P. DAIMLER & M. FRIZ.

MECHANISM FOR CONTROLLING DRIVING MEANS.

APPLICATION FILED FEB. 8, 1916.

1,269,581.

Patented June 18, 1918.

3 SHEETS—SHEET 1.

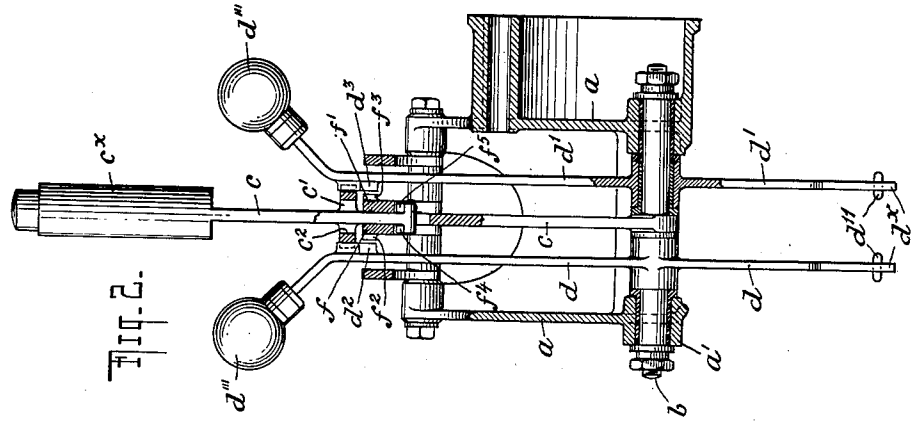


Fig. 2.

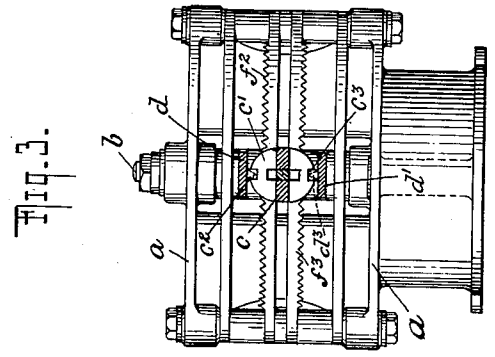


Fig. 3.

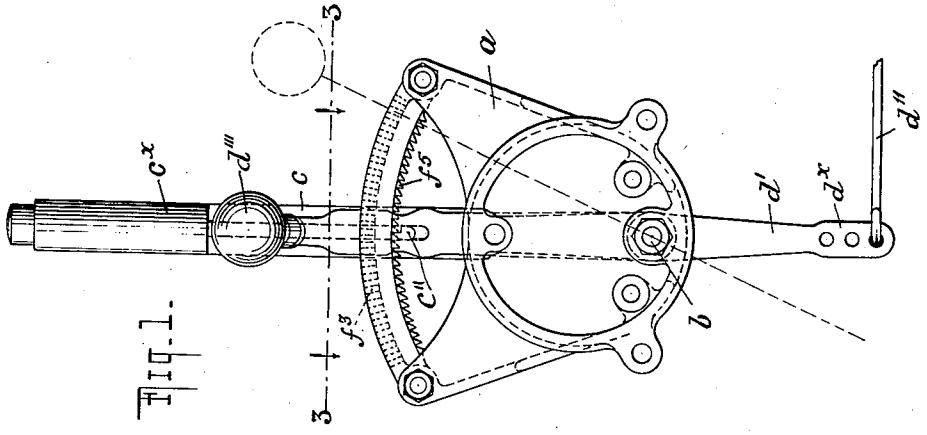


Fig. 1.

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Fig. 5.

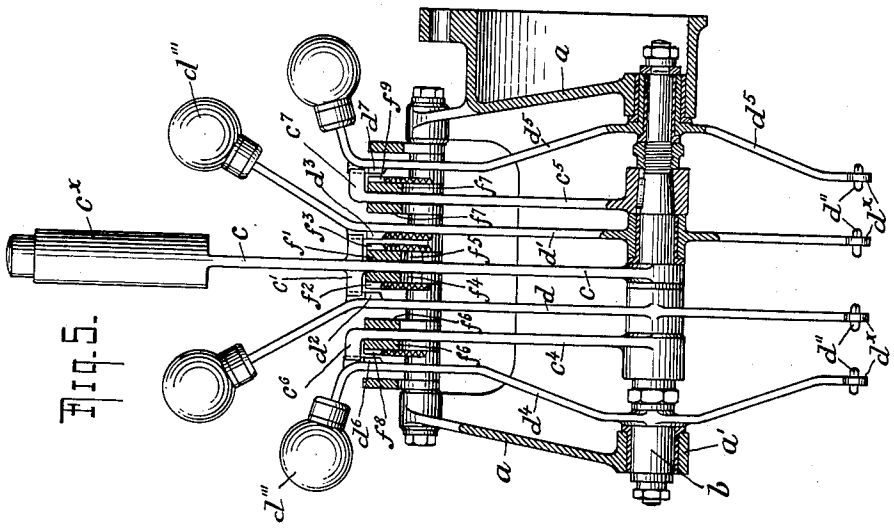


Fig. 6.

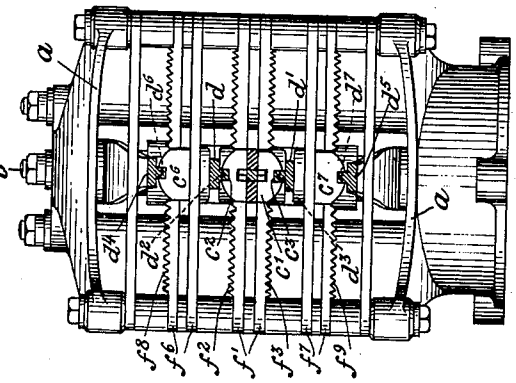
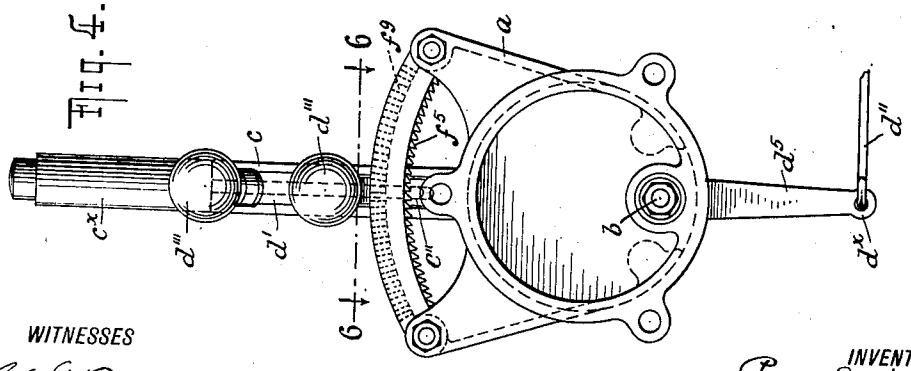


Fig. 4.



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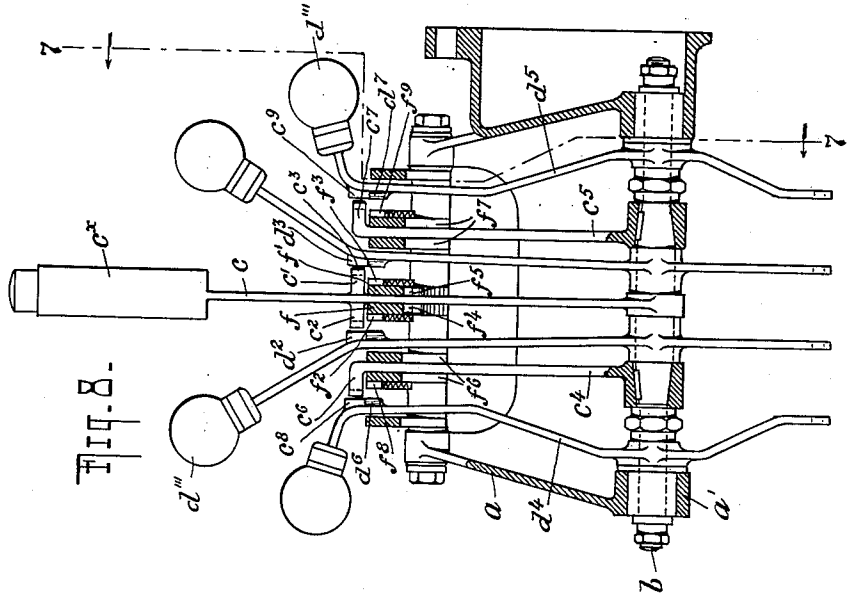


Fig. 8.

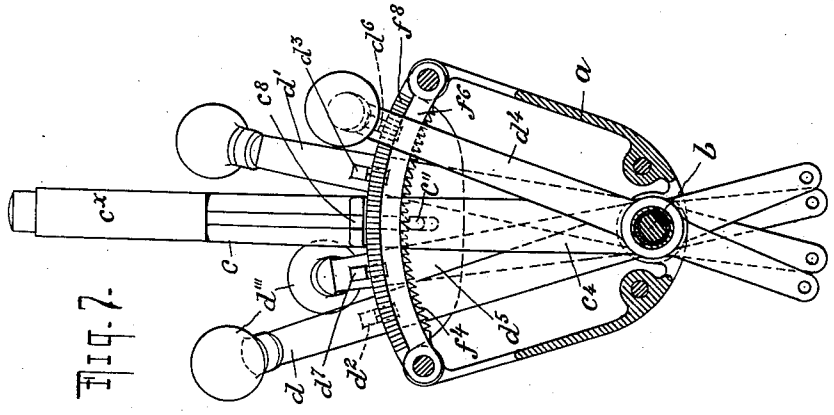


Fig. 7.

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MECHANISM FOR CONTROLLING DRIVING MEANS.

1,269,581. Specification of Letters Patent. Patented June 18, 1918.

Application filed February 8, 1916. Serial No. 77,100.

To all whom it may concern:

Be it known that we, PAUL DAIMLER and MAX FRIZ, both citizens of Germany, and residents, respectively, of Cannstadt and Stuttgart-Untertürkheim, Germany, have jointly invented certain new and useful Improvements in Mechanisms for Controlling Driving Means, of which the following is a specification.

Our invention relates to mechanisms for controlling driving mechanisms composed for instance of a plurality of individual internal combustion motors or separate motor groups and adapted more particularly as driving mediums for flying apparatus or airships. The particular purpose of our improvement is to provide a simple and efficient mechanism whereby such motors or motor groups may be individually or concurrently regulated or controlled as may be desired, the regulation or control being accomplished for instance through the medium of the vaporizer or carbureter or by regulating the ignition point as the requirements of the moment may render necessary. Our invention will be fully described hereinafter and the features of novelty will be pointed out in the appended claims.

In the accompanying drawings which show several examples of our improvement Figure 1 is a side view of one form thereof; Fig. 2 is a sectional elevation showing the parts in normal position; Fig. 3 is a detail horizontal section on the line 3—3 of Fig. 2; Fig. 4 is a view similar to Fig. 1 of another form of our improvement; Fig. 5 is a sectional elevation thereof; Fig. 6 is a horizontal section on the line 6—6 of Fig. 4; Fig. 7 is a sectional view of the form shown in Fig. 4 with the parts in different positions and Fig. 8 is a view similar to Fig. 5 showing the parts in different positions.

Referring to the form shown in Figs. 1–3 which is arranged to control a driving means composed for instance of two individual motors or two motor groups *a* represents a relatively stationary support of frame suitably supported in operative position and carrying a shaft *b* rotatably mounted in bearings *a'* located on the frame *a*. A main lever *c* is located upon this shaft *b* preferably so as to rotate therewith and extends upwardly therefrom and terminates in an operating handle c^x, auxiliary levers *d* and *d'* being loosely mounted on said shaft at opposite sides of and in relatively close proximity to the main lever *c* as shown in Fig. 2. These auxiliary levers *d* and *d'* are provided with downwardly projecting extensions d^x each of which is connected by means of a wire, rod or the like *d''* with a coöperating element in each motor or motor group which is to be regulated or controlled. The main lever *c* is movable between and guided by stationary segmental members *f* and *f'* having their opposite ends secured upon the frame *a* and curved in arcs having the axis *b* for a center as shown best in Fig. 1, said members *f* and *f'* being provided on their outer surfaces with teeth f^2 and f^3 which project toward the auxiliary levers *d* and *d'*. At their lower curved edges the segmental members *f* and *f'* are provided with teeth f^4 and f^5 which cooperate with projections c^2 on the main lever *c* to maintain the latter in a given position. In addition to this the main lever *c* at points above the segmental members *f* and *f'* is provided on its opposite faces with curved disks *c'* having centrally located notches c^2 and c^3 projecting respectively toward the auxiliary levers *d* and *d'*, this arrangement being most clearly shown in Fig. 3. The auxiliary levers *d* and *d'* carry teeth or projections d^2 and d^3 located in registry with the teeth f^2 and f^3 and extended upwardly so as to also lie opposite the disks *c'* of the main lever *c* as shown in Fig. 2. The auxiliary levers *d* and *d'* are further preferably provided at their upper ends with suitable operating handles *d'''*.

In the normal condition of the parts the teeth d^2 and d^3 of the auxiliary levers *d* and *d'* are in engagement respectively with the teeth f^2 and f^3 of the segmental members *f* and *f'* so that said auxiliary levers *d* and *d'* are held against operation, the main lever *c* being at the same time in a normal position in which the curved projections *c'* are out of line with said auxiliary levers *d* and *d'*. As before stated the main lever *c* is maintained in a given position through the cooperation of the teeth f^4—f^5 and the projection *c''*.

If it is desired to adjust or regulate the motors or motor groups independently of each other, the auxiliary levers d and d' are actuated. These auxiliary levers are constructed so as to be somewhat resilient and may thus be first manipulated transversely to disengage the teeth d^2 and d^3 from the teeth f^2 and f^3 of the segmental members f and f' after which said auxiliary levers may be pivotally moved on the axis b and relatively to the main lever c to produce a pull or a push on the wires or rods d'' whereby the elements connected with said wires or rods d'' are operated to bring about the desired adjustment or regulation of each motor or motor group independently of the others. If only one motor or motor group is to be regulated it is simply necessary to manipulate the particular auxiliary lever connected therewith, in the manner above set forth, this actuation of said auxiliary lever being independent of the other auxiliary lever and also of the main lever c. After the desired regulation has been had the auxiliary levers may be returned to normal position in which the teeth d^2 and d^3 thereof will again snap into engagement with the teeth f^2—f^3 of the members f and f' and lock said auxiliary levers against movement. The teeth f^2 and f^3 may extend along the members f and f' so that the auxiliary levers may be held in any adjusted position through the medium of the teeth d^2 and d^3.

If the motors or motor groups are to be concurrently regulated the main lever c is first released by disengaging the projection c'' from the teeth f^4 and f^5 located on the lower edges of the segmental members f and f' in any suitable and convenient manner. After this has been done the said main lever c is moved in the arc of a circle on the axis b which will first bring the curved peripheries of the disks c' into engagement with the upwardly extended portions of the teeth d^2 and d^3 of the auxiliary levers d and d'. A continued actuation of said main lever c will cause the said peripheries of said disks c' to exert a camming action on said teeth d^2 and d^3 and will in consequence gradually force said auxiliary levers d and d' apart and thus disengage the teeth d^2 and d^3 thereof from the teeth f^2 and f^3 whereby said auxiliary levers are freed from restraint. As soon as the relative movement of the main lever c is sufficient to bring the notches c^2 and c^3 of the disk c' into registry with the teeth d^2 and d^3 the latter owing to the resiliency of said auxiliary levers will snap into said notches c^2 and c^3 and thereby couple the auxiliary levers d and d' and the main lever c together. As the actuation of the main lever is now continued the auxiliary levers d and d' will be concurrently carried along in a pivotal movement and will thus bring about a simultaneous regulation of all of the motors or motor groups as will be readily apparent. A return actuation of the main lever c will carry the auxiliary levers d and d' back with it, the latter being disconnected from said main lever c by disengaging the teeth d^2 and d^3 from the notches c^2 and c^3 and permitting them to snap back into engagement with the teeth f^2 and f^3 to again lock said auxiliary levers d and d' in their normal positions. In the meantime the projection c'' in coöperation with the teeth f^4 and f^5 now again secures the main lever c against movement. The teeth f^4 and f^5 may be located along the entire lower edges of the members f and f' so that the main lever c and connected parts may be held in any adjusted position by means of the projection c''.

The form of our improvement shown in Figs. 4–6 is intended to control and regulate four individual motors or four motor groups and in addition to the parts included in the first form comprises arms c^4 and c^5 which are secured upon the shaft b to rotate therewith and are movable respectively between stationary segmental members f^6 and f^7 similar to the members f^4 and f^5 and likewise carried by the support or frame a' which latter corresponds to the frame a and is also supported in operative position in any convenient manner. The arms c^4 and c^5 are located alongside of the auxiliary levers d and d' and at their upper ends carry semi-circular disks c^6 and c^7 having notches c^8 and c^9 similar to the notches c^2 and c^3 of the disk c' and preferably arranged in line therewith. This form of my improvement further includes additional auxiliary levers d^4 and d^5 located alongside and outside of the arms c^4 and c^5 respectively and corresponding to the levers d and d' of the form first described, said auxiliary levers d^4 and d^5 being also loosely mounted on the shaft b so as to be movable thereon and preferably also having their free ends provided with operating handles d'''. The said additional auxiliary levers d^4 and d^5 are further also formed with downwardly projecting extensions d^x each of which is operatively connected by means of a rod, wire or the like d'' with one of the motors or motor groups. The additional auxiliary levers also carry teeth d^6 and d^7 corresponding to the teeth d^2 and d^3 of the auxiliary levers d and d' and adapted to coöperate in the same way with the notches c^8 and c^9 of the semi-circular disks c^6 and c^7 and with teeth f^8 and f^9 carried respectively by one of the segmental members f^6 and f^7 as shown in Figs. 5 to 8 inclusive and corresponding to the teeth f^2 and f^3. It will be understood that the auxiliary levers d^4 and d^5, like the auxiliary levers d and d', are constructed so as to be somewhat resilient. In all other respects the present form may be

the same as the form of our improvement first described.

When it is desired to regulate or control any one of the motors or motor groups independently of the others, the particular auxiliary lever d, d', d^4 or d^5 which is operatively connected with the particular motor or motor groups to be regulated is first released by pressing said lever transversely against its resiliency to disconnect the teeth d^2, d^3, d^6 or d^7 from the teeth f^2, f^3, f^8 or f^9 as the case may be. After this has been done the particular auxiliary lever is simply rocked on the shaft b and moved between its coöperating segmental members to actuate its extension $d^\times$ and connected rod, wire or the like d'' which results in a regulation or control in the desired manner of the particular motor or motor group in question. It will thus be seen, as shown in Figs. 7 and 8, that the auxiliary levers d, d', d^4 and d^5 are capable of being actuated independently of each other and of the main lever c and arms c^4 and c^5 which latter are fast upon the shaft b and thus movable with the main lever c, so that the motors or motor groups may be individually or independently regulated in any desired manner. After the particular auxiliary lever or levers have been independently operated to bring about the desired regulation they may be returned to normal position by an actuation in a reverse direction to again cause the teeth d^2, d^3, d^6 or d^7 according to which of the auxiliary levers is being manipulated to snap back into engagement with the coöperating teeth f^2, f^3, f^8 or f^9 carried by the respective segmental members, and thus again lock the auxiliary lever or levers in normal position.

If a concurrent or simultaneous regulation or adjustment of all of the motors or motor groups is desired the projection c'' is first disengaged from the teeth f^4 and f^5 of the segmental members f and f' to release the main lever c after which said main lever c is moved in the arc of a circle between the said members f and f'. This movement of the main lever c will rock the shaft b and owing to the fact that the arms c^4 and c^5 are fast upon said shaft will consequently also move said arms in circular arcs between their respective segmental members f^6 and f^7. As said main lever c and arms c^4 and c^5 are thus actuated the peripheries of the disks c', c^6 and c^7 will concurrently engage the upwardly extended portions of the teeth d^2, d^3, d^6 and d^7 and will exert a camming action thereon whereby the auxiliary levers d d', d^4 and d^5 will all be moved outwardly against their tension as shown diagrammatically in Fig. 8 and the teeth d^2, d^3, d^6 and d^7 thus disengaged from the teeth f^2, f^3, f^8 and f^9 of the segmental members f^4, f^5, f^6 and f^7. A continued actuation of the main lever c and arms c^4 and c^5 will finally bring the notches c^2, c^3, c^8 and c^9 of the disks c' c^6 and c^7 into registry respectively with the teeth d^2, d^3, d^6 and d^7 which as a result will all snap into said notches as shown in Fig. 6 and thus operatively connect the auxiliary levers d, d', d^4 and d^5 with the main lever c and arms c^4 and c^5. In this condition of the parts all of the auxiliary levers are coupled to the main lever c so that a further operation of the latter will cause a corresponding and concurrent actuation of all of said auxiliary levers and thus bring about a concurrent or simultaneous regulation or adjustment of all of the motors and motor groups. A reverse actuation of the main lever c will finally return all of the parts to their initial positions in which the auxiliary levers are again capable of being independently operated or in connection with the main lever as may be desired. With this last form it is further possible to manipulate two of the auxiliary levers, for instance d' and d^5 independently of each other and then concurrently operate the other two levers d and d' by an actuation of the main lever c as indicated in Fig. 6. Any other desired combination is possible with equal efficiency and facility. It will be noted that Fig. 2 of the drawings shows the parts in normal position while Fig. 5 illustrates all of the auxiliary levers coupled to the main lever c. In this last form also the teeth f^2, f^3, f^8 and f^9 as well as the teeth f^4 and f^5 may extend throughout the respective segmental members f, f', f^6 and f^7 so that the auxiliary levers individually or the main lever when coupled to said auxiliary levers may be maintained in an adjusted position in the same way as explained with respect to the form first described.

It will thus be seen that in both forms of our improvement a regulation or adjustment of each motor or motor groups independently of all others is readily possible, while at the same time said motors and motor groups may be simultaneously or concurrently regulated or adjusted when desired, in a simple and efficient manner. It will be apparent that our improvement may be readily adapted for individually or concurrently regulating or adjusting more than four motors or motor groups with equal efficiency by simply carrying out the arrangement shown in Figs. 4–6. It will of course be understood that the peripheries of the disks c', c^6 and c^7 may be otherwise found than as curves as long as said peripheries serve to exert the desired camming action on the auxiliary levers.

If desired both forms of our improvement may include additional members having their ends connected with the frames a and a' for bracing or stiffening same. In the form first described the main lever c may be loose or fast on the shaft b as desired

while in the form last described the said lever *c* is preferably secured to said shaft *b* to rotate therewith, although other equivalent arrangements adapted to produce the desired results may be substituted if desired. It will further be understood that the apparatus is set up within easy reach of the operator and that the same may be utilized for regulating and controlling any type of driving or other mechanisms where an individual and a concurrent adjustment is desired. While we have described our improvement as particularly adapted for use in connection with flying apparatus, airships and the like, it will be obvious that the same is equally well adapted for many other uses.

Various changes in the specific form shown and described may be made within the scope of the claims without departing from the spirit of our invention.

We claim:

1. A mechanism of the kind described comprising a plurality of auxiliary controlling members movable independently of each other, means for locking said auxiliary members against operation a movable main member and means on said main member whereby said auxiliary members are first released from said locking means and then coupled to said main lever whereby an actuation of the latter will concurrently actuate all of said auxiliary members.

2. A mechanism of the kind described comprising a movable main member, guiding means for said main member, a plurality of resilient controlling members movable independently of each other and of said main member, coöperating means on said guiding means and resilient members whereby the latter are locked against movement, cam surfaces carried by said main member arranged to move said resilient members against their tension to disengage said coöperating locking means and coöperating means combined with said resilient members and said cam surfaces for coupling the resilient members and main member together whereby an actuation of the latter will concurrently actuate all of said resilient members.

3. A mechanism of the kind described comprising a support, a shaft carried by said support, a main lever located upon said shaft, segmental members on said support between which said main lever is movable, a plurality of auxiliary, controlling levers loosely mounted on said shaft and movable thereon independently of each other and of said main lever, teeth on said segmental members, projections on said auxiliary levers adapted to coöperate with said teeth to lock said auxiliary levers against movement and means carried by said main lever for first disengaging said teeth and projections to release said auxiliary levers and then coupling the latter and said main lever together whereby an actuation of said main lever will concurrently actuate all of said auxiliary levers.

4. A mechanism of the kind described comprising a support, a shaft carried by said support, a main lever located upon said shaft, segmental members on said support between which said main lever is movable, a plurality of resilient, auxiliary controlling levers loosely mounted on said shaft and movable thereon independently of each other and of said main lever, teeth on said segmental members, projections on said auxiliary levers adapted to coöperate with said teeth to lock said auxiliary levers against movement, and cams carried by said main lever adapted to engage said projections and move said auxiliary levers against their tension to disengage said projections and teeth from each other, said cams being provided with notches adapted to receive said projections whereby said auxiliary and main levers are coupled together and an actuation of said main lever will concurrently actuate all of said auxiliary levers.

5. A mechanism of the kind described comprising a support, a shaft carried by said support, a main lever located upon said shaft, segmental members on said support between which said main lever is movable, a plurality of resilient, auxiliary controlling levers loosely mounted on said shaft and movable thereon independently of each other and of said main lever, teeth on said segmental members, projections on said auxiliary levers adapted to coöperate with said teeth to lock said auxiliary levers against movement, cams carried by said main lever adapted to engage said projections and move said auxiliary levers against their tension to disengage said projections and teeth from each other, said cams being provided with notches adapted to receive said projections whereby said auxiliary and main levers are coupled together and an actuation of said main lever will concurrently actuate all of said auxiliary levers and releasable, coöperating means on said segmental members and main lever for locking the latter against movement.

6. The combination of a support, a shaft journaled thereon, a main lever fast upon said shaft, arms fast upon said shaft and movable with said main lever, auxiliary controlling levers loosely mounted on said shaft, additional auxiliary controlling levers loosely mounted on said shaft, said auxiliary levers all being movable independently of each other and of said arms and main lever, and means for operatively connecting said auxiliary levers and said additional auxiliary levers respectively with said main lever and said arms whereby an actuation of said main lever will concurrently actuate all of said auxiliary levers.

7. The combination of a support, a shaft journaled thereon, a main lever fast upon said shaft, arms fast upon said shaft at opposite sides of said main lever and movable therewith, segmental members on said support between which said main lever and said arms are movable, resilient auxiliary controlling levers loosely mounted on said shaft between said arms and said main lever, additional resilient auxiliary controlling levers loosely mounted on said shaft outside of said arms, said auxiliary levers all being movable independently of each other, and of said arms and main lever, teeth on said segmental members, projections on said auxiliary levers adapted to coöperate with said teeth to lock said auxiliary levers against movement, and cams carried by said main lever and said arms adapted to engage said projections and concurrently move all of said auxiliary levers against their tension to disengage said projections and teeth from each other, said cams being provided with notches adapted to receive said projections whereby said auxiliary levers are operatively connected with said arms and main lever and an actuation of the latter will concurrently actuate all of said auxiliary levers.

8. A mechanism of the kind described comprising a plurality of independently movable controlling members, means for locking said members against operation and means for first releasing said controlling members and for subsequently coupling at least two of said members together to operate concurrently.

9. A mechanism of the kind described comprising a plurality of independently movable resilient controlling members, means for locking said members against operation, operating means and devices carried by said operating means whereby said members are moved against their resiliency to disconnect the locking means and whereby at least two of said members are coupled to said operating means and actuated concurrently thereby.

In testimony whereof we have hereunto set our hands.

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MAX FRIZ.