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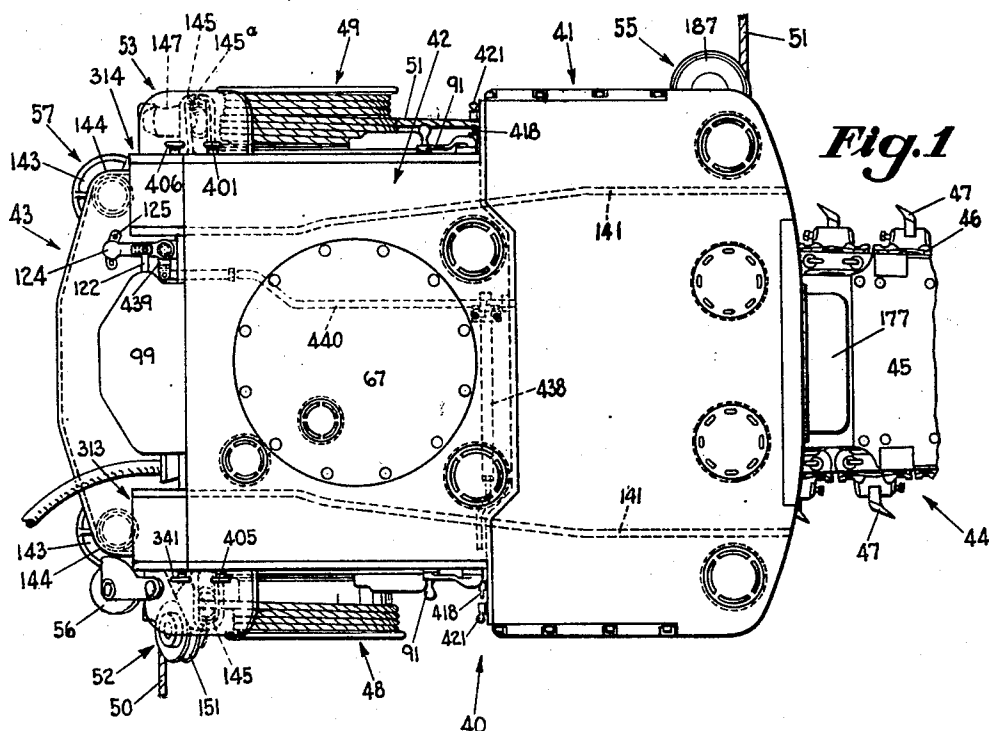
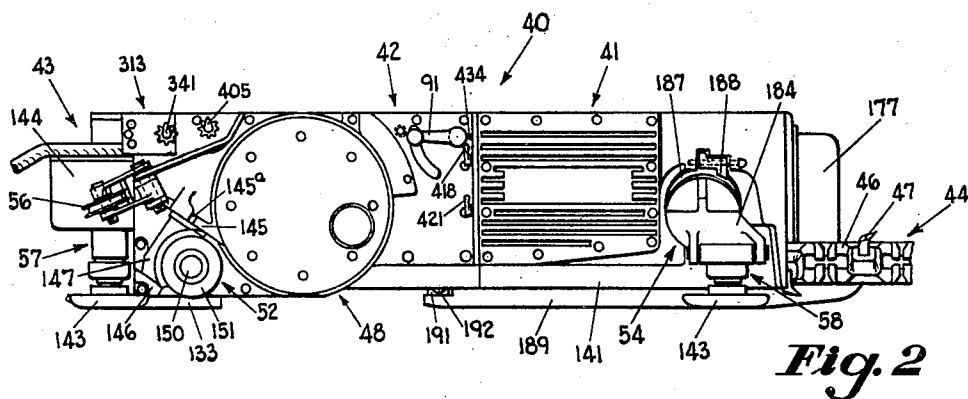
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2,543,634

MINING MACHINE FEED DRUM CONTROL

Original Filed April 6, 1945

2 Sheets-Sheet 1



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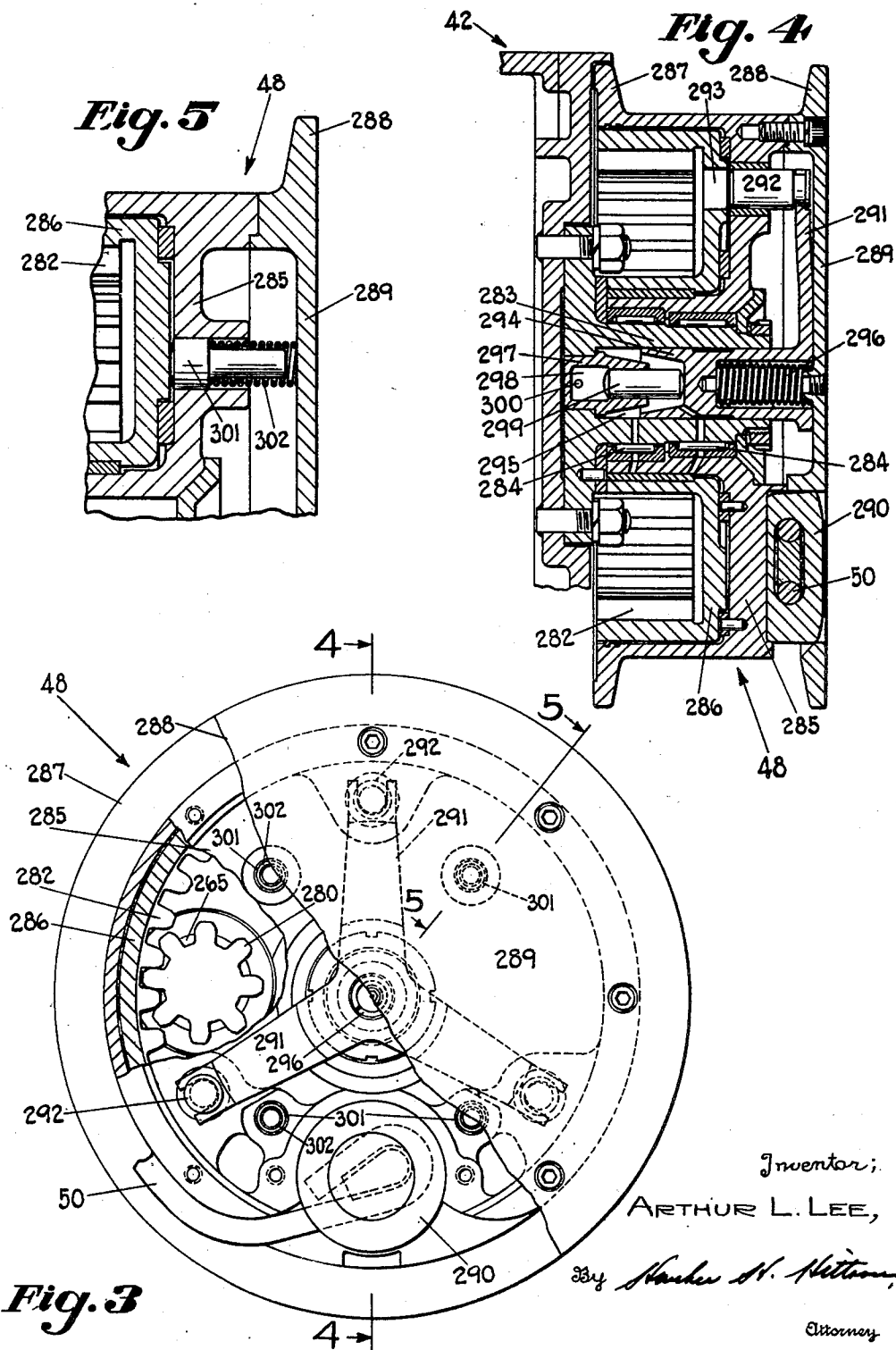
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UNITED STATES PATENT OFFICE

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MINING MACHINE FEED DRUM CONTROL

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Original applications April 6, 1945, Serial No. 586,979, and June 12, 1946, Serial No. 676,200.
Divided and this application October 1, 1948,
Serial No. 52,233

3 Claims. (Cl. 254—187)

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This invention relates to a mining machine and in the specific embodiment thereof disclosed in detail and in its most specific aspect it relates to a mining machine of the shortwall type.

An object of the invention is to provide a mining machine with a feed drum in which there are hydraulic means provided to control the driving or non-driving relation of the feed drum and associated drive gearing and where there may also be spring-pressed friction means to provide a frictional drag on the drum when it is disconnected from its driving means.

Other objects of the invention will appear hereinafter, the novel features and combinations being set forth in the appended claims.

In the accompanying drawings,

Fig. 1 is a plan view of a shortwall type machine which incorporates the features of my invention, the cutter bar being shown cut short;

Fig. 2 is a side elevational view of the machine of Fig. 1;

Fig. 3 is an end view of one of the rope or feed drums, with parts broken away and shown in section;

Fig. 4 is a sectional elevational view taken on the line 4—4 of Fig. 3, looking in the direction of the arrows; and

Fig. 5 is a sectional view taken on the line 5—5 of Fig. 3, looking in the direction of the arrows.

This application is a division of my application Serial No. 586,979, filed April 6, 1945, for a Mining Machine, and of my application Serial No. 676,200, filed June 12, 1946, for a Mining Machine.

Referring particularly to the drawings and to the shortwall machine which is therein disclosed it may be pointed out first that one of the important considerations which dictates some of the structure is the overall height of the mining machine. This mining machine is of the type which is adapted to rest on and slide over the mine floor as a unit while cutting a kerf or, in other words, is of the well known shortwall type. As a consequence, it is desirable to make its overall height a minimum, to the end that it may be used in very low seam mines.

Referring first to Figs. 1 and 2 of the drawings, the machine includes a main frame 40 which in practice is preferably formed of two substantially independent frames including a forward

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chinery frame or section 42 is a gummer or cuttings removing mechanism 43 which is optionally employed or omitted.

Extending forwardly from the motor frame or section 41 is a kerf-cutting mechanism 44 including an elongated cutter bar 45 which is of substantially standard construction, except for certain differences pointed out in the parent case and not here important, upon which there is mounted an endless cutter chain 46 provided with removable and reversible cutter bits 47. As is well known, the shortwall type of mining machine is adapted to be fed as a unit over the mine floor while cutting a kerf, the kerf being cut by first sumping the cutter bar into the solid coal and then feeding the machine laterally or across the coal face, all the while the kerf cutting mechanism 44 is in operation.

To effect the feeding of the mining machine as a unit, both at a kerf cutting speed and at a handling or higher speed and in reverse directions, the machine includes a pair of feed cable or rope drums 48 and 49 mounted on horizontal axes which are preferably in alignment, one on one side of the machine, the other on the other, as clearly illustrated in Fig. 1 of the drawings.

It may also be noted that the overall height or vertical dimension of the mining machine is substantially equal to the diameter of drum 48 or 49 and the top of the drum 48 or 49 is substantially at the top of said frame 40.

Drums 48 and 49 are provided with feed ropes or cables 50 and 51, respectively, which are adapted to be reeved about the sheaves of similar right and left hand rear sheave assemblies 52 and 53, respectively, and/or similar right and left hand front sheave assemblies 54 and 55, respectively.

For the present it need only be pointed out that the driving motor which drives the drums 48 and 49 tends to drive them always in the same direction, regardless of the direction of rotation of the motor, and that direction is such that it tends always to wind or pull in said ropes 50 and 51. That is, drum 48 tends always to be rotated by its driving motor in a clockwise direction, as viewed by a person facing it, and drum 49 tends always to rotate in a counter-clockwise direction, as viewed by a person facing it.

As further pointed out in the parent case, the mining machine may cut coal by being fed laterally in reverse directions and to do this, slippage is provided on one of the drums 48 or 49, as the case may be, and it is allowed to pay out with

a variable pull on the associated rope, as determined by the control of the associated torque converter. In Fig. 1 of the drawings the machine is illustrated with the ropes 50 and 51 reeved about the pulleys 52 and 55 to effect a lateral feeding of the machine to the left, as viewed from the rear thereof, or upward, as viewed from the drawings.

By the mere expedient of reeving rope 50 about the sheave of front assembly 54 and reeving rope 51 about the sheave of sheave assembly 53 and making the necessary operating adjustments on the machine, it may be fed to the right, reversely of that illustrated in Fig. 1 of the drawings.

By extending both of the feed ropes 50 and 51 directly forwardly and to mine jacks, the machine may be fed forwardly and sumped into the solid coal. By extending the rope 50 rearwardly and around an auxiliary sheave 56, then laterally to a central sheave not illustrated but which is common on machines of this type, the machine can be pulled rearwardly away from the mine face and may be loaded onto a truck in a manner well understood in the operation of shortwall machines.

The shortwall mining machine illustrated is, of course, adapted to rest on and slide over the mine floor when in operation and the supporting surfaces of the machine are provided largely by four spaced hydraulic piston jacks or motors (when employed), those at the rear being designated 57 and those at the front being designated 58. These hydraulic jacks provide for adjusting the elevation of the cutter mechanism 44 or, in other words, the effective height of the machine and also provide for adjusting the inclination or tilt thereof on right angularly related axes relative to a horizontal plane.

As disclosed in detail in my parent case each drum 48, 49 is driven from the motor through a torque converter and planetary gear the drive extending to a spur gear 280 which extends into the rope drum 48 (Fig. 3) and meshes with an internal gear 282 which is formed as an integral part of a driving member of the drum, the structure of which is best seen in Figs. 3 and 4 of the drawings. The drum 49 is of similar structure, except it is mounted on the reverse side of the machine. The drum 48 includes a hollow supporting post 283 which has a large base removably attached to the outer right hand side wall of the frame 42 and which carries a pair of spaced anti-friction bearings 284 which receive and support the hub of a main casting 285 of the driven or rope receiving portion of the drum 48. Journaled on a bearing on the outside of the hub of said casting 285 is the hub of a driving portion 286 of said drum 48, of which the internal gear 282 is an integral part.

In operation, the driving member 286 and the driven member 285 are, of course, connected together by clutching means, and the rope 50 is wrapped about the external surface of the main casting 285 between inner flange 287 and outer flange 288, the latter of which is formed on a removable plate 289 attached to the casting 285 by machine screws. In a cylindrical well or socket formed partially in the plate 289 and partially in the casting 285 is an anchor button 290, to which one end of the cable 50 is anchored and held.

To effect a selective driving or non-driving relation between the main casting 285 and the driving portion 286, a spider 291 is provided which has a plurality of drive pins 292 extending

through bushed openings in the casting 285 and adapted to extend selectively into aligned openings 293 in the driving member 286, thereby providing a clutching arrangement. Actuation of said clutch is provided by a piston 294 formed integral with the spider 291 and extending into a cylinder 295 formed in and along the axis of the post 283.

A spring 296 is received in a recess in the piston 294 and presses against the plate 289 to urge the pins 292 into clutch engaging position. As illustrated in Fig. 4 of the drawings, the clutch is in its disengaged position and thus the rope receiving member of the drum 48 is free to rotate, subject to some restriction as hereinafter described. To provide for this disengaging action, at the left hand end, the post 283 carries an insert 297 which is a high pressure cylinder providing a hydraulic fluid receiving chamber 298 into which an operating piston 299 extends, the outer end of which abuts the spring pressed piston 294. It is thus obvious that hydraulic fluid delivered to the chamber 298 will act through piston 299 and piston 294 to disengage the clutch pins 292 and thus free the outer or driven member of the drum 48.

As best illustrated in Fig. 5 of the drawings, a plurality of spring-pressed friction buttons 301 are provided in cylindrical bores in casting 285 and are pressed by springs 302 against a face of the driving member 286. Thus when the clutch pins 292 are disengaged, an operator can pull the rope 50 off the drum 48 against a slight drag or friction which will prevent undesirable free rotation of the driven member of said drum 48.

Obviously those skilled in the art may make various changes in the details and arrangement of parts without departing from the spirit and scope of the invention as defined by the claims hereto appended, and I therefore wish not to be restricted to the precise construction herein disclosed.

Having thus described and shown an embodiment of my invention, what I desire to secure by Letters Patent of the United States is:

1. A cable drum for a mining machine or the like including a frame having a post thereon, an internal gear mounted for rotation on said post and constituting an inner drive member of said drum, an outer cable receiving drum member also mounted on said post and surrounding said internal gear, clutch means for connecting and disconnecting said outer and inner members including a piston type clutch operating motor carried by said post, spring means urging said clutch to member engaging position, and means for supplying operating fluid to actuate said motor to disengage said clutch.

2. A cable drum for a mining machine or the like including a frame having a post thereon, a drum body having a hub mounted on said post for rotation, an internal driving gear mounted for rotation on the outside of said hub and located inside said drum body, a spider having a central piston extending into a cylinder formed in said post, said spider having drive pins extending through openings in the drum body and adapted to extend selectively into openings in said driving gear, spring means urging said drive pins into said opening, and means for actuating said spider to control the driving relation between said driving gear and said drum.

3. A cable drum for a mining machine or the like including a frame having a post thereon, a drum body having a hub mounted on said post

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for rotation, an internal driving gear mounted for rotation on the outside of said hub and located inside said drum body, a spider having a central piston extending into a cylinder formed in said post, said spider having drive pins extending through openings in the drum body and adapted to extend selectively into openings in said driving gear, and means for actuating said spider to control the driving relation between said driving gear and said drum.

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