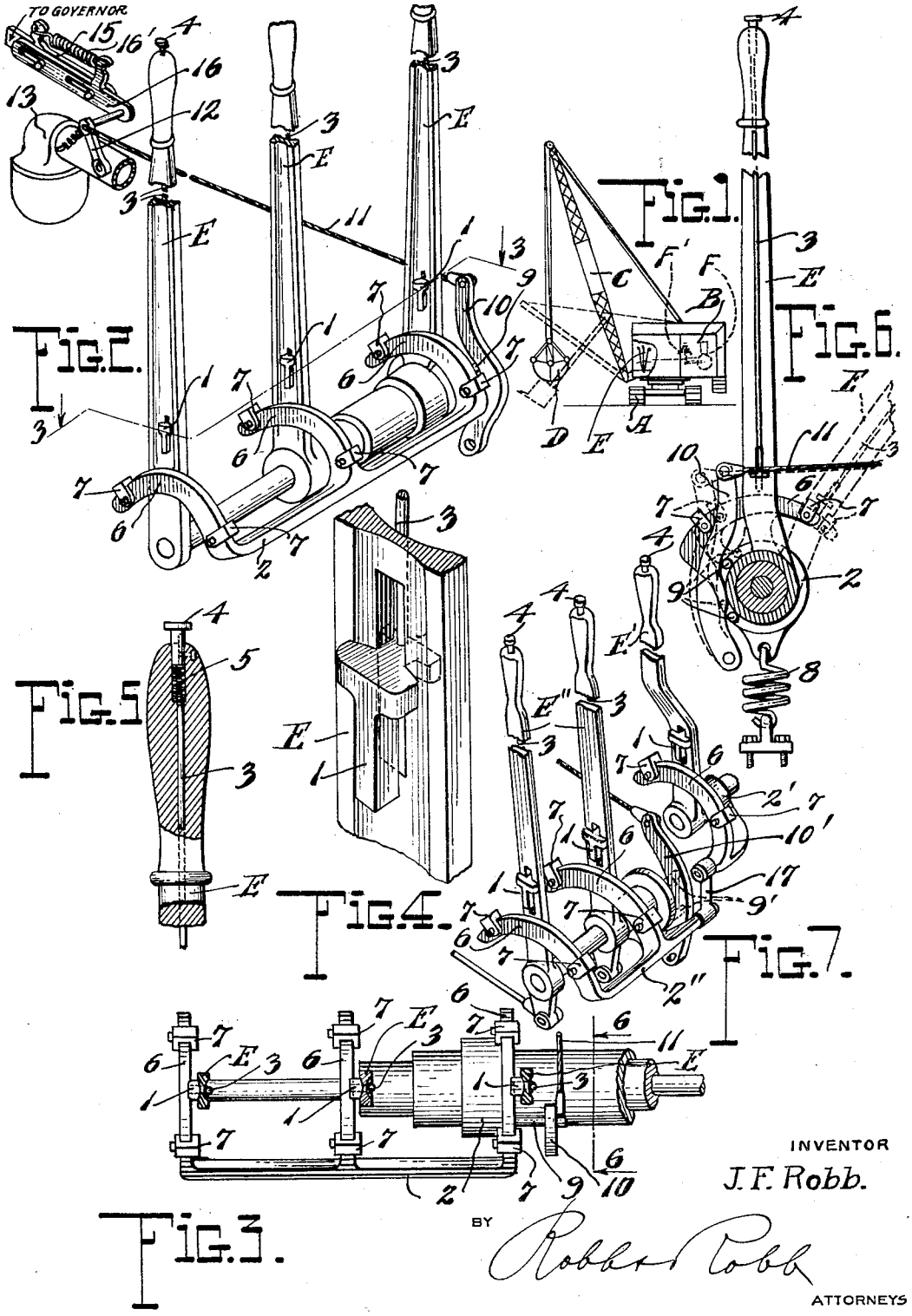
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ACCELERATOR ATTACHMENT FOR EXCAVATING MACHINES

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ACCELERATOR ATTACHMENT FOR EXCAVATING MACHINES

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This invention relates to excavating and material handling machinery and more particularly to gasoline driven cranes, shovels and the like.

In modern excavating and material handling machines, especially of the crane or shovel type which usually consist of a traction base or support upon which is revolvably mounted the material handling apparatus, it has been found that the internal combustion engine provides a very satisfactory source of power and in many localities this source of power has completely superseded the earlier steam engine driven machines.

The internal combustion engines are usually provided with a governor mechanism to maintain the operation of the engine at a substantially uniform number of revolutions per minute regardless of whether the excavator is digging or idling.

Certain of the cycles of operation of the machine can however be speeded up at times which materially increases the efficiency and output of the machine. The position of the controls however requires the operator to actuate a separate throttle lever which is not ordinarily located conveniently with respect to the main control levers of the excavating machine.

An object of my invention is to provide an accelerator for shovels, cranes and the like conveniently located with respect to the main control levers and capable of actuation at will by the operator incident to normal actuation of said main control levers.

Another object of my invention is to provide a mechanism for automatically accelerating the motive power engine of an excavating machine incident to the manipulation of the usual control levers.

A further object is to provide an automatic accelerating mechanism especially applicable to internal combustion engine operated excavating and material handling apparatus such as cranes, shovels, clam shells, drag lines and the like, which is rendered operative under the control of the operator of the machine incident to operation of the usual control levers and which may be rendered immediately inoperative when desired.

A still further object of my invention is to provide an accelerating mechanism for excavating machinery which operates in conjunction with the usual governor mechanism of an internal combustion engine for operating the machinery, the mechanism being so arranged with respect to the levers for causing the revolvable body of the machine which carries the boom to be automatically accelerated by the actuation of the levers which control the revolvable or swing cycle of the body.

In the accompanying drawings:—

Fig. 1 is a diagrammatic side elevation of an excavating machine of the convertible type such as disclosed in the Holcomb and Russell Patent No. 1,509,295, the clam shell and its supporting boom being shown in full lines, and the excavating shovel and its cooperating boom being shown in dotted lines.

Fig. 2 is a detail perspective view of a three bank lever assembly for controlling the boom hoist, load hoist, and swing movements of an excavating machine as disclosed in Figure 1.

Fig. 3 is a horizontal sectional view on the line 3—3 of Fig. 2 and looking in the direction of the arrows.

Fig. 4 is a detail perspective view of a portion of one of the levers, the depressible lug for effecting the accelerating action incident to manipulation of the lever being shown therein.

Fig. 5 is a fragmentary vertical sectional view through the handle of one of the levers.

Fig. 6 is a vertical sectional view taken approximately on the lines 6—6 of Fig. 3.

Fig. 7 is a detail perspective view of a slight modification of my invention, the same being shown applied to a series of control levers which are out of axial alignment.

As those versed in the art to which my invention relates are quite familiar with the construction and operation of the excavating machines such as illustrated, brief references only need be made to the main parts of the machine as follows:

Referring to Fig. 1, A represents the traction base upon which is revolvably mounted the crane or car body B. Secured to the forward end of the car body B is the boom C from which is supported in the usual manner

the excavating bucket or clam shell D. The control levers E are conveniently located with respect to the operator's platform and control respectively the raising and lowering of the boom C, the manipulation of the bucket D and the rotation or swing of the car body B.

Referring now to Figs. 2, 3, 6 and 7, each of the control levers is provided with a slidable abutment or lug 1 which is normally held in the raised or disengaged position with respect to the accelerator actuating or control yoke 2. These abutments 1 are connected to rods 3 which terminate in push buttons 4 located at the ends of the levers E. Springs 5 are provided for causing upward tension on the rods 3 to normally maintain the abutments 1 in disengaged position.

The control yoke 2 as disclosed in Figs. 2 and 3 is pivotally supported concentrically with respect to the pivotal axis of the levers E. This control yoke is provided with three arcuate finger extensions 6 upon which adjustable stops 7 are provided to cooperate with the abutment members 1 of the levers when these members are depressed by the actuation of the buttons 4 and the levers are moved to cause actuation of the control mechanisms of the excavating machine. The yoke member 2 is provided with a spring 8 to normally maintain the fingers and stop members 7 in equally spaced relation with respect to the levers E when these levers are in neutral position.

Projecting inwardly from the yoke 2 are the pins or lugs 9 which cooperate to actuate a lever 10 connected by a cable 11 to the control mechanism of the internal combustion engine which is disclosed in Fig. 2, as the throttle lever 12 of the carburetor 13 of the internal combustion engine for supplying motive power to the mechanisms of the excavating machine.

The operation of the internal combustion engine F, as diagrammatically illustrated in Fig. 1, is maintained at a constant speed by any suitable governor mechanism F'. Extending from the governor mechanism F' is a control rod 15 to shift the throttle lever 12 of the engine during both the material handling operations and periods when the engine is idling. Slidably secured to the end of the control rod 15 is the throttle valve actuating member 16. Under normal operations of the machine, the governor serves to shift the control rod 15 and throttle valve actuating member 16 as a unit to open and close the throttle 12, depending upon whether the machine is doing work or idling.

When it is desired to accelerate any particular cycle of operation of the machine, for instance the swing or rotation of the car body B, the operator will first depress the button 4 on the particular lever controlling that particular cycle. This moves the rod 3 to lower the abutment member 1 for engagement with the stop members 7 on the fingers 6 of the yoke 2. The operator now moves the control lever E to engage the swing clutch, not shown. The stop members 7 are so positioned that as the lever E is moved to the engaging position, the abutment 1 will strike one of the stop members and cause the yoke 2 to be rotated, shifting the pins 9. One of these pins 9 will actuate the lever 10 to cause the cable 11 which is attached to the throttle lever 12 to be pulled, thereby opening the throttle and causing an acceleration of the engine F.

When it is desired to discontinue this acceleration, the operator will remove his thumb from the button 4 permitting the spring 5 to raise the rod 3 and the abutment 1 from engagement with the stop member 7, thus releasing the yoke member 2 to permit the spring 8 to return the yoke to neutral or non-accelerating position. The spring 16' between the governor control rod 15 and the throttle valve actuating member 16 will close the throttle of the carburetor to its normal speed position as controlled by the governor F'.

As disclosed in the modification in Fig. 7, wherein one of the control levers E' is pivoted eccentrically with respect to the pivotal axis of the other control levers E'', this lever E' is provided with a separate yoke member 2' mounted concentric with the pivotal axis of the lever. The other two levers have a yoke member 2'', similar in construction to the yoke member 2 in the preferred embodiment of Fig. 2. A link 17 connects the yoke member 2' with the yoke member 2''.

Upon actuation of the yoke member 2' by the lever E', the link 17 will shift the yoke member 2'', causing one of the pins 9' to actuate the lever 10' and thereby cause acceleration of the engine in a manner similar to that described with respect to the preferred embodiment.

From the foregoing, it will be readily seen that I have provided a novel accelerating device which is common to the dipper control operating mechanism, the boom hoist operating mechanism and the swing body operating mechanism. It is also to be noted that the common accelerating device is actuated upon movement of the operating mechanisms in either direction, that is, to crowd out or pull in the dipper, to raise or lower the boom, or to swing the body in either direction.

While the invention has been specifically shown and described, changes and alterations may be made therein, without departing from the spirit of the invention as defined in the appended claims.

What is claimed is:—

1. In a control mechanism for cranes, excavating machines and the like having a hoisting mechanism, a turn table mechanism and a traction mechanism, levers for control-

ling the cycles of operation of the mechanism, a supplemental control lever for controlling the speed of operation of the machine, and shiftable means to cause actuation of the second lever incident to actuation of anyone of the first levers.

2. In a control mechanism for excavating machinery, a shiftable lever for controlling a cycle of operation of the machine, an associated engine controlling mechanism to control the speed of operation of the engine incident to actuation of the control lever, said speed controlling mechanism being automatically shiftable to inoperative position whereby said shiftable lever is rendered inoperative in its association with the same independent of the position of the shiftable lever.

3. An accelerator attachment for material handling machines having an internal combustion engine power plant, comprising a shiftable part adapted to be positioned for actuation by the usual control devices of the machine incident to actuation thereof to cause acceleration of the power plant, and manually shiftable means movable in one direction for establishing a connection between said control devices and said shiftable part incident to movement of the control devices and said manually shiftable means being automatically shiftable in another direction to discontinue said acceleration.

4. In an accelerating mechanism for excavating machines, control levers for controlling the cycles of operation of the machine, a control mechanism for controlling the speed of operation of the machine, and means carried by the levers manually shiftable to engage the speed controlling mechanism to cause actuation thereof to accelerate the cycles of operation of the machine incident to actuation of the levers and automatically releasable to cause deceleration following said acceleration.

5. In an accelerating mechanism for excavating machines, control levers for controlling the cycles of operation of the machine, a control mechanism for controlling the speed of operation of the machine comprising a control yoke, arcuate extensions on the said yoke, an actuation lever actuated by the control yoke, abutment members on the cycle controlling levers adapted to cooperate with the control yoke to effect operation of the actuation lever and to cause acceleration of the cycles of operation of the machine incident to the actuation of the cycle controlling levers.

6. In an accelerating mechanism for excavating machines, control levers for controlling the cycles of operation of the machine, a control mechanism for controlling the speed of operation of the machine comprising a control yoke, arcuate extensions on the said yoke, an actuation lever actuated by the control yoke, manually operable abutment members on the cycle controlling levers adapted to cooperate with the control yoke to effect operation of the actuation lever and to cause acceleration of the cycles of operation of the machine incident to the actuation of the cycle controlling levers.

In testimony whereof I affix my signature.

JOHN F. ROBB.