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VARIABLE CONTROL FOR SPEED ACTUATED
MULTIPLE SWITCH MECHANISM
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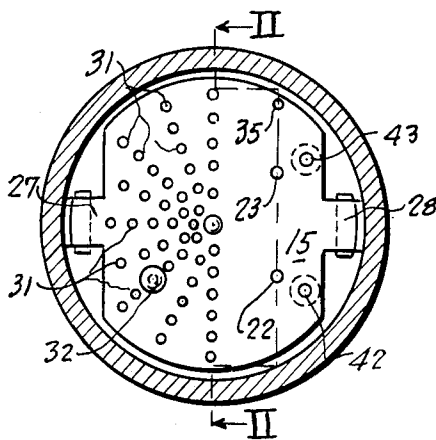
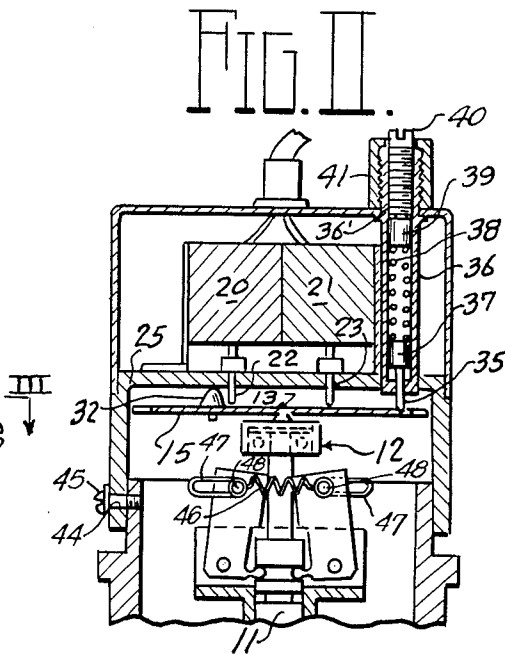
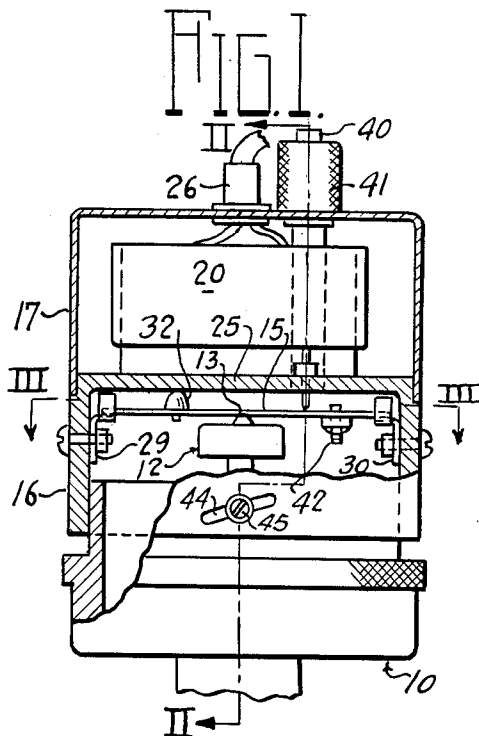
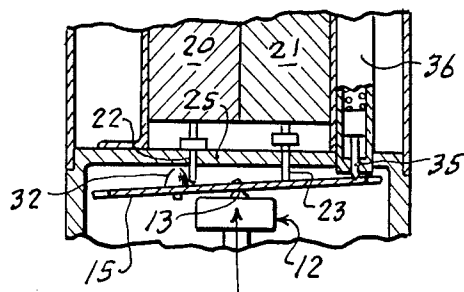


FIG. III.

FIG. IV.



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VARIABLE CONTROL FOR SPEED ACTUATED
MULTIPLE SWITCH MECHANISM

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9 Claims. (Cl. 200—80)

The present invention relates to an improvement on my prior Patent No. 2,457,192, particularly the embodiment of Figures V through IX in that by the present invention, I provide a greatly increased range of adjustability for the operation of the electrical circuit controlling switches disclosed.

The object of the present invention therefore includes providing changeable means having a wide range of position for operation whereby in tripping and resetting switches for various circuits, the ratio of movement for the operation of the switches may be widely changed to meet greatly varying operating conditions. In this connection, the correlation of the tripping and resetting of one switch and its relation to the operation of the other may be worked out in relation to speed due to the connection with the governor shaft and the operation of the switches may be controlled and correlated to a very close ratio as required in certain settings or, on the other hand, the mechanism with its adjustable arrangement may be positioned for wider differences of sequential operations.

Further objects and advantages are within the scope of this invention such as relate to the arrangement, operation and function of the related elements of the structure, to various details of construction and to combinations of parts, elements per se, and to economies of manufacture and numerous other features as will be apparent from a consideration of the specification and drawings of a form of the invention, which may be preferred, in which:

Figure I is an elevational view partly in section;

Figure II is a section on the line II—II of Figure I and Figure III;

Figure III is a transverse section on the line III—III of Figure I; and

Figure IV is a view similar to Figure II, showing the parts in an operating position.

Referring to the drawings, I provide a fixed casing 10 surrounding a governor shaft 11 on which is mounted a speed controlled extendable and retractable plunger element 12 terminating in a thrust bearing 13 adapted to effect the operations of the switches through a switching element in the form of a tilting plate 15.

Attached to the lower casing 10 is an upper two-part housing (16 and 17) for housing the switching and controlling mechanism of the present invention where it will be seen that I provide two switches 20 and 21 having depending operating switch points 22 and 23. To suitably support these switch elements, I provide a transverse upper wall 25 on the casing 16 while the upper portion of the casing 17 which houses the switches is provided with electrical circuit terminals 26.

The tiltable switch operating plate 15 is provided with integral tongues 27 and 28 adapted to be movably guided in suitable brackets 29 and 30 on the casing, as shown, each of said brackets having suitable ears for contacting said tongues on said tilting plate 15.

The plate 15 by resting on the pivot 13 of the plunger element 12 is thus connected with the governor shaft and moves upwardly and downwardly in increasing or de-

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creasing speeds. The movement and tilting of this plate 15 in a great variety of ways constitutes a special feature of the present invention.

To this end, as will be seen particularly in Figure III, the plate 15 has a large number of series of holes 31 arranged in radial lines. It will be noted that these radial lines for the holes 31 are all located on the left-hand side of a transverse diameter for the plate 15 as shown in Figure III and said series of holes are on the opposite side of the plate compared with the position of the retractable spring loaded pivot 32 on the upper casing as herein-after described.

I provide a removable and resettable pivot pin 32 adapted to be inserted in any one of these holes 31 whereby when the upper surface of said pin 32 contacts the lower surface of the transverse top wall 25 of the casing 16 further movement of the governor shaft will tilt the plate 15 so that the switch points 22 and 23 may be variously operated. Cooperating with the pivot 32, I provide a spring loaded retractable pivot 35 which may be adjusted as desired. As shown, the pivot 35 is mounted in a cylinder 36 and the pivot pin 35 has a suitable head 37. Within the cylinder 36 a preloaded spring 38 is interposed between said head and a short plunger 39 which is part of a suitable adjusting screw 40 so that the position of the head 39 may be adjusted to vary the operating effect or change the preloading of the spring 38. On the top of the upper casing 17, I provide a suitable screw-threaded collar 41 which holds the adjusting screw 40 in position on casing 17, the collar 41 clamping the cylinder 36 to the casing 17 due to the shoulder 36', the screw threads on the screw shaft 40 inside and those on cylinder 36 are arranged so that by adjusting the short shaft 40 the plunger 39 may be variously and suitably positioned.

In order to protect the operation of the tilting plate 15 and the mechanism in action, it will be noted that I have provided a pair of over-travel adjustable set screws 42 and 43 located in the plate 15, the same being arranged to contact the under surface of the transverse wall 25 in case of extreme movement of the plate 15.

The upper two part housing 16 carrying the switch and operating mechanism may be adjusted to the lower casing 10 as shown in Figure I by use of the inclined slot 44 located in one of these parts and a suitable set pin and locking screw 45 connected to the other part to lock the housing in desired adjusted position relative to the governor mechanism in the lower casing 10. This forms means for further adjusting the desired operation of the switching mechanism.

For operating the movement of the thrust bearing 12 in a special manner, I provide special range springs 46 for the governor weights having elongated loops 47 at one end as shown in Figure II so that the ends of the springs contact the retaining pins 48 at predetermined times as the speed increases and the weights fly outward thus forming further means of adjusting the time of operation of the switch mechanism hereof.

In connection with the operation of my device, it will be seen that the tilting plate 15 is carried by the thrust bearing 13 connected with the governor and the pivot pin 32 having been located in any one of the openings 31 depending upon the operating conditions desired to be effected, as the speed of the governor increases the thrust bearing moves upwardly and since the pivot 32 contacts the lower surface of the wall 25, the plate 15 will tilt. If the pin 32 is in certain position, for example, shown in Figure III, a line or axis of tilt for the plate 15 will be established for the plate 15 extending between said pivot 32 and the other pivot 35. As the plate tilts the same will contact switch point 23 and operate the switch 21. Under these conditions, the loaded spring 38 prevents the retraction of the pivot 35.

Assume now that the speed of the governor increases, increased pressure is developed on the pivot 35 overcoming the loaded spring 38, whereupon the plate 15 again tilts at another angle so as to contact the other switch point 22 and operate the other switch 20.

Upon a reduction of speed in the governor, the thrust bearing 13 moves downwardly whereupon the loaded spring 38 and the weight of the parts returns the tilting plate 15 and the parts to original position so that the switches then become reset to original position in serial.

It will be understood that by moving the pin 32 in any one of the large number of other positions available, a quite varied operation of the switch points 22 and 23 may be effected as, for example, switch point 22 may be operated prior to the operation of the switch point 23.

For production purposes, it will be understood that the manufacturer for one requirement may locate the pin 32 in one place and for another installation with the same apparatus put the pin 32 in another position and meet required conditions quite different from the first. Then again, the same first instrument may be taken apart and the pin reinserted in another place so as to use the same original device in an entirely different installation.

It is apparent that, within the scope of the invention, modifications and different arrangements may be made other than is herein disclosed, and the present disclosure is illustrative merely, the invention comprehending all variations thereof.

What I claim is:

1. In a plural switch controlling mechanism; a governor controlled movable element; a member forming an abutting surface; a spring loaded retractable pivot extending through said member toward said element, said retractable pivot adapted to be contacted by said element; a plurality of holes in said element and a removable pivot pin adapted to be set in any one of said holes, said pin upon movement of said governor controlled element adapted to be moved to contact said abutting surface whereby said pin in said element and said retractable pivot form pivotal means whereby said governor causes said element to operate said switches in a predetermined sequence.

2. In a plural switch controlling mechanism; a governor controlled movable and tiltable plate; a member forming an abutting surface; a spring loaded retractable pivot extending through said member, said retractable pivot adapted to be contacted by said plate; a plurality of holes in said plate and a removable pivot pin adapted to be set in any one of said holes, said pin upon movement of said governor controlled plate adapted to contact said abutting surface whereby said pivot pin and said retractable pivot form an axis around which movement of the governor causes said plate to tilt and actuate said switches.

3. In a governor controlled plural switch operating mechanism having a tiltable pivoted switch operating plate, said plate actuated by said governor, said mechanism having an abutting surface against which means on said plate contacts to cause said plate to tilt and operate said switches at varying times, said plate having a plurality of pin receiving openings therein; and a removable pivot pin adapted to be inserted in any one of said openings and frictionally held in said plate, said pin adapted to contact said abutting surface to form a pivot for tilting said plate and operating said switches in selective serial.

4. In a plural switch controlling mechanism, a governor controlled movable and tiltable plate; a member forming an abutting surface; a spring loaded retractable pivot carried by said member and adapted to be contacted by said tiltable plate; an insertable and removable pivot pin adapted to be carried in various positions on said plate, said pin adapted to contact said abutting surface to

tilt said plate under actuation by said governor against said retractable pivot held in extended position by said preloaded spring to operate one of said switches, the construction arranged whereby additional actuation of the governor controlled plate will cause retraction of said retractable pivot and operate another of said switches.

5. In a plural switch controlling mechanism, a speed controlled governor; a movable plate adapted to be actuated by said governor; a switch housing having a transverse wall; a plurality of individual switch actuating elements extending below said transverse wall in said housing; a spring loaded retractable pivot extending below said transverse wall in said housing, said pivot adapted to contact said movable plate; a plurality of holes in said movable plate; and a pin adapted to be removably positioned in any one of said holes in said movable plate, said pin adapted to contact said wall in said housing upon actuation of said movable plate by said governor and tilt said plate, effect contact by said plate with said retractable pivot, said plate actuating said switch elements to operate said switches in a selected serial.

6. In a plural switch controlling mechanism, a housing; a speed controlled governor within said housing; a movable plate carried by said housing; a support for said movable plate; means actuated by said governor forming a pivotal contact for said plates; a transverse wall in said housing; a plurality of individual switch actuating elements extending below said transverse wall; an adjustable spring loaded retractable pivot extending below said transverse wall, said pivot adapted to be contacted by said movable plate; a plurality of holes in said movable plate; and a pivot pin adapted to be removably positioned in any one of said holes and to contact said wall on said housing whereby upward actuation of said movable plate by said governor is adapted to tilt said plate and effect contact with said wall by said pin and contact between said retractable pivot and said plate actuating said switch elements adapted to operate said switches in the extended or retracted positions of said retractable pivot dependent upon the selected position of said removable pin.

7. In a plural switch controlling mechanism, a housing; a speed controlled governor within said housing; a movable plate carried by said housing; a support for said movable plate; means actuated by said governor forming a pivotal contact for said plate; a transverse wall in said housing; a plurality of individual switch actuating elements extending below said transverse wall; an adjustable spring loaded retractable pivot extending below said transverse wall, said pivot adapted to be contacted by said movable plate; a plurality of holes in said movable plate; and a pivot pin adapted to be removably positioned in any one of said holes and to contact said wall on said housing, the construction arranged so that upon upward movement of said means controlled by said governor, said pin on said plate contacts said bottom wall and said plate contacts said retractable pivot to tilt said plate and actuate one of said switches, and upon further movement of said governor means causes another tilting of said plate to actuate said other switch dependent upon the position of said retractable pivot.

8. In a plural switch controlling mechanism, a housing; a speed controlled governor within said housing; a movable plate carried by said housing; a support for said movable plate; means actuated by said governor forming a pivotal contact for said plate; a transverse wall in said housing; a plurality of individual switch actuating elements extending below said transverse wall; an adjustable spring loaded retractable pivot extending below said transverse wall, said pivot adapted to be contacted by said movable plate; a plurality of holes in said movable plate; and a pivot pin adapted to be removably positioned in any one of said holes and to

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contact said wall on said housing whereby upward actuation of said movable plate by said governor is adapted to tilt said plate and effect contact with said wall by said pin carried by said plate, and contact between said retractable pivot in extended position and said plate actuating 5 said switch elements to operate said switches upon retraction of said pivot.

9. In a plural switch controlling mechanism, a housing; a speed controlled governor within said housing; a movable plate carried by said housing; a support for 10 said movable plate; means actuated by said governor forming a pivotal contact for said plate; a transverse wall in said housing; a plurality of individual switch actuating elements extending below said transverse wall; an adjustable spring loaded retractable pivot extending below 15 said transverse wall, said pivot adapted to be contacted by said movable plate; a plurality of holes in said movable plate; and a pivot pin adapted to be removably

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positioned in any one of said holes and to contact said wall on said housing, the construction arranged so that upon upward movement of said means controlled by said governor, said pin on said plate contacts said bottom wall and said plate contacts said retractable pivot to tilt said plate and upon retraction of said spring loaded pivot actuates one of said switches, and said further movement of said governor means causes another tilting of said plate to actuate said other switch.

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