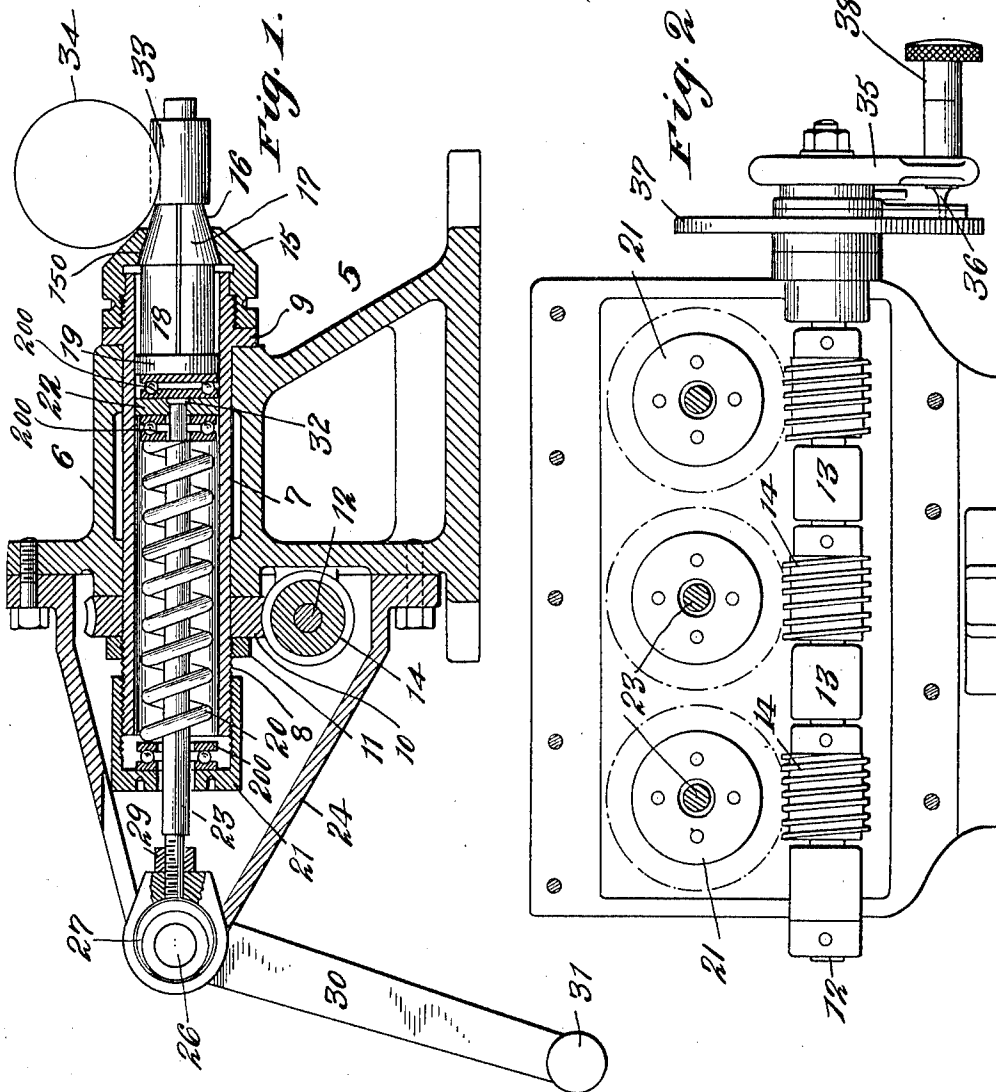


L. MASTRANGEL.
 MULTIPLE SPINDLE DIVIDING HEAD.
 APPLICATION FILED JAN. 28, 1911.

1,001,419.

Patented Aug. 22, 1911.

2 SHEETS—SHEET 1.



Witnesses:
Harry C. Hebig
Chas. L. Russell

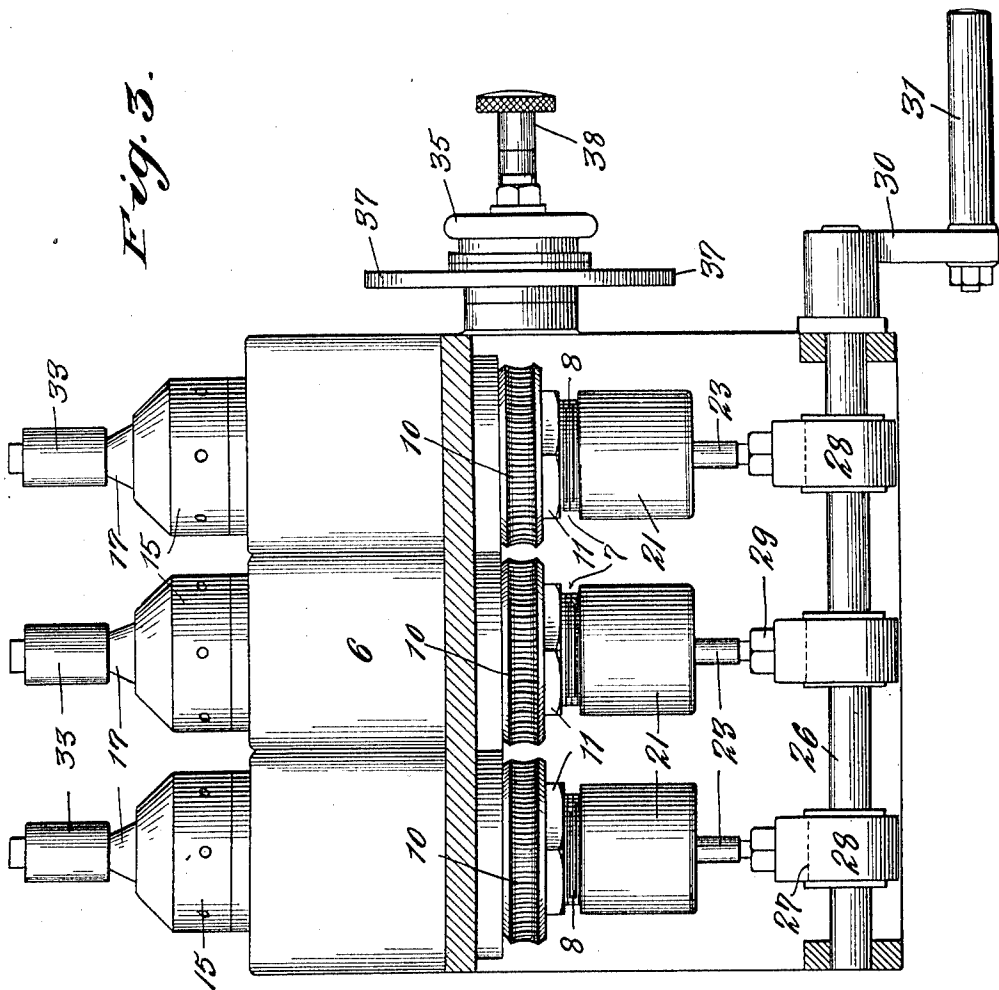
Inventor
Louis Mastrangel
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Witnesses:
Wm. L. Keegan
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UNITED STATES PATENT OFFICE.

LOUIS MASTRANGEL, OF WEST HOBOKEN, NEW JERSEY, ASSIGNOR TO HARTFORD
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YORK.

MULTIPLE-SPINDLE DIVIDING-HEAD.

1,001,419.

Specification of Letters Patent. Patented Aug. 22, 1911.

Application filed January 28, 1911. Serial No. 605,154.

To all whom it may concern:

Be it known that I, LOUIS MASTRANGEL, a citizen of the United States, residing at West Hoboken, in the county of Hudson and State of New Jersey, have invented certain new and useful Improvements in Multiple-Spindle Dividing-Heads, of which the following is a full, clear, and exact specification.

15 This invention relates to multiple spindle dividing heads.

Among the objects of this invention is the provision of an improved multiple spindle dividing head.

20 The invention also provides a mechanism wherein a plurality of work-holders are concurrently advanced through predetermined divisions of a rotation for effecting concurrent and similar movements of a tool or of work to be presented to a tool.

The invention also provides a mechanism in which a plurality of work-holders are concurrently caused to engage their work.

25 In one form of the invention the plurality of spindles will be caused concurrently to grasp their work and concurrently advance the work through a complete rotation by a series of equal steps or divisions of a rotation, and at any desired point in such step-by-step or divisional rotation be caused concurrently to release their work.

30 In the drawings accompanying and forming a part of this specification, one practicable embodiment of a form of the invention is illustrated, wherein—

35 Figure 1 is a view, partly in elevation and partly in longitudinal section, taken through the axis of rotation of one of the units entering into the multiple spindle head. Fig. 2 is an end view of the device looking at this from the left hand of Fig. 1, the housing, however, and the eccentric shaft not being shown in this view. Fig. 3 is a top plan view, the housing being removed.

40 The embodiment of the invention herein illustrated is particularly adapted for use in presenting a series of blanks for gear-wheels to a gang milling machine, whereby a series of similar gears may be concurrently produced.

45 A framework designated in a general way by 5, is illustrated, which framework is shown carrying an elongated bearing-portion 6, in which the cylindrical shell 7, which

constitutes the body-portion of the spindle, will be mounted. This shell or cylinder is shown provided with a screw-thread 8, at one end, and at the other end with a collar 9. The collar 9 is shown abutting one end of the bearing-portion 6. Adjacent the screw-thread 8 or inward thereof in the present showing, a worm-wheel 10, is keyed to the cylinder. This wheel, by means of a set-nut 11, is caused to abut the other end of the bearing-portion 6. In the present showing there are shown three spindles mounted for concurrent actuation.

50 A worm-shaft 12, is mounted in bearing-portions 13, carried by the framework of the machine. Upon the worm-shaft there is fast a worm 14, for each of the worm-wheels 10. Suitable means presently to be described will be employed for advancing the worm-shaft step by step for producing predetermined step-by-step advances of the spindle.

55 The end of the cylinder or body-portion 7 beyond the collar 9 is shown provided with a screw-thread for receiving a member 15, provided with an internal conical or slanting face 150, for engaging the conical faces 16, of the jaws 17, of the split-spring chuck. This chuck may be such as is frequently used, wherein the jaws 17 will be carried by spring-fingers 18, fast upon a body-portion 19. In the present illustration the body-portion 19, has a working fit within the spindle body or shell 7. The chuck will be closed by forcing the faces 16 into engagement with the face 150 of the member 15. Upon release of the outward movement of the chuck, with its closing tendency, the spring-arms 18, carrying the jaws 17, will effect, by means of the camming action of the jaws 150 and 16, an inward movement of the chuck, thereby permitting the chuck to open or its jaws to separate, which separation will release the work.

60 In the present illustration a compression-spring is employed for forcing the jaws of the chuck into the work-engaging position. A spiral-spring 20, is shown. The spring 20 is held under compression between the rear end or head 19 of the chuck, and a suitable adjustable member here illustrated as a cap 21, mounted upon the screw-thread 8 of the cylinder of the spindle. By means of the cap 21 the tension of the spring may be regulated. When it is desired to release the

work from the chuck the spring will be compressed from its chuck end backwardly, which will permit the chuck to move inwardly for automatically releasing its work.

5 A member 22, somewhat in the nature of a piston, it having a working fit with the inside of the cylinder 7, is carried by a rod 23. This member 22 is interposed between the end of the spring 20 and the body-portion
10 19 of the chuck. Upon backward movement, or movement toward the left in Fig. 1 of the member 22, the spring will be compressed and the chuck released to the action of its spring-arms and retracting tendency.
15 Upon movement of the member 22 forward, or toward the right in Fig. 1, the spring 20 will be permitted to expand and become active upon the chuck for closing the same.

The back portion of the device is covered
20 by a removable housing 24, which carries, or is provided with, a series of bearings 25, for supporting an eccentric-shaft 26, which eccentric-shaft is disposed substantially in the plane of the axes of the series of spindles
25 and is provided with an eccentric 27, for each of the rods 23, each rod being provided with an eccentric-strap 28, surrounding the eccentric provided therefor. The rod 23, which from its connection to the eccentric-
30 strap may be termed an eccentric-rod, is, in the present illustration, shown as having screw-threaded connection with its eccentric-strap, whereby it may be longitudinally adjusted. A lock-nut 29, is shown for securing
35 the parts in their positions of adjustment. Oscillation of the eccentric-shaft is effected by means of a crank 30, provided with a handle 31.

It will be seen from the foregoing and by
40 an inspection of the drawings, that the body-portion 7 of the spindle will rotate, and the eccentric-rod 23, together with the spring 20, will remain stationary during the rotation. To prevent undue friction between the parts
45 a ball-thrust-bearing 200, is provided between the back end of the spring 20 and the cap 21, between the outer end of the spring 20 and the member 22, and between the member 22 and the body-portion 19 of the
50 chuck.

There will be a certain amount of oscillatory vibration of the eccentric-rod 23 as the eccentric oscillates upon the center of the shaft 26. For this reason, where the rod
55 23 is headed over at 32, in the member 22, it will have a certain amount of play. The opening in the cap 21 through which the rod passes will be made with sufficient clearance to permit this vibration.

30 Each of the chucks is shown carrying a blank 33, which in Fig. 1 is shown presented to a milling-cutter 34, illustrated by a circle merely.

When it is desired to open the chucks for
65 releasing the work, the handle 31, will be en-

gaged and the eccentric-shaft oscillated, which will oscillate the eccentrics, causing the rods 23 to move toward the left in Fig. 1 and compress the spring 20. The withdrawal of the member 22, or the release of
70 the chuck from the influence of the spring will permit the conical faces between the chuck and the member 15, with the assistance of the spring-arms carrying the chuck
75 jaws, to move inward and open the chuck jaws to release all the work in all the units concurrently. Upon the application of new work to the jaws, a reverse movement of the handle 31 will permit the spring 20 to extend and to force the chuck jaws outward
80 against their engaging faces and securely hold the work, the chuck jaws moving in unison.

For the divisional advance of the spindles
85 concurrently, the worm-shaft 12 will be intermittently rotated predetermined amounts. This movement may in some instances be one or more complete rotations of the worm-shaft or it may be a partial rotation, as occasion demands. The worm-shaft is shown
90 provided with a crank 35, which carries a pin 36, the pin being located in position for registering with selected holes of a series of holes provided in the plate 37. A finger-piece 38, is provided for actuating the pin
95 36. This indexing mechanism is well known and consequently will not be described in detail. The worms controlled by the indexing mechanism will be caused to advance the spindles step by step, through steps
100 which are predetermined divisions of a rotation for effecting uniform advance of the various pieces of work in unison.

Although but one embodiment of the invention has been illustrated, yet it will be
105 apparent that changes within the scope of the claims may be made without departing from the scope of my invention.

Having described my invention, what I claim and desire to secure by Letters Patent
110 is:

1. The combination with a series of spindles, each spindle comprising a hollow cylinder, supporting means for the cylinder, a split chuck located within the cylinder and
115 provided with conical faces, a member carried by the cylinder and provided with mating conical faces for engaging the conical faces of the chuck for closing the jaws thereof upon outward movement thereof, a spring
120 for pressing the chuck outward, and an actuator for retracting the spring to release the chuck to the retracting influence of its parts and for permitting the spring to expand to become active upon the chuck for
125 closing the same.

2. The combination with a plurality of rotary spindles, each spindle comprising a chuck, mechanism for closing the chuck and mechanism for adjusting the closing mecha-
130

nism, the chuck being self-opening when released from the influence of the closing mechanism, of means for simultaneously releasing all the chucks from the influence of their respective closing mechanisms and for simultaneously subjecting the chucks thereto, and indexing or dividing mechanism for concurrently rotatively advancing the chucks predetermined divisional portions of a rotation.

3. In a device of the character specified, the combination with a plurality of spindle bodies, each having internal conical faces at one end, a chuck having arms provided with conical faces for engaging those of the body, a member in the nature of a plunger located behind the chuck, a coiled spring engaging this plunger member, the body being provided with screw threads, a cap engaging said screw threads for adjusting the tension of said spring, a pitman connected to the plunger and extending through the said cap, an eccentric, an adjustable connection between the pitman and the eccentric-strap, means for moving the eccentrics in unison, and means for rotating the spindle bodies in unison.

4. The combination with a plurality of spindles, each comprising a chuck normally tending to move axially and upon such movement to open, a coiled spring for resisting such movement, a member interposed

between the chuck and the adjacent end of the spring, a rod connected to such member, an eccentric for actuating each rod, means for oscillating the eccentrics in unison, and means for rotating the spindles in unison.

5. The combination with a plurality of spindles, each comprising a chuck normally tending to move axially and upon such movement to open, a coiled spring for resisting such movement, a member interposed between the chuck and the adjacent end of the spring, a rod connected to such member, an eccentric for actuating each rod, and an adjustable connection between the rod and the spindle.

6. The combination with a plurality of spindles, each having a chuck normally tending to move inwardly of the spindle and to open upon such inward movement, a spring for restraining such tendency to inward movement, means for withdrawing the influence of the spring from the chuck, an eccentric for actuating each spring-withdrawing means, and a shaft carrying the eccentrics.

In witness whereof I have hereunto set my hand in the presence of two subscribing witnesses.

LOUIS MASTRANGEL.

Witnesses:

CHAS. LYON RUSSELL,
WM. C. DUNN.