Nov. 23, 1926. 1,608,463

W. M. CUTLER

CHUCK

Filed March 23, 1923 2 Sheets-Sheet 1

Fig. 2.

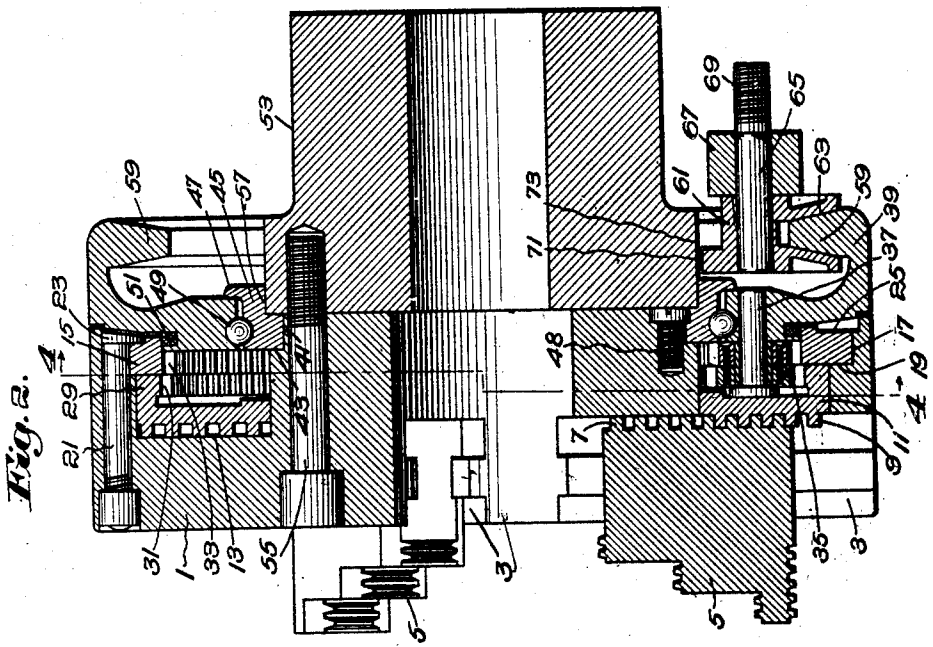
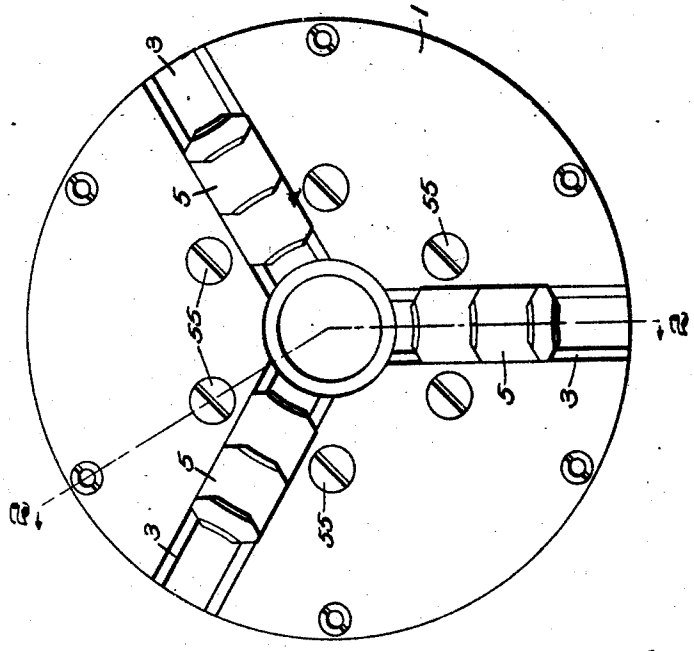


Fig. 1.



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Fig. 4.

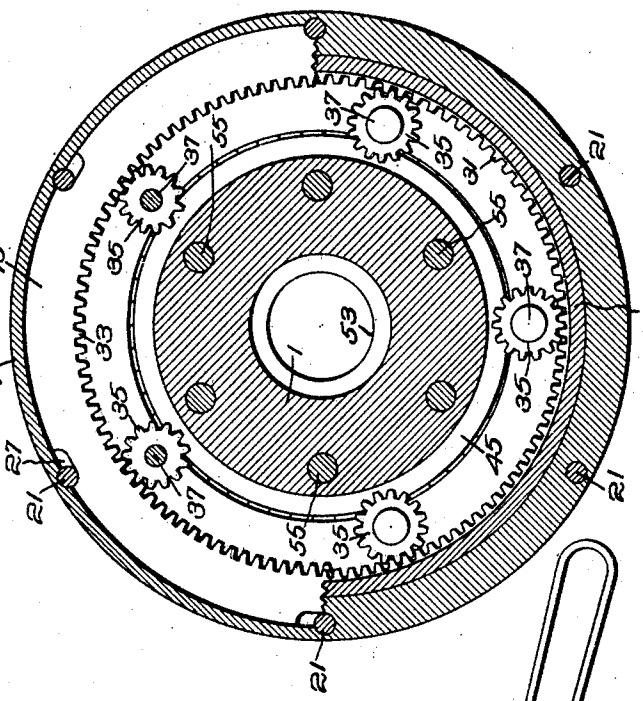
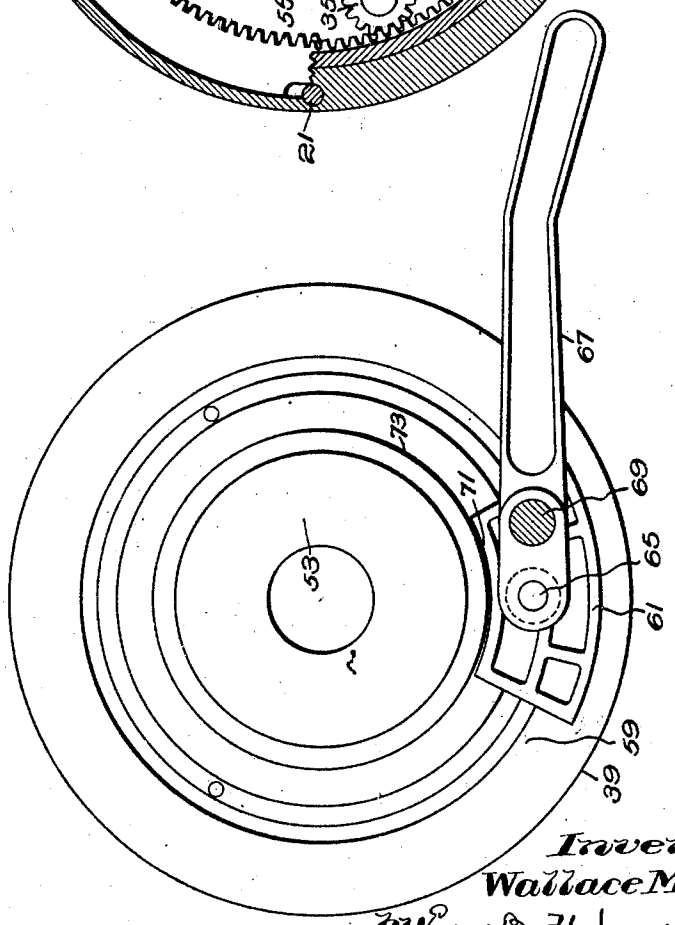


Fig. 3.



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Patented Nov. 23, 1926. 1,608,463

UNITED STATES PATENT OFFICE.

WALLACE M. CUTLER, OF WINDSOR LOCKS, CONNECTICUT, ASSIGNOR TO THE E. HORTON & SON COMPANY, OF WINDSOR LOCKS, CONNECTICUT, A CORPORATION OF CONNECTICUT.

CHUCK.

Application filed March 23, 1923. Serial No. 627,133.

My invention relates to chucks and has among its objects the provision of improved means for operating the jaws when the chuck is rotating and for permitting a hammer blow to be imparted to the jaws.

The invention will be best understood from the following description when read in the light of the accompanying drawings of an illustrative embodiment of my invention, while the scope of my invention will be more particularly pointed out in the appended claims.

In the drawings:—

Fig. 1 shows an elevation of the face of a chuck constructed according to my invention;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is a rear view of the chuck according to Figs. 1 and 2; and

Fig. 4 is a section on the line 4—4 of Fig. 2.

Referring to the drawings and to the preferred embodiment of my invention I have shown a chuck which comprises a body 1, the face of said body having the radially disposed slots 3 which are formed to provide guideways for the jaws 5, said jaws at their rearward sides having teeth 7 engaging the teeth 9 on the scroll wheel 11. It will be understood that by this construction when the scroll wheel is rotated the jaws will be moved radially relatively to the body to grip or release the work depending upon the direction of rotation of the scroll wheel.

As shown the rearward side of the body is provided with an annular recess 13 which intersects the slots 3. The scroll wheel is mounted for rotation relatively to the body in this recess and is retained therein by means of a ring 15, the rearward side of the recess 13 being enlarged at 17 to receive the outer circumferential portion of the ring and providing a shoulder 19 which the ring abuts. For holding the ring against the shoulder 19, I provide the bolts 21 which have heads 23 fitting the annular recess 25 on the rearward surface of the ring. As clearly shown in Fig. 4 the bolts 21 pass through notches 27 on the outer peripheral surface of the ring so as to permit a limited relative movement between the ring and the body.

Referring particularly to Figs. 2 and 4 the rearward side of the scroll ring is provided with an annular flange 29 having the internal gear teeth 31, while the ring 15 is provided with the internal gear teeth 33. The gear teeth on the scroll ring have a slightly greater pitch diameter than the gear teeth on the ring 15, and meshing with both sets of gear teeth are the differential pinions 35 which are rotatively mounted on pins 37 carried by a hand wheel 39.

It will be noted by the above construction that if the hand wheel is rotated relatively to the body of the chuck the differential pinions 35 will cause the scroll wheel to rotate relatively to the body, the direction of rotation of the scroll wheel depending upon the direction of rotation of the hand wheel. The lost motion between the ring 15 and the body permitted by the notches 27 allows by suddenly taking up the lost motion a "hammer blow" to be given to the jaws so as to cause them firmly to grip the work or readily to release the work.

The rearward side of the body adjacent the rearward side of the recess 13 is reduced in diameter at 41 affording the shoulder 43. On this portion of reduced diameter and abutting the shoulder is a ring 45 provided with the flange 47. The ring is secured to the body by means of one or more screws 48 and when so assembled with the body holds the hand wheel in position. The ring 45 provides a ball race for the balls 49 forming an anti-friction bearing for the hand wheel upon the ring.

The portion of the hand wheel adjacent the ring 15 is recessed to form an annular shoulder fitting the rear end of the inner side of the ring, and carried by the hand wheel is a packing 51 which acts to prevent leakage of lubricant contained in the chamber afforded by the flange 29 of the scroll wheel and by the ring 15.

The body is secured to a part 53 by means of the bolts 55, this part abutting the rearward side of the body and fitting an annular recess 57 formed by an enlargement at the rearward end of the bore of the ring 45.

For causing rotation of the ring 39 when the chuck is rotated and thereby moving the jaws to release the work or to grip the work as the case may be I provide the rearward end of the hand wheel with an internal flange 59 which in cross section is wedge

shaped tapering towards the axis of the chuck. I utilize the flange 59 as a brake surface, for this purpose providing the shoe 61 which has an arcuate recess 63 for engaging the sides of the flange. The shoe 61 is pivoted at 65 at the end of a hand lever 67, the latter being fulcrumed to a pivot pin 69 carried by a fixed part of the lathe.

The upper side of the brake shoe is concave as shown at 71 and normally is held by the weight of the lever against the exterior annular surface 73 of the part 53. This prevents tilting of the shoe on its pivot 65 and holds the outer side of the shoe in parallelism with the flange 59 which insures that the shoe will not accidentally engage the flange 59 and always will be in position effectively to engage the flange when the operator so desires. Further it will be noted that the surface 73 acts as a limit stop for the shoe and that by forcibly causing the shoe to engage the surface 73 a brake is provided for quickly stopping rotation of the chuck when it is disconnected from the source of power driving it.

Although I have described for purposes of illustration one specific embodiment of my invention it is to be understood that I am not limited thereby to its particular mechanical details, but that within the scope of my invention wide deviations may be made therefrom without departing from the spirit of my invention.

Claims—

1. A chuck comprising, in combination, a body, jaws carried by said body, a jaw operating part rotatable relatively to said body, means including a ring for actuating said part, said ring being rotatable relative to said body, said ring having a rearwardly extending annular flange the periphery of said flange being for application of the hand of the operator and an annular flange interiorly of said rearwardly extending flange, said annular flange being wedge shaped in cross-section, a brake shoe surrounded by said rearwardly extending flange and adapted to engage opposite surfaces of said annular flange, and means for operating said brake shoe.

2. A chuck comprising, in combination, a body, jaws carried by said body, a jaw operating part rotatable relatively to said body, means including a ring for actuating said part, said ring being rotatable relatively to said body, said ring having a rearwardly extending annular flange the periphery of said flange being for application of the hand of the operator and an annular flange interiorly of said rearwardly extending flange, and braking means for engaging opposite sides of said annular flange.

3. A chuck comprising, in combination, a body, jaws carried by said body, a jaw operating part rotatable relatively to said body, means including a hand wheel for actuating said part, said hand wheel being rotatable relatively to said body and having a rearwardly extending flange for application of the hand of the operator, an internal radial flange on said rearwardly extending flange of said hand wheel, and braking means for engaging said radial flange.

4. A chuck comprising, in combination, a body, jaws carried by said body, a jaw operating part rotatable relatively to said body, means including a ring for actuating said part, said ring being rotatable relatively to said body, said ring having a rearwardly extending annular flange the periphery of said flange being for application of the hand of the operator and an annular flange interiorly of said rearwardly extending flange, a brake shoe surrounded by said rearwardly extending flange and for engaging opposite sides of said annular flange, and a lever for operating said brake shoe.

5. A chuck comprising, in combination, a body, jaws carried by said body, a jaw operating part rotatable relatively to said body, means including a ring for actuating said part, said ring being rotatable relatively to said body, said ring having a rearwardly extending annular flange the periphery of said flange being for application of the hand of the operator and an annular flange interiorly of said rearwardly extending flange, a brake shoe surrounded by said rearwardly extending flange and having portions straddling said annular flange, and means for causing said portions to engage said annular flange.

6. A chuck comprising, in combination, a body, jaws radially movable relatively to said body, a scroll wheel for operating said jaws mounted in an annular recess in said body, a flange with internal gear teeth on said scroll wheel, a ring with internal gear teeth connected to said body and retaining said scroll wheel in said recess, a hand wheel carrying a differential pinion meshing with said gear teeth on said scroll wheel and said gear teeth on said ring, an internal flange on said hand wheel and a brake for engaging said flange.

7. A chuck comprising, in combination, a body, jaws radially movable relatively to said body, a scroll wheel for operating said jaws mounted in an annular recess in said body, a flange with internal gear teeth on said scroll wheel, a ring with internal gear teeth connected to said body and retaining said scroll wheel in said recess, said ring having a lost motion connection with said body, a hand wheel carrying a differential pinion meshing with said gear teeth on said scroll wheel and said gear teeth on said ring, an internal flange on said hand wheel and a brake for engaging said flange.

8. A chuck comprising, in combination, a

body, jaws radially movable relatively to said body, a scroll wheel for operating said jaws mounted in an annular recess in said body, a flange with internal gear teeth on said scroll wheel, a ring with internal gear teeth connected to said body and retaining said scroll wheel in said recess, said body at its rearward side having an exterior portion of reduced diameter affording a shoulder, a race way fitting said portion of reduced diameter and abutting said shoulder, a part to which said body is attached abutting said race way and said body, a hand wheel mounted on said race way, and differential pinion means carried by said hand wheel and meshing with said gear teeth on said scroll wheel and with said gear teeth on said ring.

9. A chuck comprising, in combination, a body, jaws radially movable relatively to said body, a scroll wheel for operating said jaws mounted in an annular recess in said body, a flange with internal gear teeth on said scroll wheel, a ring with internal gear teeth connected to said body and retaining said scroll wheel in said recess, said body at its rearward side having an exterior portion of reduced diameter affording a shoulder, a race way fitting said portions of reduced diameter and abutting said shoulder, a part to which said body is attached abutting said race way and said body, a hand wheel mounted on said race way, an exterior flange on said race way for retaining said hand wheel on said race way, and differential pinion means carried by said hand wheel and meshing with said gear teeth on said scroll wheel and with said gear teeth on said ring.

10. A chuck comprising, in combination, a body, jaws radially movable relatively to said body, a scroll wheel for operating said jaws mounted in an annular recess in said body, a flange with internal gear teeth on said scroll wheel, a ring with internal gear teeth connected to said body and retaining said scroll in said recess said body at its rearward side having an exterior portion of reduced diameter affording a shoulder, a race way fitting said portion of reduced diameter and abutting said shoulder, a part to which said body is attached abutting said race way and said body, a hand wheel mounted on said race way, a rearwardly extending flange on said hand wheel, a brake surrounded by and for engaging said flange, and differential pinion means carried by said hand wheel and meshing with said gear teeth on said scroll wheel and with said gear teeth on said ring.

11. A chuck having in combination, a body, jaws, a scroll wheel for moving said jaws, a part to which said body is attached, a race way 45 surrounding said body and part, a hand wheel having an internal flange 59, said hand wheel being carried by said race way, differential gearing connecting said scroll wheel and hand wheel, and a brake shoe 61 between and adapted to engage said part and said flange.

12. A chuck comprising, in combination, a body, jaws, a jaw operating part, gearing for moving said jaw operating part relatively to said body, means for actuating said gearing comprising an annular member rotatable relatively to said body but normally rotating with said body, a brake shoe for engaging said annular member, means affording a stop limiting the motion of said shoe when moved away from said annular member, and said shoe being pivoted to an operating lever for said shoe arranged to normally hold said shoe against said means affording said limit stop.

13. A chuck comprising, in combination, a body, jaws, a jaw operating part, gearing for moving said jaw operating part relatively to said body, means for actuating said gearing comprising a member with an internal annular surface, said member normally rotating with said chuck but being mounted on said chuck for rotation relatively to the body of said chuck, a part rotating with said chuck and having an exterior annular surface surrounded by said internal annular surface, a brake shoe positioned between said annular surfaces, said brake shoe having on one side a convex surface for engaging said internal annular surface and on its other side a concave surface for engaging said exterior annular surface, means normally holding said brake shoe against said exterior annular surface, and said means permitting said brake shoe to be forcibly pressed selectively against either of said annular surfaces.

14. A chuck comprising, in combination, a body, jaws, a jaw operating part, gearing for moving said jaw operating part, means for actuating said gearing comprising a member mounted for rotation relatively to said body but normally rotating therewith, and brake means for selectively causing rotation of said member relatively to said body or causing rotation of said chuck to be retarded.

15. A chuck comprising, in combination, a body, jaws, a jaw operating part, gearing for moving said jaw operating part relatively to said body, means for actuating said gearing comprising a member with an internal annular surface, said member normally rotating with said chuck but being mounted on said chuck for rotation relatively to the body of said chuck, a part rotating with said chuck and having an exterior annular surface surrounded by said internal annular surface, a brake shoe positioned between said annular surfaces, said brake shoe having on one side a convex surface for engaging said internal annular surface and on its other side a concave surface for engaging

said exterior annular surface, said brake shoe being pivoted to an operating lever, and said lever having its fulcrum so disposed that said lever normally holds said shoe against said exterior annular surface.

16. A chuck comprising, in combination, a body, jaws, a jaw operating part, gearing for moving said jaw operating part relatively to said body, means for actuating said gearing comprising an annular member rotatable relatively to said body but normally rotating with said body, a brake shoe for engaging said annular member, a movable part carrying said shoe for applying said shoe to said annular member, said shoe being movable relatively to said part, a member having an annular surface rotating with said chuck, and said brake shoe being so disposed relatively to said annular surface that it is normally held thereby in parallelism with said annular member.

17. A chuck comprising, in combination, a body, jaws, a jaw operating part, gearing for moving said jaw operating part relatively to said body, means for actuating said gearing comprising an annular member rotatable relatively to said body but normally rotating with said body, a brake shoe for engaging said annular member, movable operating means for said brake shoe to which said brake shoe is pivotally connected for adjusting itself to said annular member, and a part rotating with said chuck for preventing tilting of said shoe on its pivotal connection.

18. A chuck comprising, in combination, a body, jaws, a jaw operating part, gearing for moving said jaw operating part relatively to said body, means for actuating said gearing comprising an annular member rotatable relatively to said body but normally rotating with said body, a brake shoe for engaging said annular member, movable operating means for said brake shoe to which said brake shoe is relatively movable for adjusting itself to said annular member, and means rotating with said chuck for limiting such relative movement.

19. A chuck comprising, in combination, a body, jaws, a jaw operating part, a hand wheel rotatable relatively to said body for moving said jaw operating part, an annular flange on said hand wheel, a brake shoe for engaging said annular flange, movable operating means for said shoe to which said shoe is movably fastened for adjusting itself to said flange, and means rotating with said chuck for holding said shoe when in its disengaged position in parallelism with said annular flange.

20. A chuck comprising, in combination, a body, jaws, a jaw operating part, a hand wheel rotatable relatively to said body for moving said jaw operating part, an annular flange on said hand wheel, a brake shoe for engaging said annular flange, operating means for said shoe, means comprising an annular surface rotating with said chuck, said annular surface holding said shoe when in its disengaged position in parallelism with said flange, and said operating means for said shoe being effective to forcibly press said shoe against said annular surface for braking said chuck at the will of the operator.

21. A chuck comprising, in combination, a body, jaws, a jaw operating part, differential gearing for moving said jaw operating part, means for actuating said gearing comprising a member mounted for rotation relatively to said body but normally rotating therewith, and brake means for selectively causing rotation of said member relatively to said body or causing rotation of said chuck to be retarded.

22. A chuck comprising, in combination, a body, jaws, a jaw operating part, differential means for operating said jaw operating part, said means including a differential gear mounted for bodily rotation relatively to said body and meshing with two annular series of gear teeth respectively carried by said body and jaw operating part, and means permitting a limited rotative movement of one of said annular series of gear teeth relatively to the part carrying it.

23. A chuck comprising, in combination, a body, jaws, a jaw operating part, differential means for operating said jaw operating part, said means including a differential gear mounted for bodily rotation relatively to said body and meshing with two annular series of gear teeth respectively carried by said body and jaw operating part, and means permitting a limited rotative movement relatively to said body of said annular series of gear teeth carried by said body.

24. A chuck comprising, in combination, a body, jaws, a jaw operating part, differential means for operating said jaw operating part, said means including a differential gear mounted for bodily rotation relatively to said body, said gear meshing with an annular series of gear teeth carried by said jaw operating part, a ring carried by said body and having a limited rotative movement relatively to said body, and said ring having an annular series of gear teeth meshing with said differential gear.

25. A chuck comprising, in combination, a body, jaws, a jaw operating part, differential means for operating said jaw operating part, said means including a differential gear mounted for bodily rotation relatively to said body, said gear meshing with an annular series of gear teeth carried by said jaw operating part, a ring having an annular series of gear teeth meshing with said gear, and bolts securing said ring to said body and permitting a limited rotative

movement of said ring relatively to said body.

26. A chuck comprising, in combination, a body, jaws, a jaw operating part, differential gearing for operating said jaw operating part, said differential gearing comprising a train of gears, and a mounting for one of said gears permitting lost motion in said train.

27. A chuck comprising, in combination, a body, jaws, a jaw operating part, differential gearing for operating said jaw operating part, said differential gearing comprising a train of gears, and means permitting a limited lost motion other than back lash in said train of gears.

28. A chuck comprising, in combination, a body, jaws, a jaw operating part, a member mounted for rotation on said body and having a rearwardly projecting annular flange for manual operation of said member, annular series of gear teeth carried by both said body and jaw operating part, said member having rotatably mounted thereon a pinion meshing with both annular series of gear teeth and forming therewith two gear sets of slightly different ratio, and a lost motion connection between one of said annular series of gear teeth and the part carrying it.

29. A chuck comprising, in combination, a body having a rearwardly opening recess, radial slots on the forward face of said body intersecting said recess, a scroll wheel on said recess, jaws in said radial slots having rack teeth meshing with said scroll wheel, said scroll wheel carrying a gear, a ring gear having a lost motion connection with said body, a hand wheel at the rear of said ring gear, pinions rotatably mounted on said wheel meshing with both said gear carried by said scroll wheel and said ring gear, and said pinions and gears forming two gear sets of slightly different ratio.

30. A chuck comprising, in combination, an annular body, jaws, a jaw operating part, a hand wheel mounted for rotation on said body at the rear of said body and having an annular exterior, said body at its periphery abutting said hand wheel, a pair of gears respectively carried by said body and jaw operating part, a pinion rotatably mounted on said hand wheel, said pinion meshing with both gears and forming therewith two gear sets of slightly different ratio, and a lost motion connection between one of said gears and the part carrying it.

31. A chuck having in combination, a body, a rearwardly opening annular recess in said body, radial slots on the forward face of said body intersecting said recess, a scroll wheel in said recess, jaws in said slots having rack teeth meshing with said scroll wheel, an annular flange provided with internal gear teeth carried at the rearward side of said wheel, said recess at its rearward side having an annular enlargement, an internal ring gear received in said recess, bolts holding said ring gear on said body and permitting lost motion between said body and ring gear, a hand wheel mounted for rotation on said body and closing the rearward side of said recess, studs on said hand wheel projecting into said recess, a pinion on each stud, and each pinion meshing with both the gear teeth carried by said scroll wheel and said ring gear and forming therewith two gear sets of slightly different ratio.

32. A chuck comprising, in combination, a body, jaws radially movable relatively to said body, a scroll wheel for operating said jaws mounted in an annular recess in said body, a flange with internal gear teeth on said scroll wheel, a ring with internal gear teeth connected to said body for limited rotative movement relatively to said body and retaining said scroll wheel in said recess, a hand wheel carrying a differential pinion meshing with said gear teeth on said scroll wheel and said gear teeth on said ring, an internal flange on said hand wheel and a brake for engaging said flange.

In testimony whereof, I have signed my name to this specification.

WALLACE M. CUTLER.

Certificate of Correction.

It is hereby certified that in Letters Patent No. 1,608,463, granted November 23, 1926, upon the application of Wallace M. Cutler, of Windsor Locks, Connecticut, for an improvement in "Chucks," errors appear in the printed specification requiring correction as follows: Page 3, line 28, claim 9, for the word "portions" read *portion*, and line 45, claim 10, after the word "scroll" insert the word *wheel;* and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 4th day of January, A. D. 1927.

[SEAL.]

M. J. MOORE,
Acting Commissioner of Patents.