

No. 725,100.

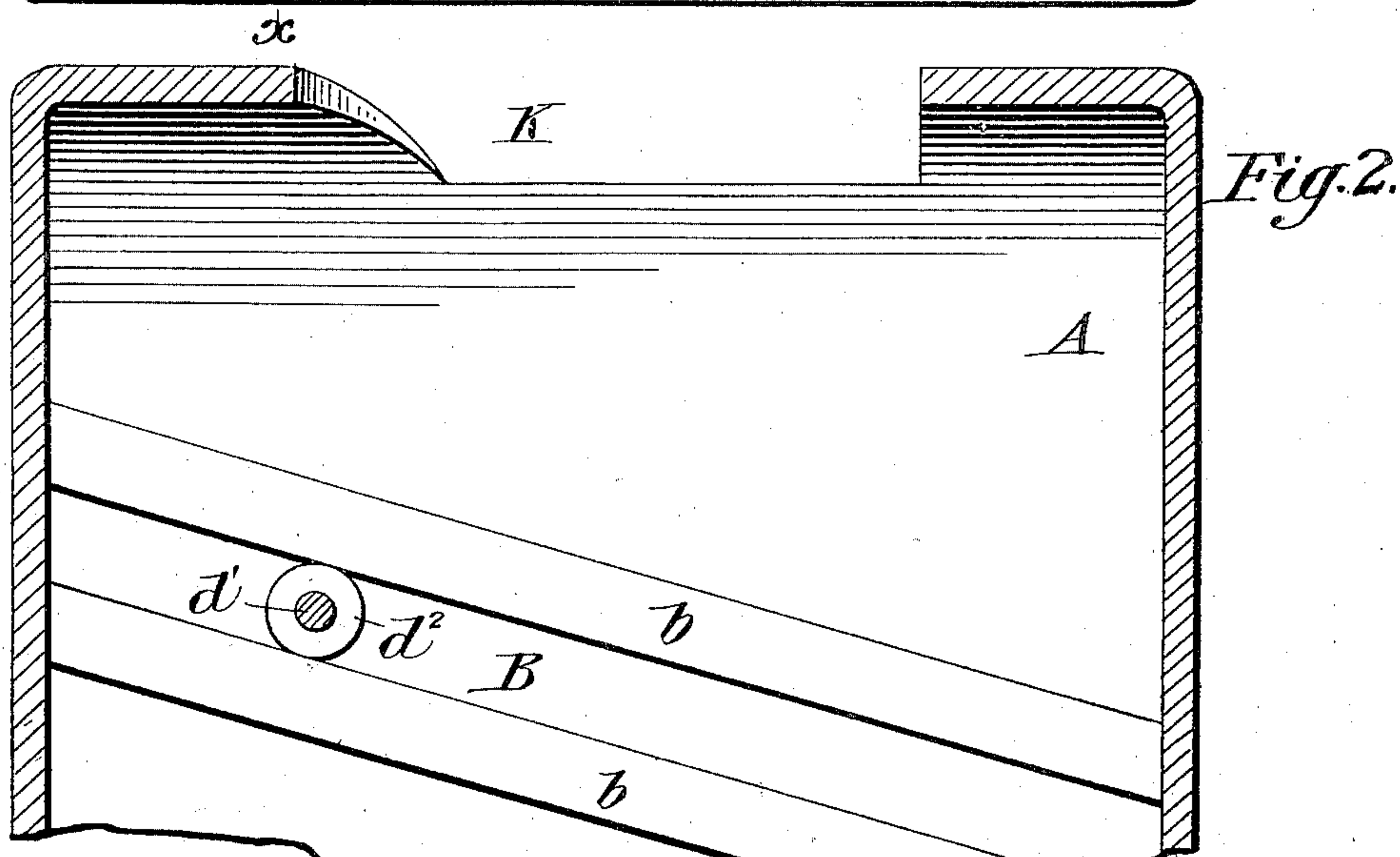
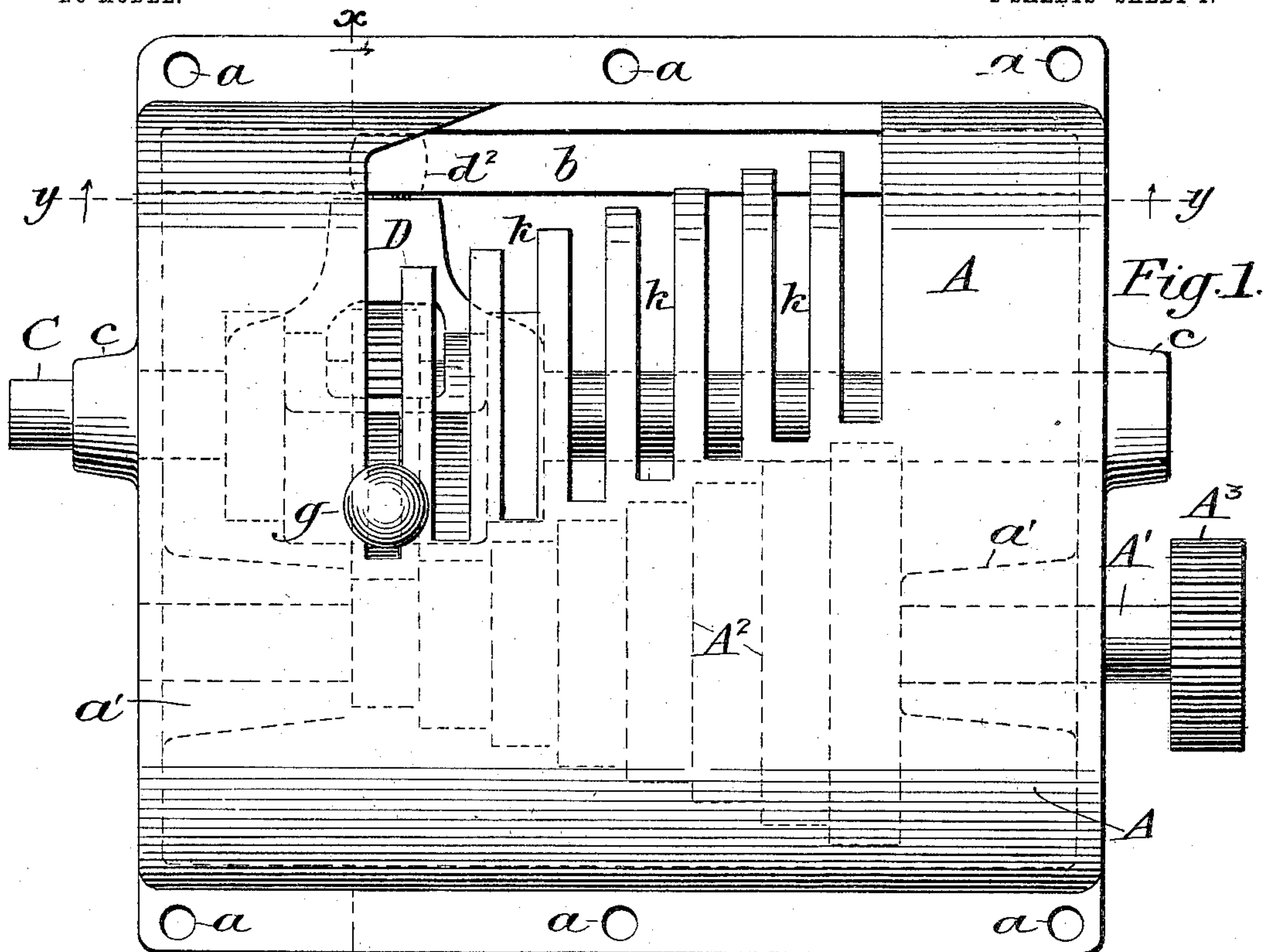
PATENTED APR. 14, 1903.

R. K. LE BLOND & W. F. GROENE.
SPEED CHANGING MECHANISM.

APPLICATION FILED JAN. 28, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses:
D. W. Edelin.
A. Harvey cutter.

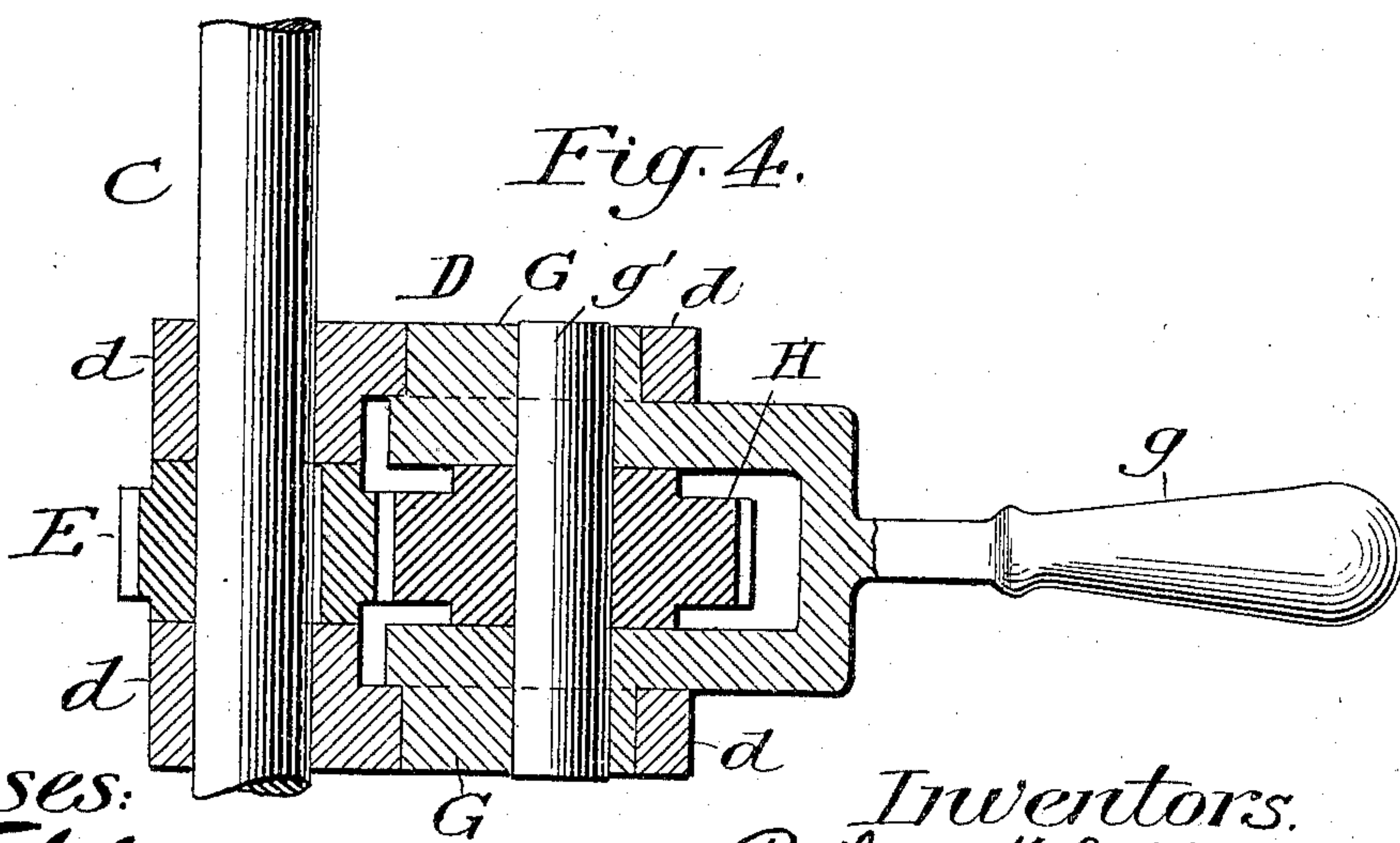
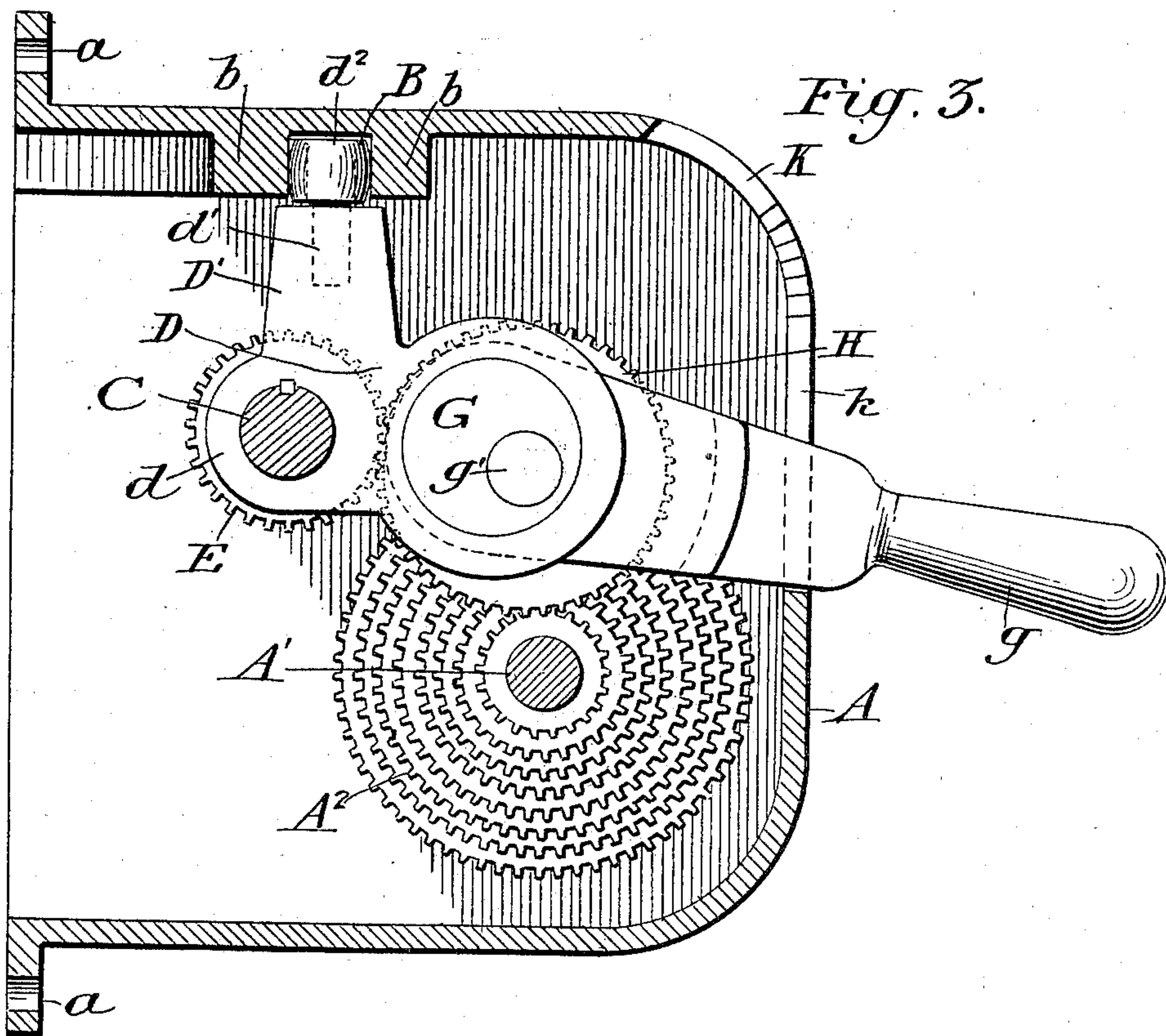
Inventors:
Richard H. LeBlond and
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

RICHARD K. LE BLOND AND WILLIAM F. GROENE, OF CINCINNATI, OHIO,
ASSIGNORS TO THE R. K. LE BLOND MACHINE TOOL COMPANY.

SPEED-CHANGING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 725,100, dated April 14, 1903.

Application filed January 28, 1903. Serial No. 140,838. (No model.)

To all whom it may concern:

Be it known that we, RICHARD K. LE BLOND and WILLIAM F. GROENE, citizens of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Speed-Changing Mechanism, of which the following is a specification.

The invention to be hereinafter described relates to speed-changing boxes—that is, devices for transmitting different speeds—which may be employed generally in any machine where it is desired that certain mechanism shall be driven at one speed under certain conditions and other speeds under certain other conditions; and the object of the present invention, stated generally, is to improve prior structures of this general type and to provide a speed-changing box of simple construction which will at the same time be effective and reliable in operation; and with these general objects in view the invention consists of the parts and combinations, as will hereinafter be fully described, and then definitely pointed out in the claims.

In the drawings, Figure 1 is a front view of a device embodying the present invention. Fig. 2 is a sectional view on line *y y*, Fig. 1, looking in the direction of the arrow, Fig. 1, to show the general character and direction of the guide in the casing, parts of casing being broken away. Fig. 3 is a transverse section on line *x x*, Fig. 1; and Fig. 4 is a detached sectional view of parts of the yoke and its adjuncts to show the eccentric arrangement of the transmitting-gear in this form of the invention.

In the drawings, A represents any usual style or general character of casing adapted for connection with the machine, to which the device is to be applied by means of usual fastenings passing through holes *a a*.

Mounted in suitable bearings—as, for instance, bearings *a' a'* in the sides of casing A—is the cone-shaft *A'*, carrying a cone of gears *A²*, suitably secured thereto in any usual or desired manner, and at one end said cone-shaft has keyed or otherwise connected thereto a gear *A³*, from which power transmitted to the cone-shaft may be taken, as will be

fully understood. Likewise supported in bearings, as the bearings *c c* in the sides of the casing, is the shaft C, which may be driven in any usual manner and which for identification will be hereinafter designated as the “spline-shaft.” Mounted upon the spline-shaft C to slide longitudinally of and turn with respect thereto is a yoke D, having arms *d d*, embracing the spline-shaft, and between these arms is a gear E, splined to the spline-shaft, so as to rotate therewith, but free to move longitudinally of said shaft with the yoke. Journaled in suitable bearings in the side arms *d d* of the yoke D is a second yoke or transmitting-gear carrier G, having a suitable handle *g*, by which said second yoke or transmitting-gear carrier may be turned in its bearings. Eccentrically mounted in the transmitting-gear carrier G is the shaft *g'*, carrying the transmitting-gear H, which is engaged with the gear E on the spline-shaft C, so that rotation of the spline-shaft is transmitted to the transmitting-gear H. It is also obvious that since the gear E, which may be designated the “driving-gear,” and the transmitting-gear H are both movable with the yoke they will remain in transmitting engagement irrespective of the adjustment of the yoke D longitudinally of the spline-shaft.

As hereinbefore stated, the second yoke or transmitting-gear carrier G has the transmitting-gear H eccentrically mounted therein, so that movement of the handle *g* upward or downward in the disposition of parts, as shown by Fig. 3, will carry the transmitting-gear H out of and into engagement with the cone of gears, and said transmitting-gear being in engagement with the driven gear E motion will be imparted to the cone of gears, as will be obvious.

In order to enable the transmitting-gear carrier or second yoke G to be properly turned in its bearings in the yoke D, the handle *g* is projected through a suitable opening K of the frame A, as best seen in Figs. 1 and 3. The casing A is provided also with a series of slots *k*, Fig. 1, which when the transmitting-gear H is in proper position to be engaged with any of the gears of the cone of gears *A²* the said handle *g* may be turned downward

into the appropriate slot *k*, and the gear H thereby brought into engaging connection with the desired gear of the cone of gears.

Projecting upward from the yoke D is the
 5 projection or stud-bearing D', carrying a suitable stud *d'*, (shown in dotted lines in Fig. 3,) which may carry at its upper end a roller *d*², the said roller engaging in a guide B, extending longitudinally and diagonally of the casing A in a manner such that as the yoke D is
 10 moved longitudinally of the splined shaft C the said yoke D will be turned with reference to the splined shaft. The guide B may be formed in any approved manner, and, as
 15 shown in the present embodiment of the invention, it comprises a groove formed in the inner upper wall of the casing A, as shown in Figs. 2 and 3, between the ribs *b b*.

From the construction thus described it
 20 will be evident that the transmitting-gear H may by movement of the handle *g* of the second yoke or transmitting-gear carrier G be thrown into engagement or out of engagement with the gears of the cone of gears A²,
 25 due to the eccentric arrangement of the transmitting-gear H on the said carrier. When the said transmitting-gear H is thrown out of engagement with the cone of gears by movement of the handle *g* upward out of its
 30 engaging slot *k* of the casing, it is evident that the yoke D may be moved longitudinally of the splined shaft C and that as it is so moved it is positively guided by the guide B, so that said yoke D will be moved about the
 35 splined shaft C during its longitudinal movement thereon in order to guide the transmitting-gear in a path of travel substantially corresponding to the element of the cone of gears, and when said yoke D has been moved
 40 to a position opposite the appropriate gear of the cone of gears it is obvious that movement of the handle *g* downward into one of the slots *k* will by the eccentric mounting of the transmitting-gear H lower that gear on
 45 the yoke D into engagement with the cone of gears. By this arrangement it will be seen that no latch or other form of fastening is necessary for the handle *g*, it merely resting in the slots *k*, formed in the casing A, and
 50 the gears being maintained in their operative relation by the eccentric mounting of the transmitting-gear H. It is desirable that the direction of the guide B may be lengthwise and diagonal of the casing A, so that as the
 55 yoke D is moved along the splined shaft C the free ends of the arms *d* of the yoke, and consequently the parts carried thereby, shall move in a path substantially parallel with the element of the cone of gears, although, of
 60 course, this direction of travel may be varied more or less.

While we have shown the particular form of guide and eccentric mounting for a transmitting-gear and also have set forth the specific arrangement of parts, it is obvious, of
 65 course, that the structure may be varied within the limits of our invention.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a speed-changing box, a cone of gears, a spline-shaft, a yoke slidable longitudinally on said spline-shaft, gears for transmitting motion between the spline-shaft and cone of gears, a guide for swinging the yoke about
 75 the spline-shaft as said yoke is moved longitudinally thereof, and devices for operatively engaging and disengaging the gears with the cone of gears independent of the movement of the yoke. 80

2. In a speed-changing box, a cone of gears, a spline-shaft, a yoke slidable longitudinally on said spline-shaft, gears for transmitting motion between the spline-shaft and cone of gears, a guide for positively swinging the
 85 yoke about the spline-shaft as said yoke is moved longitudinally thereof, and devices eccentrically mounted upon the yoke for operatively engaging and disengaging the gears with the cone of gears. 90

3. In a speed-changing box, a cone of gears, a spline-shaft, a yoke slidable longitudinally on said spline-shaft, a driven gear on said spline-shaft movable with the yoke, a transmitting-gear carried by said yoke and operatively engaged with the said driven gear, a
 95 guide for swinging the yoke about the spline-shaft as said yoke is moved longitudinally thereof, and means for moving the transmitting-gear into and out of operative engagement with the cone of gears independent of movement of the yoke. 100

4. In a speed-changing box, a cone of gears, a spline-shaft, a yoke slidable longitudinally of said spline-shaft, a driven gear mounted
 105 upon the spline-shaft and movable longitudinally thereon with said yoke, an eccentric mounted on said yoke, a transmitting-gear carried thereby, a guide for positively swinging the yoke about the spline-shaft as said
 110 yoke is moved longitudinally thereof, and means for turning said eccentric to engage and disengage the transmitting-gear with the cone of gears.

5. In a speed-changing box, the combination of a casing having a guide therein, a cone of gears, a spline-shaft, a yoke mounted upon and movable longitudinally on said spline-shaft and having a projection or stud engaging the guide on the casing to positively turn
 120 the yoke about the spline-shaft as the yoke is moved longitudinally thereof, gearing for conveying motion between the spline-shaft and cone of gears, and an eccentric for operatively engaging and disengaging the said
 125 gearing with the cone of gears independent of movement of the yoke.

6. In a speed-changing box, a spline-shaft, a cone of gears, a yoke longitudinally movable on the spline-shaft and adapted to be
 130 turned thereon, a gear splined to the spline-shaft to turn therewith and be movable longitudinally thereof, a second yoke or transmitting-gear carrier mounted on the first-

named yoke, a transmitting-gear carried by the second yoke or carrier and an eccentric for engaging and disengaging the transmitting-gear with the cone of gears.

5 7. In a speed-changing box, a spline-shaft, a cone of gears, a yoke longitudinally movable on the spline-shaft, a gear mounted upon said spline-shaft to turn therewith and be movable longitudinally thereon, a second
10 yoke or transmitting-gear carrier journaled in the first-named yoke, means for turning the second yoke or transmitting-gear carrier in its journals, a transmitting-gear eccentric-

ally mounted in the second yoke or transmitting-gear carrier whereby upon operation 15 of said means the transmitting-gear is moved into or out of engagement with the cone of gears.

In testimony whereof we affix our signatures in presence of two witnesses.

RICHARD K. LE BLOND.
WILLIAM F. GROENE.

Witnesses:

GEO. T. PRITCHARD,
WM. PAHREN.