the heads of said bolts are made of conical form, as clearly seen in Fig. 8, thereby giving to the same a wedge-like action against the edges of said plate. With this construction the plate will be held or pressed firmly against the flat face of the chuck-disk, so that there will be no tendency in the plate to spring or give under the pressure of the cutting-tool thereon.

Referring now to the means for holding and manipulating the cutting-tool, F designates a tool-carriage, which is generally of rectangular shape and is mounted longitudinally of the machine upon the lower part of the supporting-casting A′, as clearly shown in Figs. 1 and 3 of the drawings. Said carriage is mounted to have longitudinally-sliding movement upon the casting A′, so as to be movable toward and from the chuck E. For this purpose the carriage is provided at its bottom with two lateral guide-grooves *f f*, which engage laterally-extending guide-flanges a^2 a^2, which project from the opposite sides of the said casting A′, at the top of the latter. Upon said tool-carriage is mounted a tool-holding block F′, which is inclined on its upper surface and is of less width than said carriage and constructed to have lateral adjustment thereon. Said block is herein shown of right-angle triangular shape, as seen in side view, with the higher portion thereof adjacent to the chuck-disk E and of a height when mounted upon said carriage to extend to a point near the level of the center of said disk. As herein shown, said block is movably secured upon the carriage by means of bolts *f′*, which pass therethrough and engage at their headed or lower ends with transverse T slots or grooves f^2 in the carriage F. Said bolts pass through the block F′ and are provided on their upper ends with nuts, by means of which the block may be rigidly clamped to the carriage in a familiar manner.

F^2 designates a cutting-tool which is mounted upon the inclined top surfaces of the tool-block F′, with its cutting edge closely adjacent to the chuck-disk E and approximately in the same horizontal plane with the center of the disk. The cutting-tool consists of a flat thin plate of a width equal approximately to the radius of the surface to be cut on the plate or blank, the tool being intended to make a cut or take a shaving equal in width to the distance from the center hole of the blank to the outer margin of the surface acted upon by the cutter. Said tool is secured upon said block by means of a clamping-bolt f^3, which engages at its lower headed end a transverse T slot or groove f^4 in the block and passes upwardly through the block and tool and through a clamping-plate F^3 upon the upper surface thereof and is provided on its outer end with a nut, by means of which said tool may be rigidly clamped in place. Said tool is provided with a slot f^5, which extends longitudinally thereof, by means of which it may be adjusted toward and from the chuck-disk as the thickness of the blank operated upon or the wearing away of the knife requires. As herein shown, the block F′ is provided in its upper face with a circular opening f^6, which opens into the slot f^4, by means of which the head of the bolt F^3 may be engaged with or disengaged from said slot. In order to additionally secure the tool from lateral movement upon the block, said block is provided on its opposite upper sides with ribs or flanges f^7 f^8, between which the tool is located. Said tool is adapted to rest when in operative position against one of said ribs, as herein shown the rib F^8, and the opposite rib is provided with a transverse aperture which is screw-threaded and engaged by a screw-threaded bolt f^9, which latter engages at its inner end the side of the tool opposite that engaged by the rib F^8. Said block is also provided with an adjusting-screw F^4, which is arranged longitudinally thereof and has screw-threaded engagement with an apertured lug F^5 at the base of said block in such manner as to act at its inner end upon the rear end of the knife, so that said bolt F^4 not only serves as a means of adjusting the tool toward and from the chuck-disk E, but also tends to hold it in said adjusted position.

Referring now to the means by which the tool-carriage is operated to feed the tool to-

ward the disk and withdraw it therefrom, said parts are constructed as follows:

G designates the carriage-actuating shaft, which is arranged longitudinally of the machine in a horizontal position and engages at its inner end an aperture in the forward end of the carriage F, being held therein by means of a nut *g*. Said shaft is screw-threaded in the greater part of its length between its ends and has screw-threaded engagement with a standard H, which is shown as located near the forward end of the casting A'. Said shaft acts when rotated to move the carriage back and forth upon the supporting-casting A'. Said standard is herein shown as made separate from the supporting-casting and as secured thereto by means of bolts *h*, which pass therethrough and into the casting A'. Said standard will preferably be provided with an inner bearing-sleeve H', which is rigidly secured therein and has screw-threaded engagement with the shaft. Said bearing-sleeve H' will preferably be made of a metal softer than the shaft, so that the wear between the parts will be taken wholly by the sleeve, which will be made removable and may be renewed from time to time. Said sleeve is provided in its inner end with an annular radially-extending flange *h'*, which fits within an annular rabbet in the inner face of said standard and which serves to hold the sleeve from endwise movement within the standard under the thrust of said shaft when the tool is engaged with the plate X and is acting thereon to cut the same. Said bearing is provided on its opposite end with a flange h^2, similar to the flange *h'*, but is made removable therefrom for convenience in inserting the bearing into the standard. The shaft G is provided, when it engages the carriage F, with a thrust-bearing to take the forward thrust of said carriage, said parts being made as follows: G' designates an annular flange on said shaft located outside of the carriage F. Surrounding the shaft between the said flange and the adjacent face of the carriage are a plurality of bearing-rings G^2, said rings preferably being made of two different metals and arranged alternately. Said bearing is provided with an oil-receptacle G^3, as shown in Fig. 3, by means of which a lubricant may be applied thereto. The shaft G is rotated to operate the carriage by means of a plurality of radially-extending spokes or arms G^4.

As a further improvement means are provided for setting the actuating devices of the carriage so as to automatically stop said carriage when the plate X is cut to a predetermined depth. These parts are constructed as follows:

I designates a stop, which is herein shown as consisting of a cylindrical rod and is mounted in an aperture in an upwardly-extending part of the standard H and is arranged parallel with the shaft G. Said stop has longitudinal movement within said standard from front to rear of the machine for the purpose of adjustment and is adapted to be held in its adjusted position by means of set-screws h^3, which pass through the upper part of the standard and are engaged at their inner ends with said rod.

J designates a detent or coöperating stop which is rigidly attached to the shaft G outside of the standard H and rotates with said shaft. Said stop or detent J is located at such distance from the center of the shaft that it will strike the stop I when carried inwardly or forwardly toward said stop. It will come in contact therewith and coöperate with the same to prevent further rotation of the shaft and further feeding of the tool toward the chuck. As herein shown, said stop or detent J is carried by a friction-collar J', which is provided with a radially-extending finger J^2, within which the stop or detent J is mounted. Said collar J' is provided with a clamping-screw *j*, which passes through the meeting ends of the collar and by means of which the collar may be clamped rigidly upon the shaft. With this construction it will be seen that the shaft G may be stopped at any point in its rotation by adjusting the collar thereon to different angular positions on the shaft. The adjacent faces or ends of the stops will preferably have interfitting connection when in contact with each other, as more clearly shown in Fig. 2. As herein shown, the adjacent sides of the ends of the stops are cut away to the vertical plane of the axis thereof, so as to provide flat contacting surfaces therein.

The operation of the machine will be obvious from the foregoing description, but may be briefly stated as follows: The square plate or blank to be operated upon will be placed upon the chuck in the manner shown in Fig. 7, with the holding-studs E^4 of said chuck-disk engaging the opposite edges of the plate near the diagonally opposite corners thereof. The shaft G will then be rotated to move the carriage F and the tool carried thereby toward the plate until the cutting edge of said tool is in contact with said plate. Said tool, as before stated, is of such width as to extend from the central aperture of the plate to the outer circumference of the recess to be cut, and the tool is mounted in such manner as to engage the plate at one side of the center thereof, as indicated in said Fig. 7 and also Fig. 2. Said disk will be rotated in a direction toward that side of the disk upon which the knife acts upon the plate, so that when power is applied to the pulley B^4 to rotate said shaft and disk the action of the knife upon said plate will tend to drive the plate into closer contact with the holding-studs and to thereby hold the same more firmly upon the disk. The cutting-tool being arranged at an angle with the horizontal axis of the disk acts to cut the material from the plate in thin cuttings or shavings, as usual in such tools. The stop I will be adjusted toward and from

the stop J, so as to come in contact with the same when the shaft and carriage F, connected therewith, have been moved a predetermined distance toward the disk and the blank carried thereby. It will be seen, however, that with the adjustment of the stop I alone the movement of the carriage and tool carried thereby can be controlled only within the limits of a full rotation of the shaft G. To secure a more accurate adjustment, the stop J will be adjusted angularly by turning the collar J′ upon the shaft, thereby limiting the movement of the carriage and tool at any point in the rotation of the shaft. The stop I and sleeve J may be provided with suitable graduations, determined by previous experiments, by which the advance movement of the tool may be accurately limited.

I claim as my invention—

1. A machine for facing thin blanks comprising a rotative disk having a flat supporting-surface against which the blank is placed, said disk being provided with a centering-stud concentric to the axis of the disk and with a holding-stud adapted to engage a projecting part of the blank, and a cutting-tool which is movable toward and from the face of said disk and is advanced toward the disk in cutting; said tool having a broad cutting edge arranged radially with respect to the disk at one side of said centering-stud.

2. A machine for facing thin blanks comprising a rotative disk having a flat supporting-surface against which the blank is placed, said disk being provided with a centering-stud concentric to the axis of the disk and with a holding-stud adapted to engage a projecting part of the blank, and a cutting-tool which is movable toward and from the face of said disk and is advanced toward the disk in cutting; said tool having a broad cutting edge arranged radially with respect to the disk at one side of said supporting-stud, said disk being provided with a plurality of holes at different distances from its center, in either of which the holding-stud may be inserted.

3. A machine for facing thin blanks comprising a rotative disk having a flat supporting-surface against which the blank is placed, said disk being provided with a centering-stud concentric to the axis of the disk and with a holding-stud adapted to engage a projecting part of the blank, and a cutting-tool which is movable toward and from the face of said disk and is advanced toward the disk in cutting; said tool having a broad cutting edge arranged radially with respect to the disk at one side of said centering-stud, said holding-stud being provided with a head which is inclined on its inner face to clamp the margin of the blank against the disk.

4. A machine for facing thin blanks comprising a rotative disk having a flat supporting-surface against which the blank is placed, said disk being provided with a centering-stud concentric with the axis of the shaft and with a holding-stud adapted to engage a projecting part of the blank, and a cutting-tool which is movable toward and from the face of said disk and is advanced toward the disk in cutting; said tool having a broad cutting edge arranged radially with respect to the disk at one side of said supporting-stud, and an adjustable stop for limiting the approach of the cutting-tool toward the face of the disk.

5. A machine for facing thin blanks comprising a rotative disk having a flat supporting-surface against which the blank is placed, said disk being provided with a centering-stud concentric with the axis of rotation of the disk and with a plurality of holding-studs arranged at equal distances from the center of the disk and in diametrically opposite relation to each other, and a cutting-tool movable toward and from the face of said disk and which is advanced toward the disk in cutting; said tool having a wide cutting edge arranged radially with respect to the center of the disk and at one side of said centering-stud.

6. A machine for facing thin blanks comprising a rotative disk having a flat supporting-surface against which the blank is placed, said disk being provided with a centering-stud concentric with the axis of rotation of the disk and with a plurality of holding-studs arranged at equal distances from the center of the disk and in diametrically opposite relation to each other, and a cutting-tool movable toward and from the face of said disk and which is advanced toward the disk in cutting said tool having a wide cutting edge arranged radially with respect to the center of the disk and at one side of said centering-stud, said holding-studs having heads provided with inclined inner surfaces which engage the margin of the plate to clamp the same closely against the face of the disk.

7. A machine of the character described comprising a supporting-frame, a shaft mounted therein, a disk attached to the shaft and provided with a flat supporting-surface against which the blank is placed, said disk being provided with a centering-stud and with a holding-stud adapted to engage a projecting part of the blank, a tool-holder movable on the frame toward and from the face of the disk at one side of the central axis thereof, said tool-holder having an inclined tool-supporting surface, and a cutting-tool mounted on said holder and having a broad cutting edge arranged radially with respect to the central axis of the disk.

8. A machine of the character described comprising a supporting-frame, a shaft mounted therein, a disk attached to the shaft and provided with a flat supporting-surface against which the blank is placed, said disk being provided with a centering-stud and with a holding-stud adapted to engage a projecting part of the blank, a tool-holder movable on the frame toward and from the face of the disk at one side of the central axis thereof,

said tool-holder having an inclined tool-supporting surface, a cutting-tool mounted on said holder and having a broad cutting edge arranged radially with respect to the central axis of the disk, and a carriage on which said tool-holder is mounted, said tool-holder being movable laterally upon the carriage.

9. In a machine of the character described, the combination with a machine-frame of a rotative disk having a flat face against which the blank is placed and provided with a centering-pin and holding-stud, a tool-carriage movably mounted on said frame and movable toward and from the face of the disk, a cutting-tool mounted on said carriage, means for moving said carriage toward and from the face of the disk comprising a rotative screw-threaded shaft engaged with said carriage and having screw-threaded engagement with said frame, and an adjustable stop for limiting the rotative movement of said shaft.

10. In a machine of the character described, the combination with a machine-frame, of a rotative disk having a flat face against which the blank is placed and provided with a centering-pin and holding-stud, a tool-carriage movably mounted on said frame and movable toward and from the face of the disk, a cutting-tool mounted on said carriage, means for moving said carriage toward and from the face of the disk comprising a rotative screw-threaded shaft engaged with said carriage and having screw-threaded engagement with said frame, and an adjustable stop for limiting the rotative movement of said shaft, and a thrust-bearing comprising a plurality of loose bearing-links mounted on the shaft.

11. In a machine of the character described, the combination of a supporting-frame, a rotative chuck-disk mounted therein, a tool-carriage movable toward and from the face of said disk, a cutting-tool mounted on said carriage, means for moving said carriage toward and from the disk, a rotative shaft connected at one end with said carriage and passing through and having screw-threaded engagement with a part upon the frame, means for limiting the rotation of said shaft comprising a longitudinally-adjustable rod mounted in said frame parallel with said shaft, and a stop or detent rigidly attached to said shaft and adapted to engage said rod.

12. In a machine of the character described, the combination of a supporting-frame, a rotative chuck-disk mounted therein, a tool-carriage movable on said frame, toward and from said disk, a cutting-tool mounted on said carriage, means for moving said carriage toward and from the disk, a rotative shaft connected at one end with said carriage and passing through and having screw-threaded engagement with a part of the frame, and a stop for limiting the rotation of said shaft comprising an endwise-adjustable rod arranged parallel with the said shaft, and a stop or detent adjustably mounted on said shaft and having angular adjustment in a plane perpendicular to the axis thereof.

13. In a machine of the character described, the combination of a supporting-frame, a rotative chuck-disk mounted thereon, a tool-carriage which is movable toward and from said disk, a cutting-tool mounted on said carriage, and means for moving said carriage toward and from the disk comprising a rotative screw-threaded shaft engaging said carriage and having screw-threaded engagement with said frame, and means for limiting the rotation of the shaft comprising a collar surrounding said shaft outside of said casting and provided with a stop-arm, means for clamping said collar on the shaft, and a stop on said frame adapted to engage and coöperate with said stop-arm on the collar.

14. In a machine of the character described, the combination of a supporting-frame, a rotative chuck-disk mounted therein, a tool-carriage which is movable toward and from said disk, a cutting-tool mounted on said carriage, means for moving said carriage toward and from the disk comprising a rotative, screw-threaded shaft engaging said carriage and having screw-threaded engagement with said frame, and means for limiting the rotation thereof of said shaft comprising a split clamping-ring mounted on said shaft and provided with a stop-arm, means for clamping the ring on the shaft, and a stop on said frame adapted to engage and coöperate with said stop-arm on the shaft.

15. In a machine of the character described, the combination of a supporting-frame, a rotative shaft mounted therein, a gear-wheel mounted on one end thereof, a counter-shaft, operative connections between said counter-shaft and gear-wheel, means for driving said counter-shaft, a chuck-disk mounted on said gear-wheel and a cutting-tool mounted on said casting and adapted to coöperate with said disk.

16. In a machine of the character described, the combination of a supporting-frame, a shaft mounted therein and provided at one end with a gear-wheel and at its opposite end with a loose rotative sleeve, a counter-shaft, operative connection between one end of said counter-shaft and the sleeve, operative connections between said opposite end of said counter-shaft and the gear-wheel, a chuck-disk attached to the face of said gear-wheel, and a cutting-tool mounted on the frame and adapted to coöperate with said disk.

17. In a machine of the character described, the combination of a supporting-frame, a shaft mounted therein and provided on one end with a gear-wheel and on its opposite end with a loose rotative sleeve, a gear-pinion on said sleeve, a counter-shaft mounted on said casting parallel with said bearing-shaft, a gear-wheel on said counter-shaft adapted to mesh with the gear-pinion of said sleeve, a gear-wheel on the opposite end of said coun-

ter-shaft adapted to mesh with said gear-wheel of the bearing-shaft, a chuck-disk attached to the face of said gear-wheel on the shaft, and a cutting-tool mounted on said frame and adapted to coöperate with said disk.

18. In a machine of the character described, the combination of a shaft provided on its forward end with a gear-wheel and on its rear end with a loose sleeve, a gear-pinion on said sleeve, a counter-shaft mounted in said casting parallel with said bearing-shaft, a gear-wheel on one end of said shaft adapted to mesh with the gear-pinion of the sleeve and operatively connected at its opposite end with said gear-wheel of the bearing-shaft, means for rotating said sleeve, a thrust-bearing between said shaft and the supporting-frame, a chuck-disk attached to the face of said gear-wheel, and a cutting-tool mounted on the casting and adapted to coöperate with said disk.

19. In a machine of the character described, the combination of a supporting-frame, a shaft mounted therein and provided adjacent to its forward end with an annular flange, a gear-wheel provided with a central opening and with an inwardly-extending annular flange adapted to be secured to said flange of the shaft, a chuck-disk mounted on said wheel and provided with a marginal rabbet, an annular flange on said wheel engaging said rabbet of the disk, a bolt passing through said wheel and having screw-threaded engagement with said disk, and a cutting-tool mounted on said frame and adapted to coöperate with said disk.

20. In a machine of the character described, the combination of a supporting-frame provided with two shaft-bearings, a shaft rotatively mounted therein, a gear-wheel on the forward end of said shaft, a thrust-bearing between said shaft and one of said bearings to receive the backward endwise thrust of said shaft, a chuck-disk attached to the face of said wheel, and a cutting-tool mounted on the frame and adapted to coöperate with said disk.

21. In a machine of the character described, the combination of a supporting-frame provided with two shaft-bearings, a shaft rotatively mounted therein, a gear-wheel on the forward end of said shaft, a shoulder on said shaft in front of the rear bearing, a thrust-bearing between said shoulder and bearing, a chuck-disk attached to the face of said wheel, and a cutting-tool mounted on the frame and adapted to coöperate with said disk.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 27th day of October, A. D. 1897.

WILLIAM H. FAUBER.

Witnesses:

C. CLARENCE POOLE,

R. CUTHBERT VIVIAN.