June 14, 1927. 1,632,417

L. ROEBEL

MACHINE CONTROL APPARATUS

Filed March 4, 1926

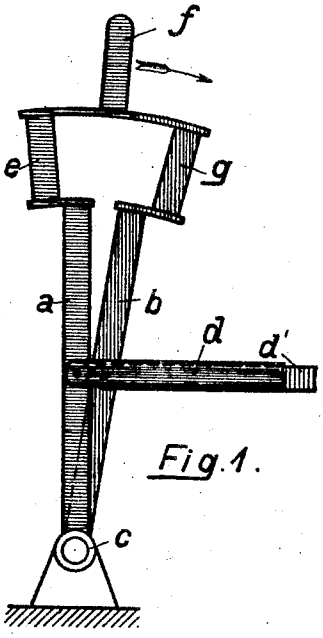

Fig.1.

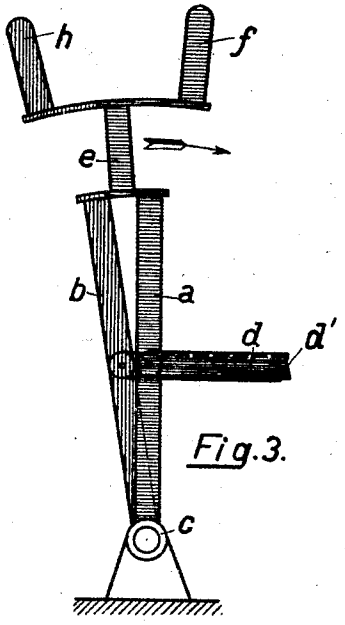

Fig.3.

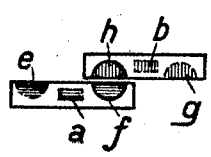

Fig.2.

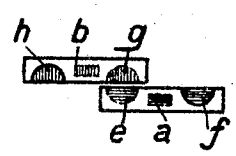

Fig.4.

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UNITED STATES PATENT OFFICE.

LUDWIG ROEBEL, OF MANNHEIM, GERMANY, ASSIGNOR TO AKTIENGESELLSCHAFT BROWN BOVERI & CIE., OF BADEN, SWITZERLAND, A JOINT-STOCK COMPANY OF SWITZERLAND.

MACHINE-CONTROL APPARATUS.

Application filed March 4, 1926, Serial No. 92,299, and in Germany March 12, 1925.

This invention relates to hand operated controls for machines whose operation is to be governed in definite relationship. In various types of apparatus, driven by electric motors for example, it is desirable to control the operation of respective prime movers in a definite relationship which is subject to selective variation. An illustrative instance is the operation of grab hoists or derricks wherein one motor is utilized to operate the grab mechanism and another to raise or lower the load, the grab-operating motor having to develop a somewhat greater torque than the other when the derrick is lifting with a closed grab and a somewhat smaller torque when lifting with an open grab. The handling of the control means in such apparatus requires close attention and accurate manipulation by the operator, as an improper variation in the relationship in which the controls are operated may lead to disastrous consequences, such as the premature dropping of the load.

The object of the present invention is the provision of control apparatus whereby the operation of the respective prime movers may be held definitely to the desired relationship as a concomitant of the normal and most convenient maniplation of the control means.

Another object is the provision of such apparatus by which selection as among various operating relationships of the prime movers may be made with ease and certainty and executed with facility.

Another object is the provision of apparatus whereby the operator may maintain accurate control of a plurality of prime movers with one hand, leaving the other hand free to control associated apparatus.

Other and further objects will be indicated or pointed out hereinafter or obvious to one skilled in the art upon an understanding of the present disclosure.

In the drawing forming a part of this specification only one embodiment of the invention is shown, but it is intended that the claims cover all other forms within the true scope of the invention in the art. In said drawing,

Fig. 1 is an elevational view of a control device in one position,

Fig. 2 is a top view of same,

Fig. 3 an elevational view of the same device in another position or adjustment, and

Fig. 4 a top view of same.

Referring to the illustrative form for an understanding of the invention, it will be seen that a and b designate two control levers collaterally pivoted at c for operation in parallel planes. The respective levers are connected with respective prime movers, or the governing means therefor, by control connections d and d', the shifting of which operates the governing means to vary the operation of the prime movers. The respective levers are provided with complementary handle portions f and h, formed to be grasped conjointly with one hand when in juxtaposed position, as illustrated in Figs. 1 and 2, whereby the levers may be moved on their pivots conjointly in a definite angular relationship. The levers have also the complementary handle portions e and g, likewise formed for conjoint manipulation when in juxtaposed positions. These handles, however, are displaced from the handles f and h in the directions of oscillation, so that when juxtaposed they establish an angular relationship of the levers different from that obtaining when the handles f and h are juxtaposed. As illustrated in Figs. 1 and 2, when handles f and h are together, lever b will lead lever a by a definite distance when swung conjointly in the direction of the arrow, while when handles e and g are together, lever a will have a definite lead on lever b, as shown in Figs. 3 and 4. In this fashion the proper relationships of the governing mechanism and operation of the prime movers may be definitely controlled without the operator's having to give specific attention to that detail. The operation of both prime movers is thus easily controlled by the operator with one hand, leaving the other hand free to operate associated mechanism, such as that for controlling the slewing of the hoist boom or the travel of the derrick.

What I claim is:

1. Machine control apparatus comprising a plurality of relatively movable manipulative members, a plurality of handle portions on said manipulative members, said handle portions exceeding the number of manipula-

tive members, handle portions on different manipulative members being arranged to be grasped conjointly with one hand.

2. Apparatus for conjointly controlling a plurality of prime movers, comprising manipulative elements, each having a plurality of handles, handles on the different elements being arranged for hand engagement conjointly.

3. Apparatus for conjointly controlling a plurality of prime movers, comprising levers having each a plurality of handles, handles on different levers being arranged to be grasped conjointly with one hand.

4. Apparatus for conjointly controlling a plurality of prime movers, comprising levers having each a plurality of handles displaced from one another in the direction of movement of the levers, handles on different levers being arranged to be grasped conjointly with one hand.

5. Apparatus for conjointly controlling a plurality of prime movers, comprising concentrically pivoted members arranged in juxtaposition, a plurality of handles on each member, handles on the different members being arranged to be grasped conjointly with one hand.

In testimony whereof I have hereunto subscribed my name at Stuttgart on the 10 day of February A. D. 1926.

LUDWIG ROEBEL.