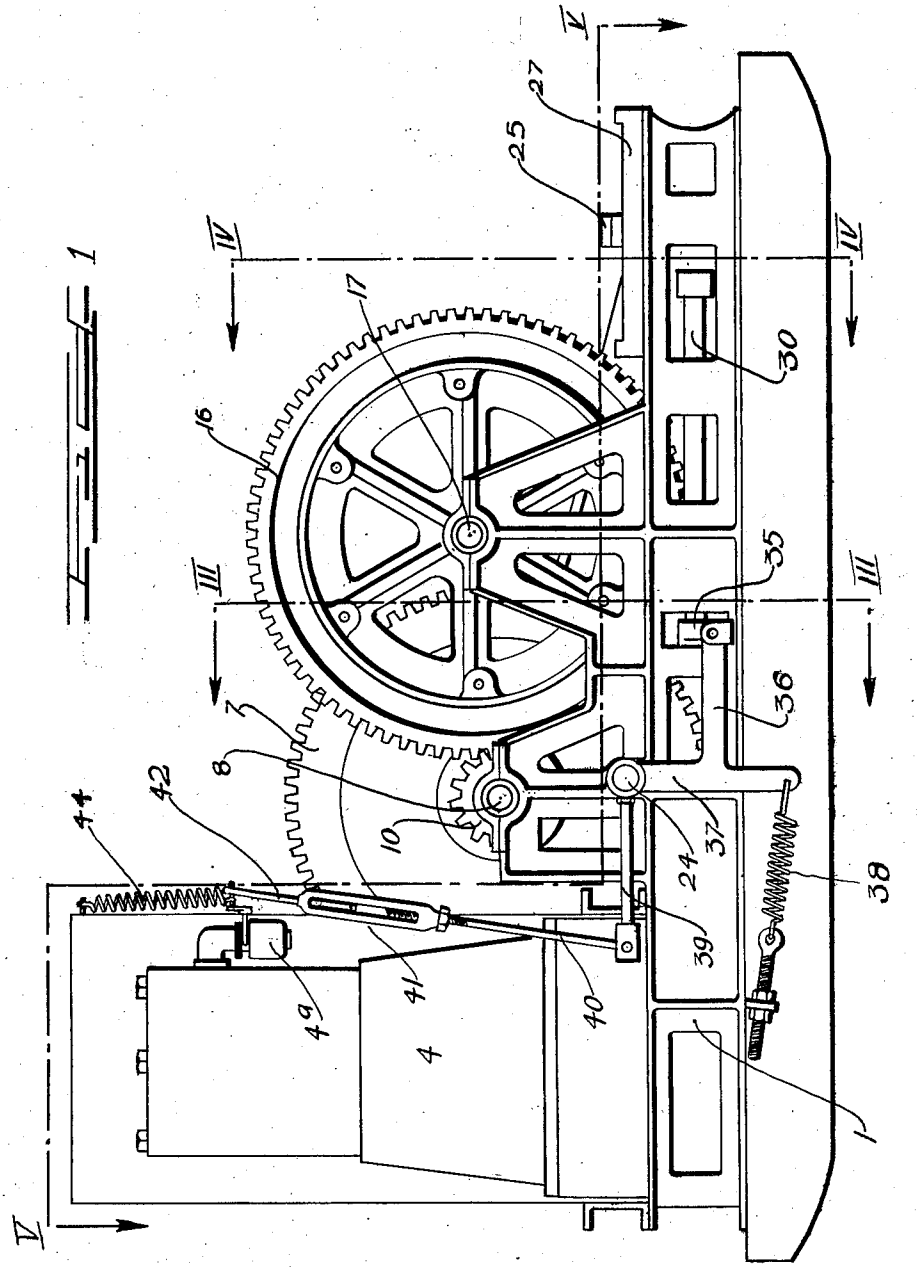
May 14, 1935. E. ERICKSON 2,001,674

AUTOMATIC GAS ENGINE CONTROL FOR HOISTS

Original Filed July 23, 1926 5 Sheets-Sheet 1



Inventor

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May 14, 1935. E. ERICKSON 2,001,674

AUTOMATIC GAS ENGINE CONTROL FOR HOISTS

Original Filed July 23, 1926 5 Sheets-Sheet 2

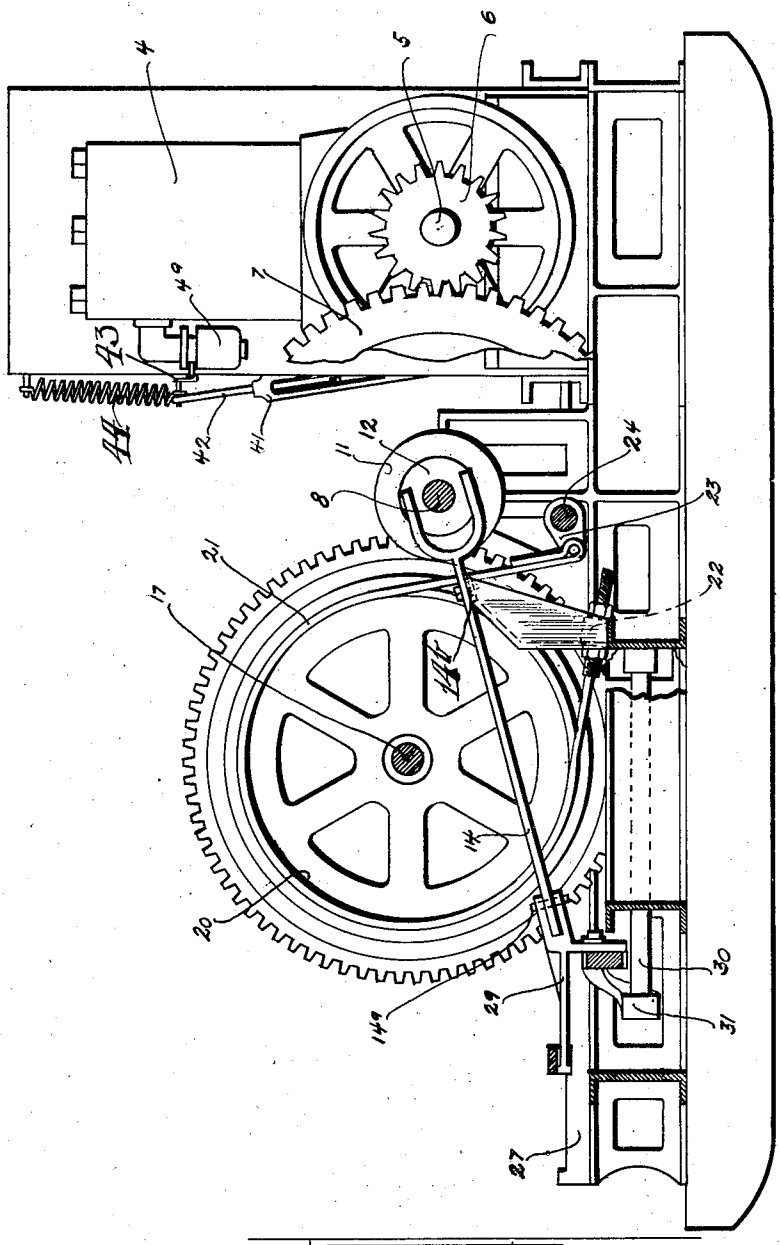


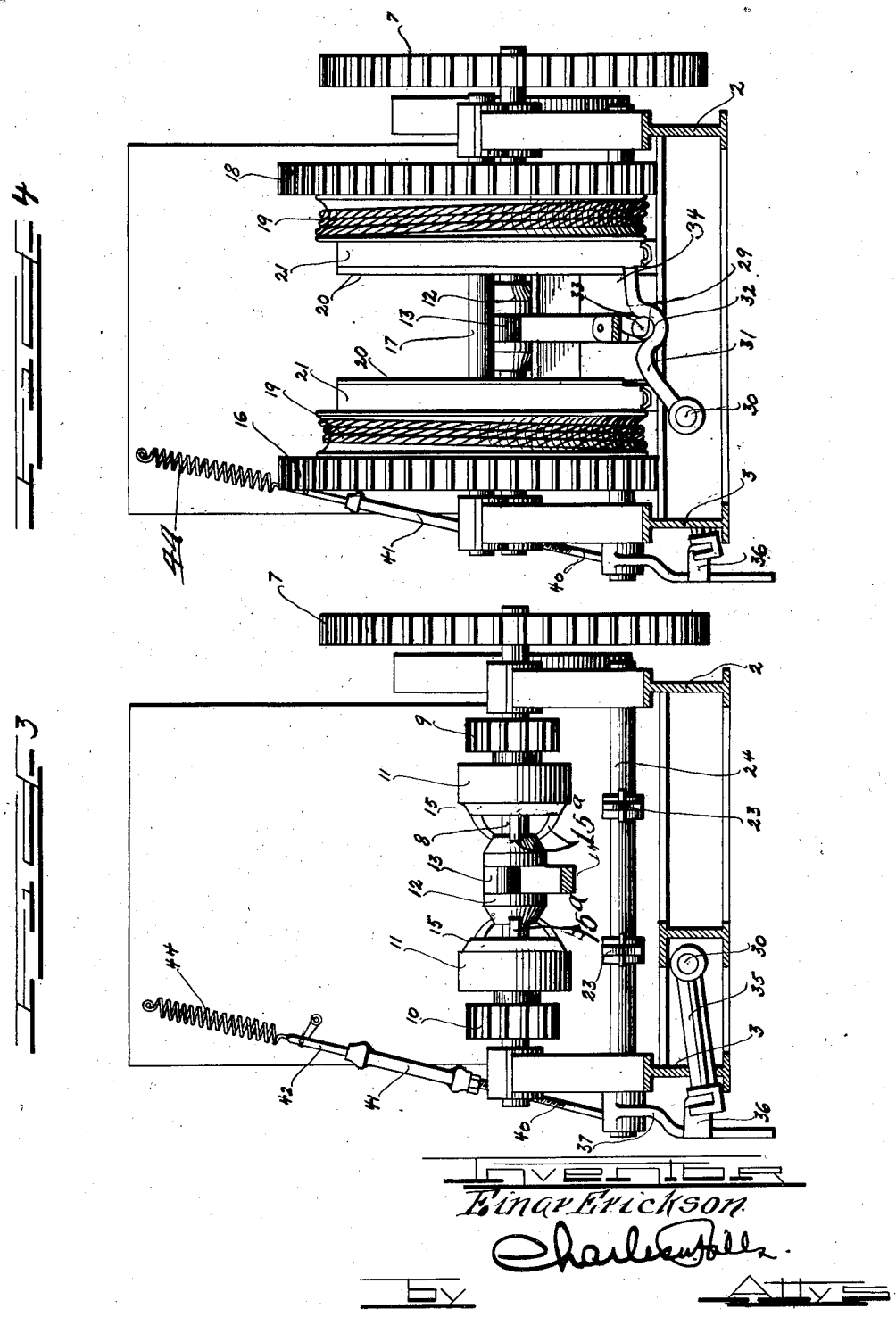
FIG. 2

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AUTOMATIC GAS ENGINE CONTROL FOR HOISTS

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AUTOMATIC GAS ENGINE CONTROL FOR HOISTS

Original Filed July 23, 1926 5 Sheets-Sheet 4

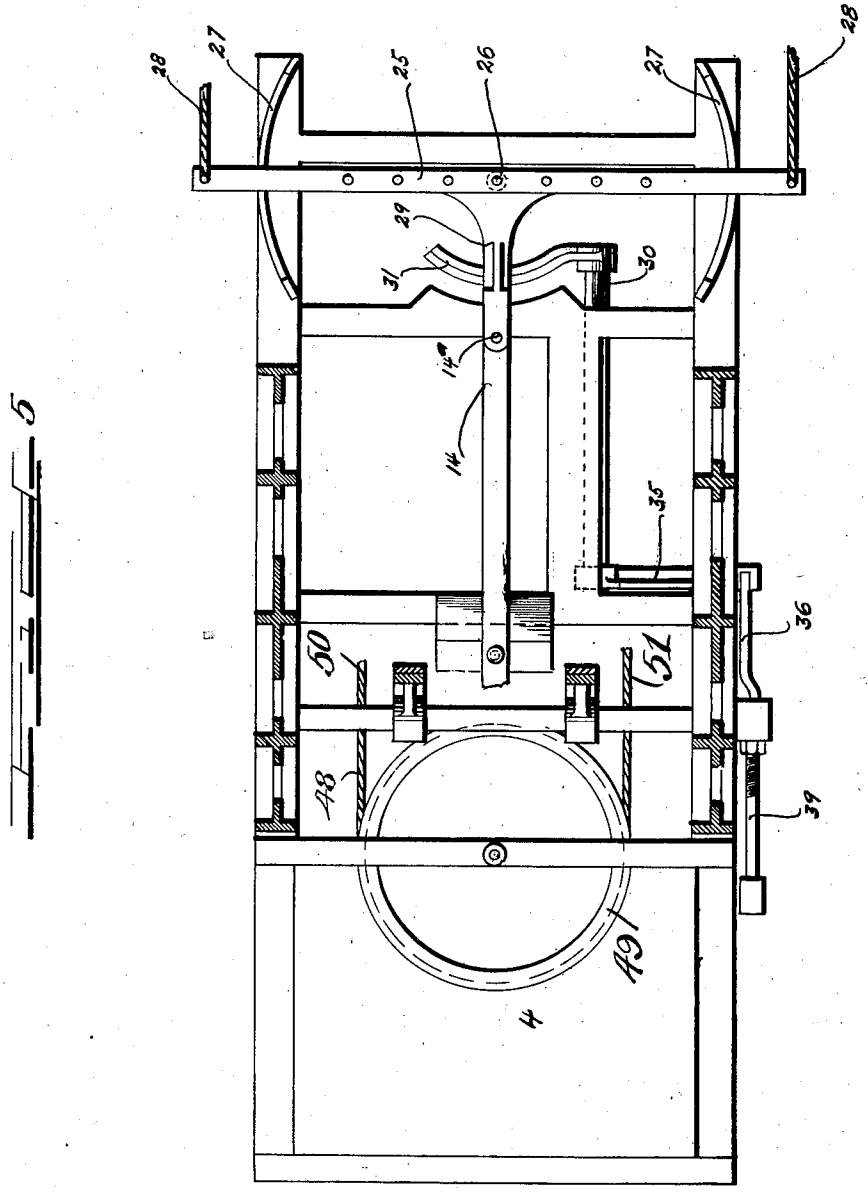


Fig. 5

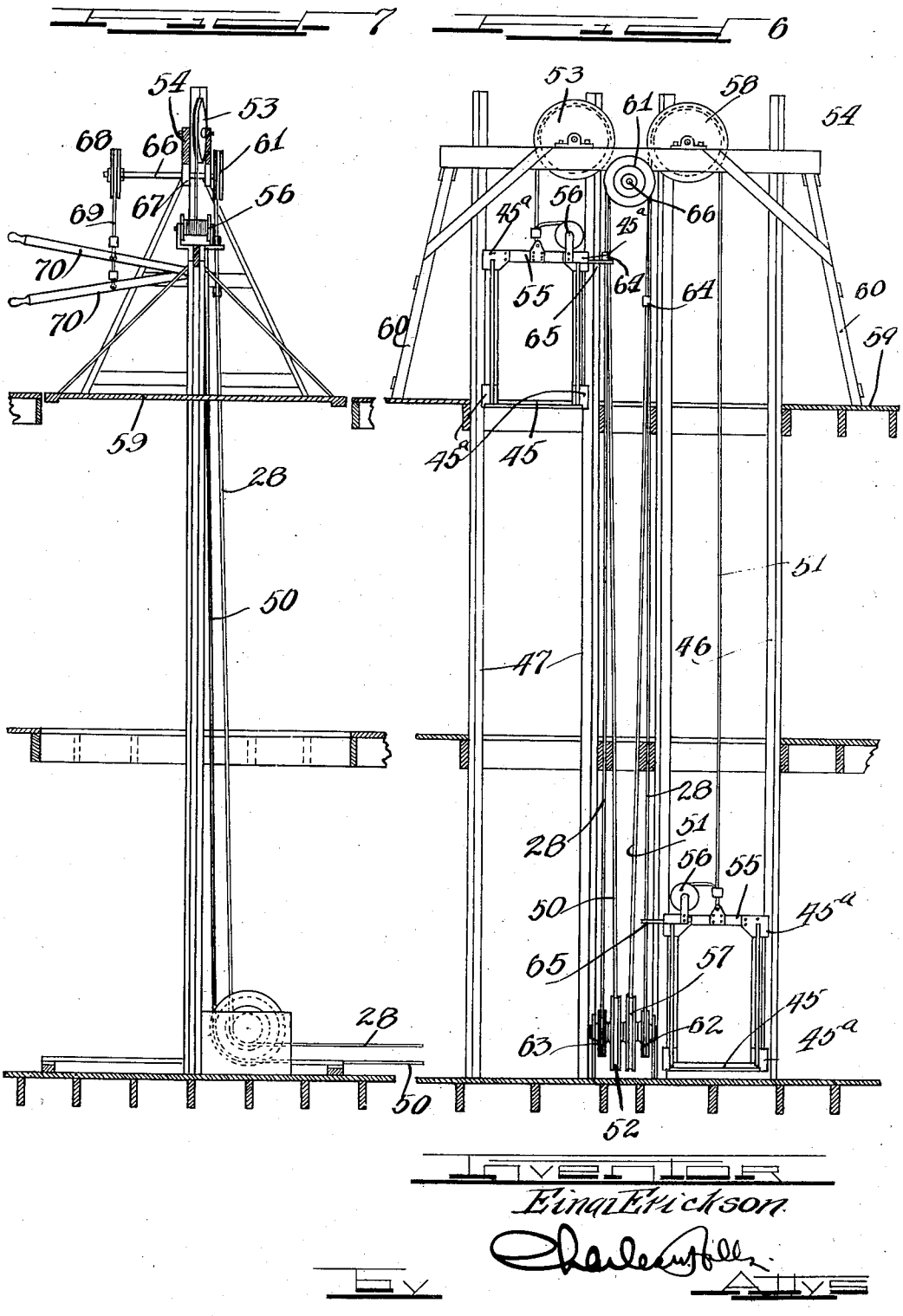
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May 14, 1935. E. ERICKSON 2,001,674

AUTOMATIC GAS ENGINE CONTROL FOR HOISTS

Original Filed July 23, 1926 5 Sheets-Sheet 5



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Patented May 14, 1935 2,001,674

UNITED STATES PATENT OFFICE

2,001,674

AUTOMATIC GAS ENGINE CONTROL FOR HOISTS

Einar Erickson, Chicago, Ill., assignor, by mesne assignments, to John Howard McElroy, Chicago, Ill.

Application July 23, 1926, Serial No. 124,395
Renewed October 19, 1934

5 Claims. (Cl. 187—2)

This invention relates to an automatic engine control for hoists.

In the use of such hoisting machines there are loading or unloading dwells at which times the engine is running while the hoisting mechanism is idle. If the engine is running under full power during such dwells, the vibrations thereof will be very severe upon the machine, thereby greatly reducing the life of the machine.

It is an object of this invention to overcome the above noted objection in the provision of means automatically controlled for slowing down the engine when the hoisting mechanism is disconnected from the engine and for speeding up the engine when the hoisting mechanism is connected to the engine.

The invention comprises the novel structure and combinations hereinafter described and more particularly pointed out and defined in the appended claims.

In the accompanying drawings which illustrate a preferred embodiment of this invention and in which similar reference numerals refer to similar features in the different views;

Figure 1 is a side elevation of a hoisting machine involving this invention.

Figure 2 is a part sectional and part elevational view of the hoisting machine.

Figure 3 is a sectional view taken substantially upon the line III—III of Figure 1.

Figure 4 is a sectional view taken substantially upon the line IV—IV of Figure 1.

Figure 5 is a sectional view taken substantially upon the line V—V of Figure 1.

Figure 6 is a front elevational view of the hoist tower used in connection with the hoisting mechanism.

Figure 7 is an end elevational view of the hoisting tower partly in section.

The hoisting machine which is illustrated for explaining the structure and operation of this invention comprises a frame structure 1, having side members 2 and 3. A hydrocarbon or other suitable engine 4 of any well known construction is supported upon the rear end of the frame and the fuel mixture to said engine is supplied by any suitable carburetor or mixer 4a provided with the customary throttle valve for controlling the inlet of fuel mixture to the engine. The engine has a shaft 5 (Figure 2) upon which a small gear 6 is secured. The gear 6 meshes with a driven gear 7 secured upon a driven shaft 8 best shown in Figure 3. A pair of pinions 9 and 10 are loosely supported upon the shaft 8. Each pinion has an extended hub in the form of a clutch drum 11. Between the drums there is a shiftable clutch member 12 which is slidably keyed upon the shaft 8 for rotation therewith. The clutch member 12 has a groove 13 for receiving the yoke of a shifting lever 14 pivoted intermediate its ends at 14a and has its opposite ends cone shaped for expanding dogs 15a pressing against clutch members 15 which are adapted for alternately effecting a frictional drive between the shaft 8 and drums as shown in the Allen Patent No. 1,586,768, dated June 1, 1926. Any suitable clutch, however, may be used. The pinion 10 meshes with a gear wheel 16 loosely mounted on a shaft 17 journalled upon the side bars of the frame and the pinion 9 meshes with the gear wheel 18 loosely mounted on the shaft 17. Each gear wheel 16 and 18 carries a cable drum 19 and each cable drum 19 carries a brake drum 20. A brake band 21 surrounds each brake drum 20. One end of each brake band is adjustably secured in a stationary bracket 22 on the frame. The opposite ends of the brake bands are respectively secured to crank arms 23 secured upon a shaft 24 journalled in the frame of the machine. By placing the brakes upon the cable drums, the wear and tear of the machine is greatly reduced over a machine in which the brakes are elsewhere, such as on the clutch shaft for instance.

Mechanism has been provided for simultaneously controlling the brake bands and the shiftable clutch member 12. The illustrated embodiment of this mechanism will now be described. Upon the forward end of the machine there is pivotally supported intermediate its ends a lever 25 (Figure 5) which may be oscillated upon its supporting pivot 26. A pair of curved tracks 27 on the frame serve as runners for the lever. To the opposite ends of the lever are secured the ends of cable 28 which extends from the unloading station. The lever 25 has a forwardly extending arm 29 to which the aforementioned clutch shifting lever 14 is pivoted at 14a by a slot and pin connection.

Suitably journalled in the frame is a shaft 30. The forward end of this shaft rigidly supports a cam arm 31 best shown in Figures 4 and 5. This cam arm has a depression 32 in which a roller 33 is normally seated when the hoisting mechanism is not in operation. The roller 33 (Fig. 4) is journalled on a lug 34 depending from the arm 29 of the lever 25. To the other end of the shaft 30 there is connected a crank arm 35 (Fig. 3) which connects to an arm 36 of a bell crank lever 37 secured upon the aforementioned brake operating shaft 24. An adjustable tension device

38 (Figure 1) connects the bell crank lever 37 to the frame of the machine. This tension device is adapted to normally hold the brake bands 21 in firm frictional engagement with their respective drums. A rod 39 is adjustably threaded in the hub of the bell crank lever 37. A link 40 is pivotally connected to the end of the rod 39 and a turn buckle 41 is adjustably threaded upon the upper end of the rod 40. A short stem 42 is slidably swiveled in the upper end of the turn buckle 41 and the end of the stem 42 is connected to the throttle lever 43 of the carburetor or mixer 4a. A spring 44 connects the upper end of the stem 42 to the engine casing, and this spring is normally effective for returning the throttle lever 43 to move the throttle to idling position.

The aforedescribed hoisting machine may be used for any hoisting purpose. In the drawings, however, I have illustrated the same in connection with a pair of elevator platforms 45 (Figure 6) which alternately travel up and down a hoisting tower for supplying material to the workmen during the construction of buildings. In referring to Figures 6 and 7, it will be noted that the hoisting tower comprises two sets of vertical standards 46 and 47. The opposed surfaces of the standards of each set form guides for the platforms 45 which have grooved side members 45a slidably fitting such guides.

A one piece cable 48 (Figure 5) is wrapped around a guide pulley 49. The reaches 50 and 51 of this cable respectively pass around the drums 19. From the drums 19, the cable reaches 50 and 51 extend to the hoisting tower. The reach 50 is trained over a pulley 52 journalled on a shaft suitably supported at the bottom of the hoisting tower and between the two sets of standards. The reach 50 is then trained over a pulley 53 carried by a support 54 at the top of the tower. The end of said reach depends from the pulley 53 and is attached to a cross bar 55 which connects the sides of one elevator platform. A storage pulley 56 is preferably carried by the cross piece to carry any excess cable that may be used in cases when the tower is raised.

The cable reach 51 is trained over a pulley 57 at the bottom of the tower and then over a pulley 58 carried by the support 54. The end of this cable reach 51 depends from the pulley 58 and is attached to the cross bar 55 that connects the sides of the other elevator platform. The excess cable of reach 51 may also be wrapped around a storage pulley 56 on the cross bar 55 for the purpose above set forth.

In the present instance, there is shown an unloading station 59 from which the support 54 is sustained by legs 60 suitably braced. Usually the workmen are located on a level with the unloading station, and unload the elevators.

The aforementioned cable 28 which is a control cable is trained over a pulley 61 at the top of the tower. The reaches of this cable are respectively trained over pulleys 62 and 63 mounted at the foot of the tower. Each reach of the cable 28 is provided with a stop member 64 and each elevator platform has a laterally projecting arm 65. The arms 65 are preferably apertured at their end to receive the reaches of the cable 28. The pulley 61 is secured upon a shaft 66 suitably journalled in bearings 67 on the support 54. A pulley 68 is secured upon the rear end of this shaft, and a cable 69 is trained over this pulley. The respective ends of the cable 69 are attached to the levers 70—70 which are pivoted at their inner ends to the hoisting tower.

The operation is as follows:

It will be understood that after the engine is started, it will run continuously driving the clutch shaft 8. As shown in the drawings, the hoisting mechanism is in its inoperative position as the clutch member 12 is in its neutral position. If the engine is running, in such position, it will be noted that one elevated platform is in its elevated position, while the other is in its lowered position. If the building material is carried upon wheel-barrows, a workman at the unloading station 59 will, of course, have removed the loaded wheel-barrow. An empty wheel-barrow may then be placed upon the elevated platform, and a loaded wheel-barrow may be placed upon the lower platform. The hoisting mechanism may then be connected with the engine which is running under reduced power due to the automatic control of the throttle. In order to connect the hoisting mechanism with the engine, a workman at the unloading station will operate the proper lever 70 for rotating the pulley 61. The rotation of the pulley 61 will slacken one end of the control cable 28 and draw the other end thereby shifting or oscillating the lever 25. As the lever 25 is thuswise oscillated, it will simultaneously operate the clutch lever 14 for shifting clutch member 12 for effecting engagement between the proper clutch drum 11 and shaft 8 for connecting the hoisting mechanism to the engine, and the cam arm 31 for rocking the shaft 30 for releasing the brake bands. In releasing the brake bands, the brake operating shaft 24 will be given a partial turn carrying the arm 39 in a downward direction for opening the throttle valve of the engine to running position.

The operation of the hoisting mechanism will raise the lower platform and lower the elevated one. When the arm 65 on the loaded platform reaches its stop 64 on the control cable 28, the latter will be sufficiently operated for shifting the lever 25 to its neutral position as shown in the drawings. At the same time the brake bands will be applied to their drums by the tension device 38, and the arm 39 will be brought to its horizontal position allowing spring 44 to draw stem 42 for moving the throttle valve to its idling position.

From the foregoing, it will be appreciated that the speed of the engine is automatically controlled and when the same is under no load, it will run at reduced speed thereby eliminating the obstructive vibration that results when an engine is running at full power and under no load. At the same time, it will be appreciated that a great saving of fuel is effected. Further by putting the brakes upon the drum shaft the wear and tear of the machine is greatly reduced over a machine in which the brake bands are upon the clutch drums.

I am aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention and I therefore do not purpose limiting the patent granted hereon otherwise than necessitated by the prior art.

I claim as my invention:

1. In a hoisting apparatus, the combination with an engine and a throttle valve for controlling its speed, of a clutch shaft, a drum shaft, a pair of drums having friction brakes and brake bands attached thereto loosely mounted on said

drum shaft, gearing between the engine and the clutch shaft, shiftable clutch mechanism on the clutch shaft, duplex gearing between the clutch mechanism and the drums, a cable wound on the drums, cages on the ends of the cable, guiding means for the cables and cages, a central cable associated with the guiding mechanism, a brake-band rock-shaft, a clutch-shifting rock-shaft, connections between the brake-band rock-shaft and the clutch-shifting rock-shaft to cause them to rock together, an arm on the brake-band rock-shaft, and a link from said arm to the throttle valve, substantially as and for the purpose described.

2. In a hoisting apparatus of the character described, the combination with a pair of vertical guideways and a pair of cages slidable therein, of cable drum mechanism, cable supporting and guiding pulleys, a hoisting cable co-operating with said drum mechanism engaged with said pulleys and at its ends connected to said cages, an explosion engine having a throttle valve, power transmitting means for the engine including a clutch for rotating the drum mechanism to pay out the cable in either direction, clutch shifting means, and mechanism actuated by said clutch shifting means for opening the throttle valve of said engine more widely when the clutch is shifted to working position and for partially closing said throttle valve when the clutch is shifted to idle position.

3. In a hoisting apparatus of the character described, the combination with a pair of vertical guideways and a pair of cages slidable therein, of cable drum mechanism, cable supporting and guiding pulleys, a hoisting cable co-operating with said drum mechanism engaged with said pulleys and at its ends connected to said cages, an explosion engine having a throttle valve, power transmitting means for the engine including a clutch for rotating the drum mechanism to pay out the cable in either direction, clutch shifting means, mechanism actuated by said clutch shifting means for opening the throttle valve of said engine more widely when the clutch is shifted to working position and for partially closing said throttle valve when the clutch is shifted to idle position, and manually operable means located at a distance from the engine for shifting said clutch at any point in the ascent of said cages.

4. In a hoisting apparatus of the character described, the combination with a pair of vertical guideways and a pair of cages slidable therein, of cable drum mechanism, cable supporting and guiding pulleys, a hoisting cable co-operating with said drum mechanism engaged with said pulleys and at its ends connected to said cages, an explosion engine having a throttle valve, power transmitting means from the engine including a clutch for rotating the drum mechanism to pay out the cable in either direction, clutch shifting means, friction brake mechanism co-operating with the cable drum mechanism, spring actuated means normally applying the brake mechanism, and mechanism actuated by said clutch shifting means for opening the throttle valve of said engine more widely when the clutch is shifted to working position and for simultaneously releasing said brake mechanism and for partially closing said throttle valve when said clutch is shifted to idle position.

5. In a hoisting apparatus of the character described, the combination with a pair of vertical guideways and a pair of cages slidable therein, of cable drum mechanism, cable supporting and guiding pulleys, a hoisting cable co-operating with said drum mechanism engaged with said pulleys and at its ends connected to said cages, an explosion engine having a throttle valve, power transmitting means from the engine including a clutch for rotating the drum mechanism to pay out the cable in either direction, clutch shifting means, friction brake mechanism co-operating with the cable drum mechanism, spring actuated means normally applying the brake mechanism, mechanism actuated by said clutch shifting means for opening the throttle valve of said engine more widely when the clutch is shifted to working position and for simultaneously releasing said brake mechanism and for partially closing said throttle valve when said clutch is shifted to idle position, and manually operable means located at a distance from the engine for shifting said clutch at any point in the ascent of said cages.

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