No. 767,678. PATENTED AUG. 16, 1904.

C. W. BARNABY.

LATHE CHUCK.

APPLICATION FILED APR. 19, 1902.

NO MODEL.

Fig.1

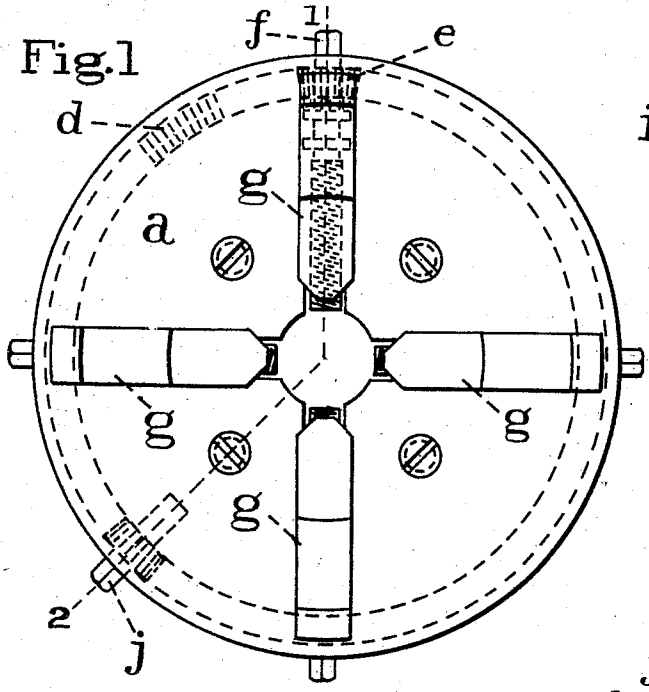


Fig2

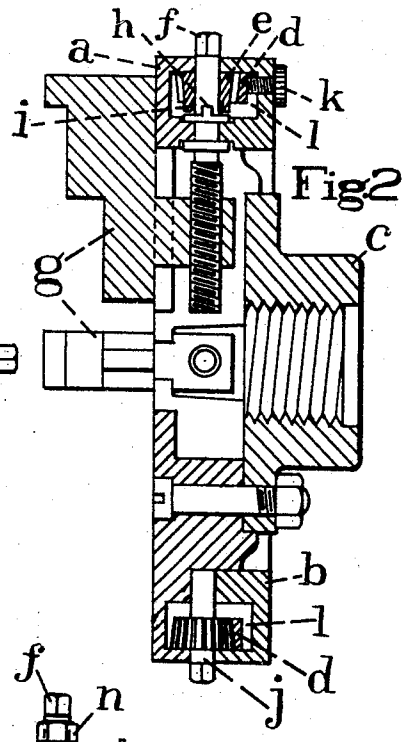


Fig.4

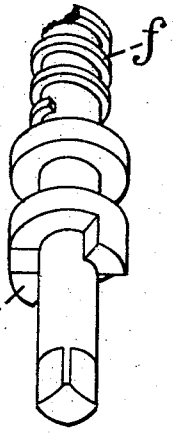


Fig.5

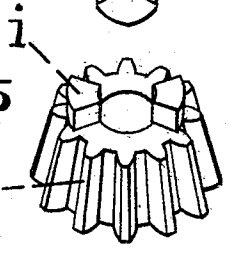
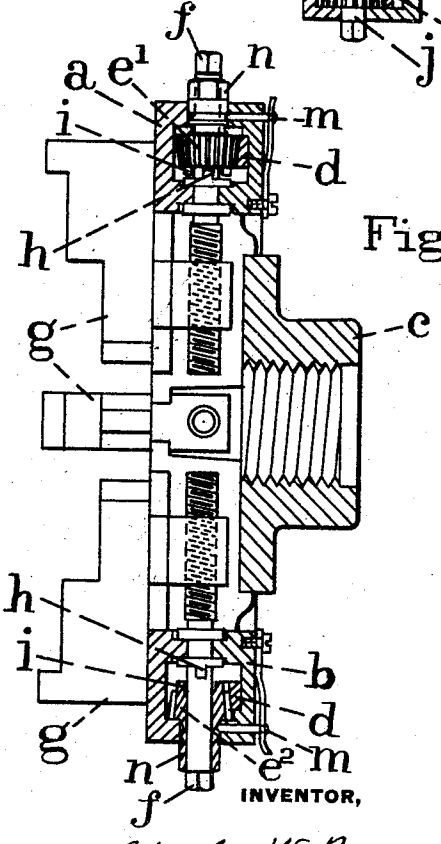


Fig.3



WITNESSES:

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No. 767,678. Patented August 16, 1904.

UNITED STATES PATENT OFFICE.

CHARLES W. BARNABY, OF NEW YORK, N. Y.

LATHE-CHUCK.

SPECIFICATION forming part of Letters Patent No. 767,678, dated August 16, 1904.

Application filed April 19, 1902. Serial No. 103,820. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. BARNABY, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Chucks, of which the following is a specification.

The object of my invention is to facilitate the operation of gripping work in geared screw-chucks of the type generally known as "universal" and "combination" chucks; and to this end my invention consists, first, in the provision of a secondary independent gripping adjustment in combination with the usual universal movement as a primary gripping adjustment, and, second, in the provision of means of throwing one or more of the jaw-operating screws out of engagement with the universal connections to admit of the chuck being used part independent and part universal, as well as wholly independent or wholly universal, as in the ordinary construction.

In the application of my invention I prefer to secure the primary or simultaneous movement of the jaw-screws through the application of a circular rack engaging with a pinion on each screw, in accordance with the usual practice. The secondary or independent movement is preferably secured by means of a lost-motion jaw-clutch connection of each pinion with its screw. By providing means for throwing these clutches in and out of engagement one or more of the chuck-screws can be thrown out of connection with the universal mechanism and the remaining screws operated in unison.

The application of my invention is exemplified in the drawings on the accompanying sheet.

Figure 1 is a front view of a chuck embodying some features of my improvement. Fig. 2 is a sectional view taken on line 1 2 of Fig. 1. Fig. 3 is a central sectional view showing a modification in the application of my improvement from that shown in Figs. 1 and 2. Figs. 4 and 5 show the clutch-jaws on the shank of the screws and pinions.

Artisans who have operated universal geared screw-chucks understand that owing to the high percentage of friction of the mechanism the first grip, obtained by applying the maximum permissible force to one screw, is very weak and inadequate to withstand the stress of ordinary tooling operations upon the work held. It has therefore been necessary, prior to my invention, to apply the chuck-wrench to each screw successively, taking up the slight amount allowed by the clearance in the gear-teeth at each application until after going around the chuck many times the required degree of tightness is secured. When it is desired to remove the work from the chuck, it is again necessary to go around the chuck many times, loosening each screw in succession to the slight degree permitted by the gear-teeth clearance before the resistance of the combination is brought down to a point that will allow the screws to all respond to the force applied to one screw without destructive effects on the wearing-surfaces of the pinions and racks.

In the accompanying drawings similar letters refer to similar parts throughout the several views, *a* being the body, *b* the back covering-ring, *c* the face-plate by means of which the chuck is secured to the lathe, *d* the circular rack, *e e' e²* the pinions, *f* the screws, and *g* the jaws of the chuck. The clutch-jaws *h* on the shank of the screws engage with jaws *i* on the pinions. The clutch-jaws on each piece being much narrower than the corresponding recesses in the other gives a considerable fraction of a revolution's lost motion between the two parts.

Referring to Figs. 1 and 2, the operation of the chuck is as follows: The circular rack being in mesh with the several pinions *j e* is made to rotate by the application of a suitable wrench to the square shank of the pinion *j*. As a result all of the pinions are rotated in unison, which motion is obviously transmitted to the screws *f* and the chuck-jaws *g* caused to advance in unison to clamp the work in the chuck. This first grip is necessarily comparatively weak, as explained above. The wrench is therefore applied to each of the screws *f* in succession, the about one-quarter of a turn lost motion between the clutch-jaws *h i* of screws and pinions giving sufficient range of movement for each screw to permit

the chuck to be set up to rigidly grip the work by the application of the wrench to each of the screws *f* but once, thus saving the large expenditure of time required to tighten and loosen the grip of chucks of the usual type. This secondary adjustment has the further advantage in chucks of four or more jaws of allowing each of the jaws to be set up more or less to conform with slightly "out-of-round" work, thus giving a uniformity and rigidity of grip which is not obtainable in the ordinary universal chucks.

The rack-operating pinion *j*, Figs. 1 and 2, may be dispensed with, if desired, and one or more of the pinions *e* provided with a sleeve extending outside of the body of the chuck and shaped to be operated by a suitable wrench, as indicated at *n*, Fig. 3, when it will obviously fill the place of pinion *j*.

When it is desired to use the chuck as an independent jawed chuck, the circular rack may be thrown out of mesh with the pinions by dropping it back into the recess *l*, as is the present practice, screws *k*, Fig. 2, cams, or other devices being provided to throw the rack into or allow it move out of mesh with the pinions. It is obvious that with this method it is only practicable to use the chuck wholly universal or wholly independent.

The application of my invention exemplified in Fig. 3 permits any one or more screws to be thrown out of connection with the pinion-and-rack motion, while the remaining screws are still connected with and operated in unison by the rack. This is accomplished by providing for throwing out of engagement the clutch by which the pinion operates the screw, sufficient latitude of movement of the pinion along the shank of the screw being provided for to admit of the clutch-jaws being in engagement, as at e', or out of engagement, as at e^2, a pin *m*, engaging in a groove in the sleeve of the pinion, holding the pinion in either position.

I am aware that prior to my invention geared screw universal chucks have been used. I therefore do not claim such device broadly.

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, in a chucking device, of a gear-driven pinion, a chuck-jaw-operating screw, and a lost-motion engaging device connecting said pinion with said screw, for the purpose specified.

2. In combination, a series of jaw-operating screws, gearing for simultaneous rotation of said screws and a series of lost-motion engaging devices, substantially as and for the purpose set forth.

3. The combination of a mechanism for simultaneously operating the gripping-jaws, a series of lost-motion engaging devices in said mechanism and a device for disengaging one or more of the jaws from the simultaneously-operating mechanism, substantially as specified.

4. In combination, in a chucking device, a series of jaw-operating screws, each provided with means of independent adjustment, a simultaneous-movement gearing system provided with its own means for operation, and a series of lost-motion engaging devices connecting said screws with said gearing system, whereby each screw may be adjusted directly; or all operated indirectly, in unison by movement applied to the gearing system, substantially as and for the purpose set forth.

5. The combination, in a lathe-chuck, of a series of jaw-operating screws, *f*, a series of pinions, *e*, in lost-motion engagement with said screws, a circular rack, *d*, for operating said pinions and a rack-operating pinion, *j*, substantially as shown and described.

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Witnesses:
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