

Feb. 23, 1926.

1,574,667

H. W. MACKENZIE
MECHANISM FOR IMPARTING TO A SUPPORT, CARRIER, OR THE LIKE, MOVEMENTS
OF A DETERMINED CHARACTER
Filed Sept. 27, 1921

5 Sheets-Sheet 1

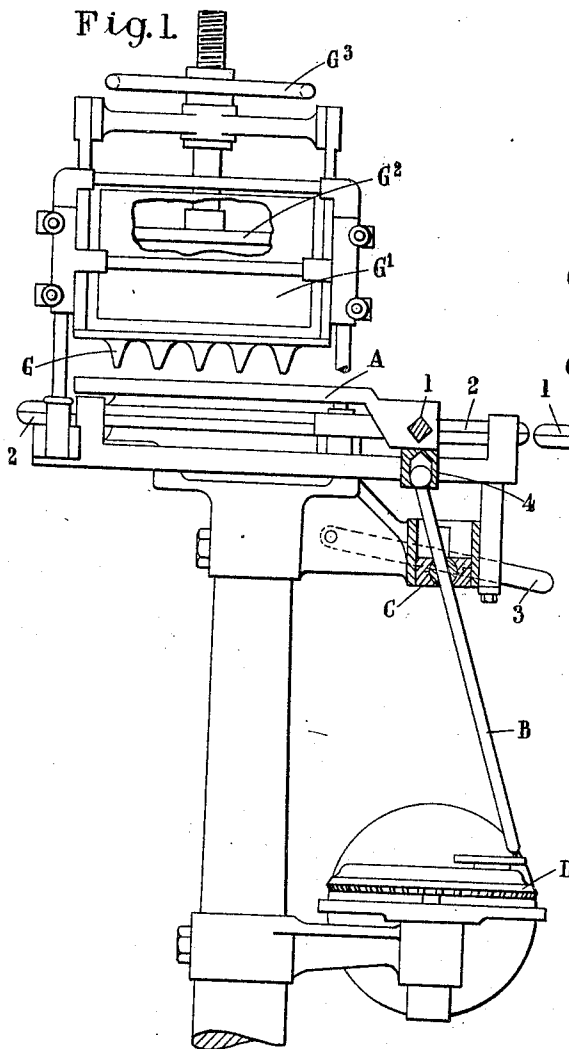
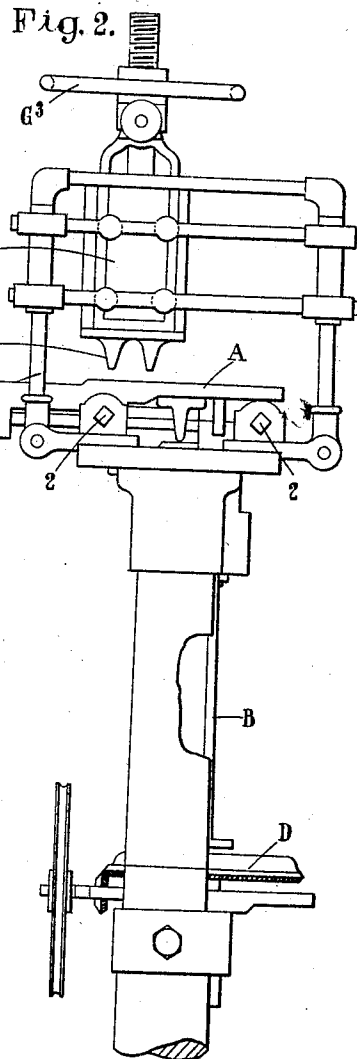


Fig. 6.

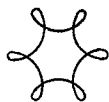
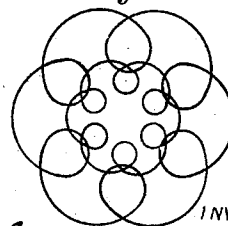


Fig. 7.



INVENTOR

Hugh Watson Mackenzie

By J. Walter Forrer
Atty.

Feb. 23, 1926.

1,574,667

H. W. MACKENZIE
MECHANISM FOR IMPARTING TO A SUPPORT, CARRIER, OR THE LIKE, MOVEMENTS
OF A DETERMINED CHARACTER
Filed Sept. 27, 1921

5 Sheets-Sheet 2

Fig. 3.

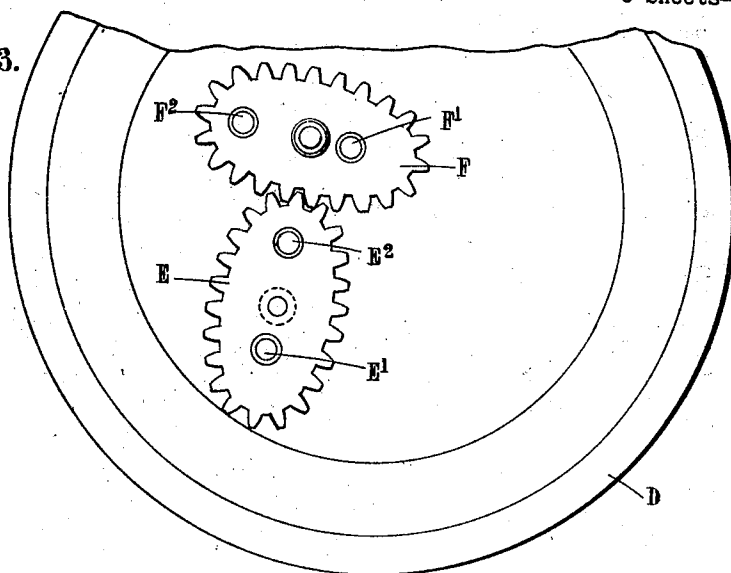


Fig. 4.

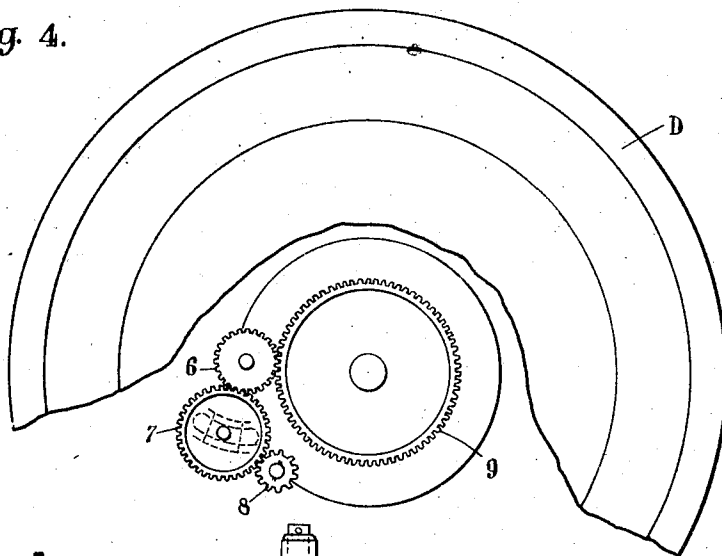
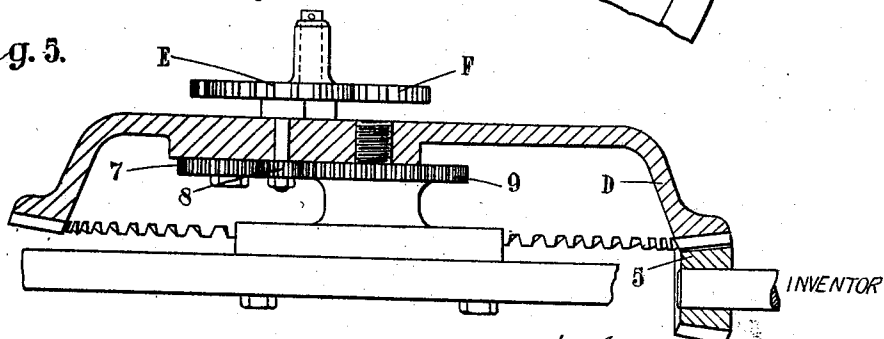


Fig. 5.



INVENTOR
Hugh Watson Mackenzie
By J. Walter Foster
att'y.

Feb. 23, 1926.

1,574,667

H. W. MACKENZIE
MECHANISM FOR IMPARTING TO A SUPPORT, CARRIER, OR THE LIKE, MOVEMENTS
OF A DETERMINED CHARACTER
Filed Sept. 27, 1921

5 Sheets-Sheet 3

Fig. 8.

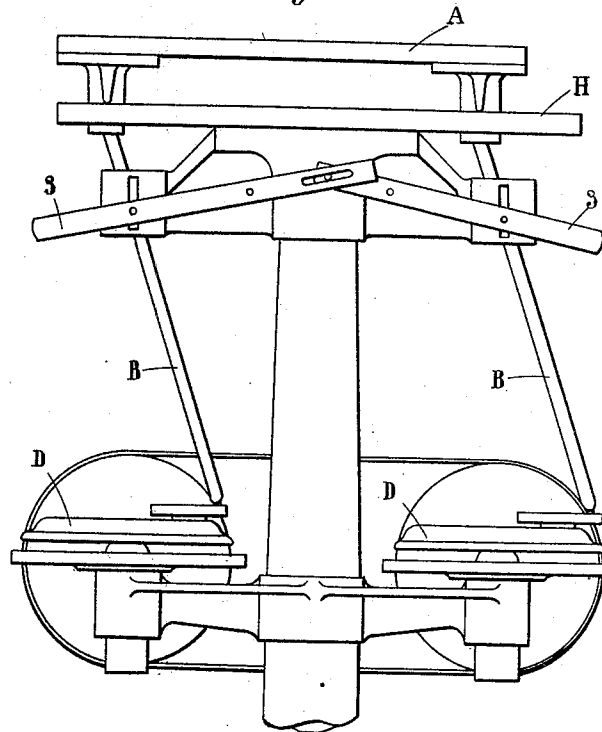
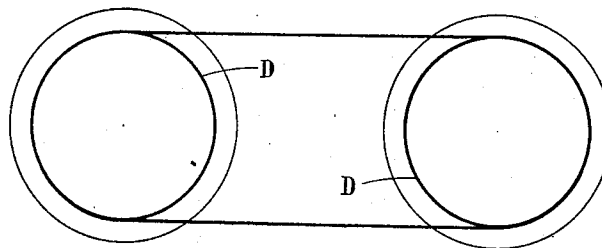


Fig. 9.



INVENTOR

Hugh Watson Mackenzie

By *J. Walter Fowler*
Atty.

Feb. 23, 1926.

1,574,667

H. W. MACKENZIE
MECHANISM FOR IMPARTING TO A SUPPORT, CARRIER, OR THE LIKE, MOVEMENTS
OF A DETERMINED CHARACTER
Filed Sept. 27, 1921

5 Sheets-Sheet 4

Fig. 10.

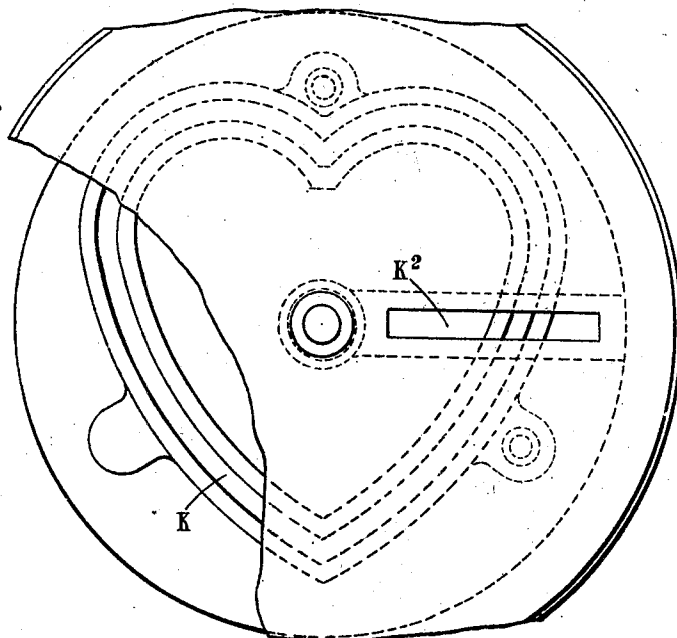


Fig. 11.

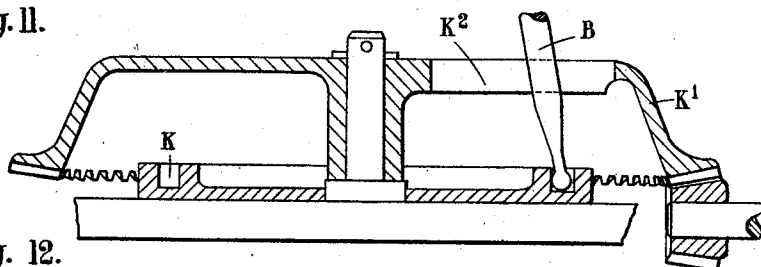


Fig. 12.

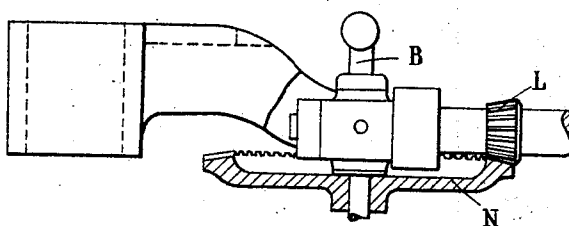
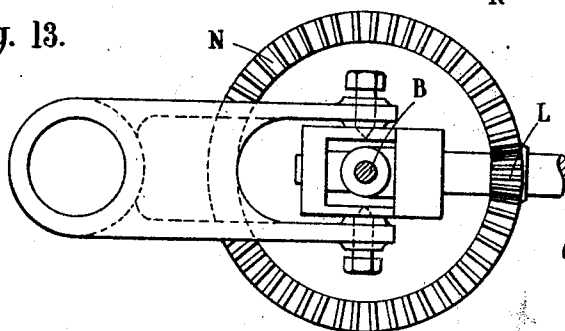


Fig. 13.



INVENTOR

Hugh Watson Mackenzie
By J. Walter Forrer
att'y.

Feb. 23, 1926.

H. W. MACKENZIE
MECHANISM FOR IMPARTING TO A SUPPORT, CARRIER, OR THE LIKE, MOVEMENTS
OF A DETERMINED CHARACTER
Filed Sept. 27, 1921

1,574,667

5 Sheets-Sheet 5

Fig. 14.

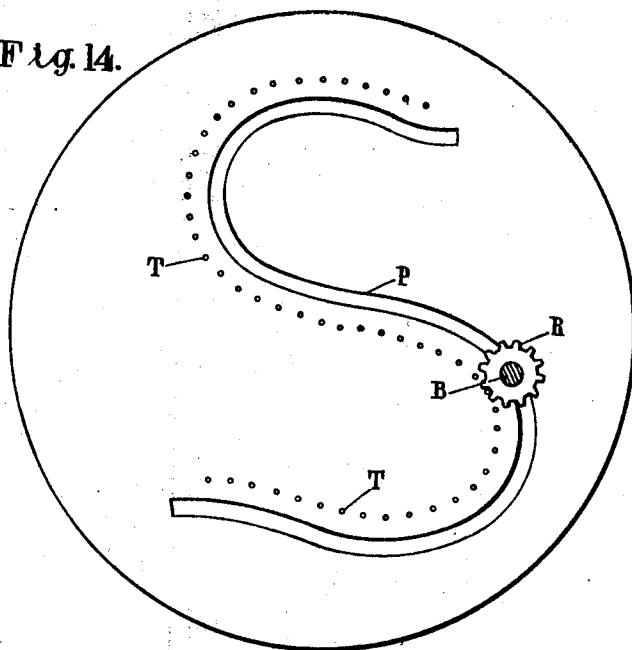
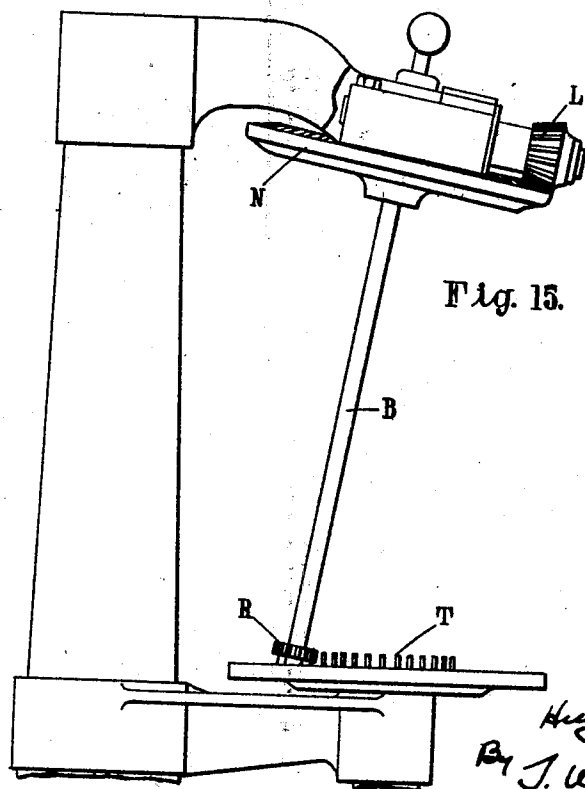


Fig. 15.

INVENTOR

Hugh Watson Mackenzie
By J. Walter Fowler
att'y.

UNITED STATES PATENT OFFICE.

HUGH WATSON MACKENZIE, OF YORKSHIRE, ENGLAND.

MECHANISM FOR IMPARTING TO A SUPPORT, CARRIER, OR THE LIKE, MOVEMENTS OF
A DETERMINED CHARACTER.

Application filed September 27, 1921. Serial No. 503,569.

To all whom it may concern:

Be it known that I, HUGH WATSON MACKENZIE, a subject of the King of Great Britain and Ireland, residing at 119 Spencer Place, Leeds, Yorkshire, England, have invented new and useful Improvements in or Connected with Mechanism for Imparting to a Support, Carrier, or the like, Movements of a Determined Character, of which the following is a specification.

This invention relates to the production of apparatus comprising a support, carrier or the like, hereinafter referred to generally as the movable member, position restricting means by which the movable member is permitted to move freely in or approximately in a plane in such a manner that when the member is moved any straight line on the movable member in said plane is maintained parallel to its original position, or approximately so, and means for mechanically imparting compound movements (movements which are not purely circular or rectilinear) to the movable member determined by guides, or determined by the operation of directing mechanism.

According to this invention the movable member (which in the first place will be assumed to be a table having a flat surface arranged horizontally) may be mounted to slide on guides or swing about axes which are at right angles to one another and in this case are horizontal, being parallel to the surface of the table, and the movements required to be imparted to the table are transmitted through the medium of a rocking arm having a support located at a position between its ends about which the rocking arm may turn freely in all angular directions, the movements to be imparted being applied mechanically to one end, say, the outer end of the rocking arm, in which case the movements transmitted are from the inner end of the arm, which is connected by a direct or indirect coupling connection with the movable member. In practice, the distance between the inner end of the arm and its support may usually be short in comparison with the distance between the support and the outer end of the arm, and provision may be made for altering the position of the support relative to the ends of the rocking arm.

Compound movements may be applied to

the outer end of the rocking arm, for example, as follows. The outer end of the rocking arm may be arranged to engage with an endless guide and be swept mechanically around the guide. A system of gearing may be provided for directing the outer end of the arm, for example a plate may be provided arranged to rotate about an axis co-axial with the normal axis of the arm, assumed to be vertical, and upon this plate, epicyclic, circular, elliptical, double lobe, or other form of auxiliary gear may be provided intergeared with a stationary gear wheel, and arranged for example, so that the outer end of the arm, which is connected to be driven by the auxiliary gear, partakes of the rotational motion of the plate combined with the motion imparted by the auxiliary gear. In another case a guide may be provided for directing the movement of the outer end of the arm, and provision made for mechanically moving the end of the arm along the guide. For example, a rack may be provided along the path of the guide and a pinion be fixed at the outer end of the arm, and provision made for rotating the arm, so that with the pinion in mesh with the rack, the arm is moved along the guide.

In one form of construction the rocking arm may be of shaft formation arranged to extend diametrically through a ball which is mounted in a spherical bearing so carried in guides as to be capable of axial adjustment for varying the position of rock. Thus, assuming that the normal position of the arm is vertical the guide is also vertical and provision may be made for readily adjusting the position of the spherical bearing. As an example of an alternative method of support, a gimbal mounting may be provided. For guiding the outer end of the arm directing mechanism of the required character may be fixed with its centre co-axial with the normal axis of the arm and with its surface generally at right angles to the axis. The surface of the guide plate may be concave or flat and provision may be made if required to permit endwise movement of the outer end of the rod relative to the centre of rock, for example, it may be telescopic and be extended by a spring or otherwise.

Apparatus according to this invention is particularly adapted for use in conjunc-

tion with co-acting means, such as material distributing appliances, cutting devices and the like. For example, a number of stationary distributing nozzles may be arranged above the surface of the table for discharging material, for example, by controlled extrusion, upon the surface of the table at separate positions, while the table is moved. For example, the material distributed may be for making cakes, biscuits, confections, chocolates and the like, or for applying to formed articles placed upon the table a coating or partial coating of a decorative character, which in each case will be similar and in accordance with the movements imparted to the table. Cutters, for example, may be provided in place of nozzles and provision made for rotating the cutters rapidly or at such a speed so that the cutting edge of each cutter is maintained opposed to the direction of movement of the table. Cutters of this character may be used for dividing wafers, for engraving and other purposes.

As an example of another application of this invention a carrier may be provided furnished, for instance, with coating means such as distributors or cutters, the movements in this case being imparted to the carrier. Associated with a carrier of this description the articles to be produced or operated on may be formed or supported on a bed while stationary and in some cases provision may be made for intermittently moving the bed when the operations are completed, or for intermittently advancing beds successively into position on which groups of articles are to be formed or on which groups of articles to be operated on are mounted, or on which material to be operated on is placed.

Some examples of construction and modification of details will now be described with reference to the accompanying drawings in which:—

Figures 1 and 2 are a side and a front elevation illustrating a construction of apparatus.

Figure 3 is a plan, Figure 4 is a broken plan and Figure 5 is a sectional elevation of a system of gearing.

Figures 6 and 7 are diagrams to be described.

Figure 8 is an elevation illustrating a construction of apparatus, and

Figure 9 illustrates a modification.

Figure 10 is a broken plan and Figure 11 is a sectional elevation of a modification.

Figure 12 is an elevation and Figure 13 is a plan, and Figure 14 is a plan and Figure 15 is an elevation each respectively of mechanism to be described.

In the drawings A designates the movable member which is represented in each case as consisting of a table, and B the rocking arm.

In Figures 1 and 2, the table A is mounted to move on guides comprising a rod 1 fixed to rods 2 and arranged at right angles thereto. The rods 2 slide in brackets and the table A slides on the rod 1 which moves laterally when sliding with the rods 2. The rocking arm B passes through a spherical bearing C which permits it to turn freely in all angular directions, and as indicated is arranged capable of vertical adjustment by connection with a lever 3. The inner end (in this case the upper end) of the arm B engages with a socket 4 on the underside of the table and the outer end of the arm B is connected to a system of gearing, which will be described with reference also to Figures 3, 4 and 5. This system comprises a rotatable driver here represented as consisting of a power driven pinion 5 which meshes with a toothed gear wheel D, gear wheels 6, 7 and 8, carried by the wheel D, a stationary toothed gear 9 and two lobe gear wheels E, F which mesh with one another. The lobe E and gear wheel 8 are connected to rotate together. In operation as the wheel D is rotated the lobe E is rotated about its axis being driven by the gear 6 (in mesh with the stationary gear 9) and gear wheels 7 and 8, and the lobe wheel F is driven by the lobe E. In each lobe two sockets E¹ E² and F¹ F² are formed, in any one of which the outer end of the rocking arm B may be placed and its movements thereby directed. Thus when in engagement with the socket E¹ movements are imparted to the table A such that all points describe a path as illustrated at Figure 6 and when in engagement with the socket F² paths as illustrated at Figure 7, in the latter case the outer path being described when bearing C is in a low position and the inner path when in a high position.

In Figures 1 and 2 G indicates a series of distributing nozzles of an extrusion apparatus which comprises a chamber G¹ to receive material and a piston G² operated by a hand wheel G³ for effecting extrusion through the nozzles G. This apparatus is adapted to be operated in one position and traversed laterally for subsequent discharges.

In Figure 8 the movable member A is mounted to rest upon a stationary horizontal bed H, and is guided by two rocking arms B being provided to which corresponding rocking movements are imparted. In this case two gear systems of the character described with reference to Figures 3, 4 and 5 are provided driven by connected power shafts are indicated, but as indicated at Figure 9 one power drive only may be used by connecting the wheels D. This method may also be applied for driving the lobe wheels E. As illustrated at Figure 8 two hand levers 3 are provided, one for each

spherical bearing of the rocking arms B, and these levers 3 are connected so that corresponding adjustments will be made by operation of either.

5 In Figures 10 and 11 a stationary diagram guide K is provided with which the rocking arm B engages, and is moved along the guide K by a power driven wheel K¹ formed with a radial slot K² through which
10 the arm B extends.

Figures 12 and 13 illustrate a gimbal support to permit the lever B to rock freely in all angular directions associated with means for rotating the arm B. This construction comprises axes at right angles to one another and is associated with a driving pinion L, mounted co-axial with one of these axes, which gears with a toothed wheel N with which the arm B is connected to rotate while being free to move endwise therein.

Figures 14 and 15 illustrate a construction comprising a guide P for the rocking arm B to engage with associated gear such as described with reference to Figures 12 and 13 in which the arm B is rotated. In this case a pinion R is fixed to the outer end of the arm B to engage with a rack T, whereby in operation the arm is moved along the guide.

I claim:—

1. Apparatus comprising a movable member, position restricting means by which the movable member is permitted to move freely in or approximately in a plane in such a manner that when the movable member is moved any straight line on the movable member in said plane is maintained parallel to its original position or approximately so,
35 a rocking arm, a support for the rocking arm located at a position between its ends about which the rocking arm may turn freely in all angular directions, a coupling connection between one end of the rocking arm and the movable member, a rotatable driver, and means driven by the rotatable driver connected with the rocking arm for mechanically imparting compound movements to the other end of the rocking arm,
40 for the purposes set forth.

2. Apparatus comprising a movable member, position restricting means by which the movable member is permitted to move freely in or approximately in a plane in such a manner that when the movable member is moved any straight line on the movable member in said plane is maintained parallel to its original position or approximately so,
45 a rocking arm, a support for the rocking arm located at a position between its ends about which the rocking arm may turn freely in all angular directions, means for altering the position of the support relative to the ends of the rocking arm, a coupling connection between one end of the rocking arm
50 and the movable member, a rotatable driver, and means driven by the rotatable driver connected with the rocking arm for mechanically imparting compound movements to the other end of the rocking arm, for the purposes set forth.

3. Apparatus comprising a movable member, position restricting means by which the movable member is permitted to move freely in or approximately in a plane in such a manner that when the movable member is moved any straight line on the movable member in said plane is maintained parallel to its original position or approximately so,
55 a rocking arm, a support for the rocking arm located at a position between its ends about which the rocking arm may turn freely in all angular directions, a coupling connection between the inner end of the rocking arm and the movable member, the distance between the support and the inner end of the arm being short in comparison with that between the support and the outer end, a rotatable driver, and means driven by the rotatable driver connected with the outer end of the rocking arm for mechanically imparting compound movements to the outer end of the rocking arm, for the purposes set forth.

4. Apparatus comprising a movable member, position restricting means for the movable member comprising guides at right angles to one another and arranged parallel to the plane of movement to be imparted to the movable member, a rocking arm, a support for the rocking arm located at a position between its ends about which the rocking arm may turn freely in all angular directions, a coupling connection between one end of the rocking arm and the movable member, a rotatable driver, and means driven by the rotatable driver connected with the rocking arm for mechanically imparting compound movements to the other end of the rocking arm, for the purposes set forth.

5. Apparatus comprising a movable member having a flat surface arranged horizontally, position restricting means for the movable member comprising horizontal guides at right angles to one another, a rocking arm, a support for the rocking arm located at a position between its ends about which the rocking arm may turn freely in all angular directions, a coupling connection between one end of the rocking arm and the movable member, a rotatable driver, and means driven by the rotatable driver connected with the rocking arm for imparting compound movements to the other end of the rocking arm, for the purposes set forth.

6. Apparatus comprising a movable member having a flat surface arranged horizontally, position restricting means by which the movable member is permitted to move
120
125
130

freely in or approximately in a plane in such a manner that when the movable member is moved any straight line on the movable member in said plane is maintained parallel to its original position or approximately so, a rocking arm, a support for the rocking arm located at a position between its ends about which the rocking arm may turn freely in all angular directions, a coupling connection between one end of the rocking arm and the movable member, and a system of gearing for directing the other end of the arm, for the purposes set forth.

7. Apparatus comprising a movable member, position restricting means by which the movable member is permitted to move freely in or approximately in a plane in such a manner that when the movable member is moved any straight line on the movable member in said plane is maintained parallel to its original position or approximately so, transmission means for transmitting to the movable member movements, directing mechanism comprising a system of gearing, and a connection between the transmission means and the directing mechanism, for the purposes set forth.

8. Apparatus comprising a movable member, position restricting means by which the movable member is permitted to move freely in or approximately in a plane in such a manner that when the movable member is moved any straight line on the movable member in said plane is maintained parallel to its original position or approximately so, transmission means for transmitting to the movable member movements, and directing mechanism comprising a rotatable plate, a stationary gear wheel, an auxiliary gear carried by the plate and intergeared with the stationary gear wheel, and a connection between the auxiliary gear

and the transmission means, for the purposes set forth.

9. Apparatus comprising a movable member, position restricting means by which the movable member is permitted to move freely in or approximately in a plane in such a manner that when the movable member is moved any straight line on the movable member in said plane is maintained parallel to its original position or approximately so, a rocking arm, a support for the rocking arm located at a position between its ends about which the rocking arm may turn freely in all angular directions, a coupling connection between the inner end of the rocking arm and the movable member, a rotatable plate, a stationary gear wheel, an auxiliary gear carried by the plate and intergeared with the stationary gear wheel and, a connection between the auxiliary gear and the rocking arm, for the purposes set forth.

10. Apparatus comprising a movable member, position restricting means by which the movable member is permitted to move freely in or approximately in a plane in such a manner that when the movable member is moved any straight line on the movable member in said plane is maintained parallel to its original position or approximately so, a rocking arm of shaft formation, a spherical bearing support through which the rocking arm extends diametrically, a guide for the spherical bearing, means for adjusting the position of the spherical bearing in the guide, a connection between one end of the rocking arm and the movable member and means connected with the rocking arm for mechanically imparting compound movements to the other end of the rocking arm, for the purposes set forth.

HUGH WATSON MACKENZIE.