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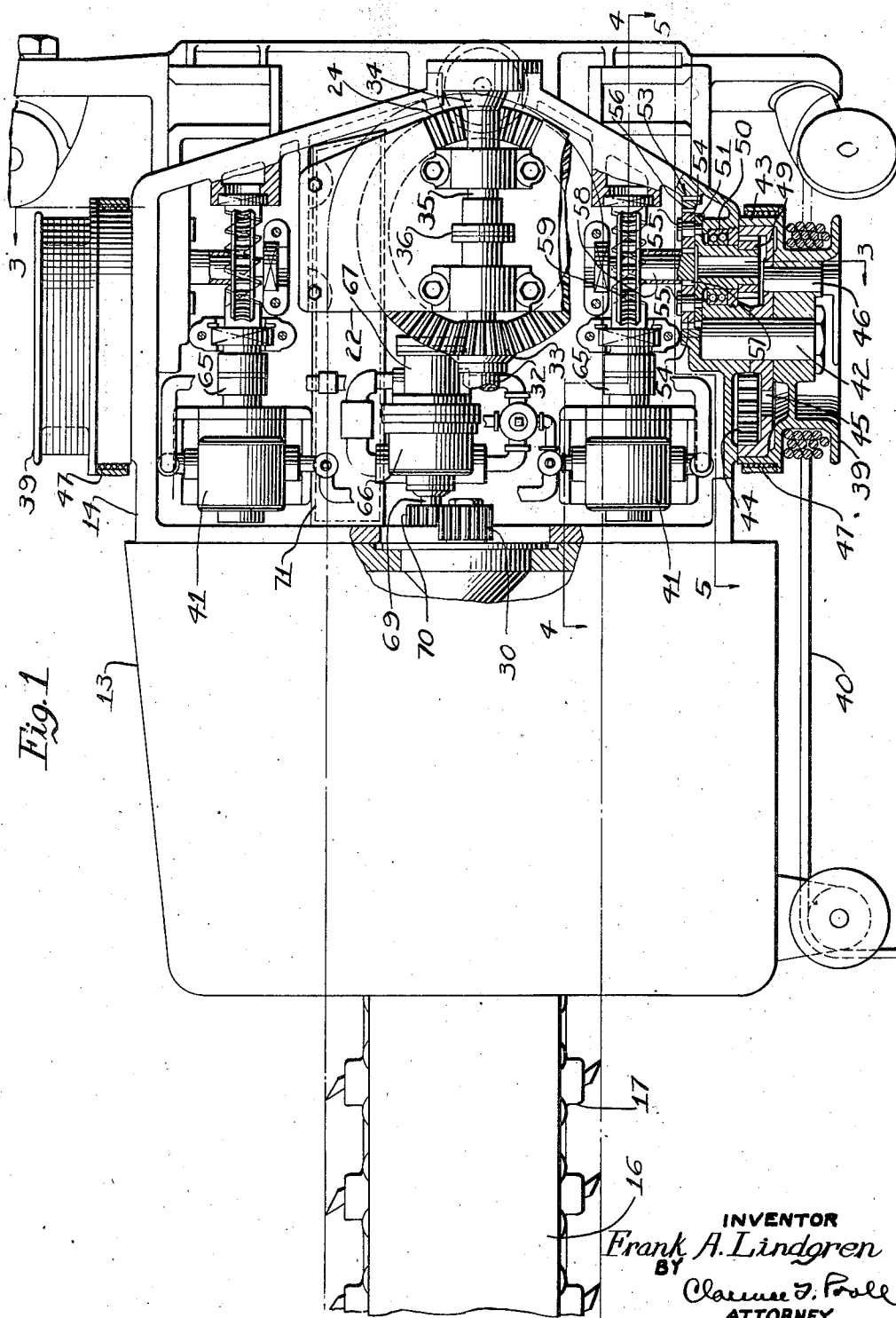
F. A. LINDGREN

2,308,451

KERF-CUTTING MACHINE

Filed Jan. 24, 1941

3 Sheets-Sheet 1



INVENTOR
Frank A. Lindgren
BY
Clarence J. Foll
ATTORNEY

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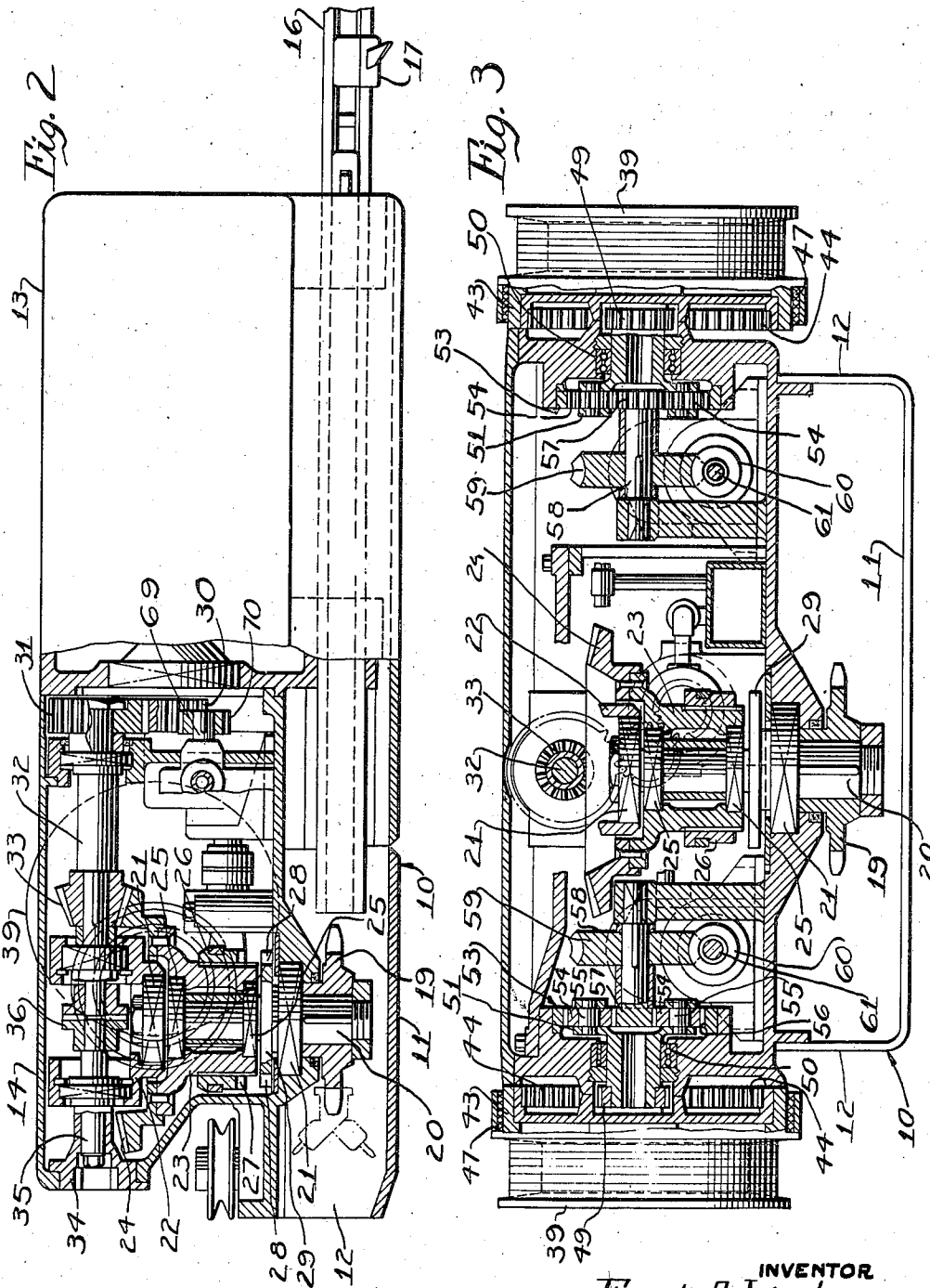
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3 Sheets-Sheet 2



INVENTOR
Frank A. Lindgren
BY
Clarence T. Poole
ATTORNEY

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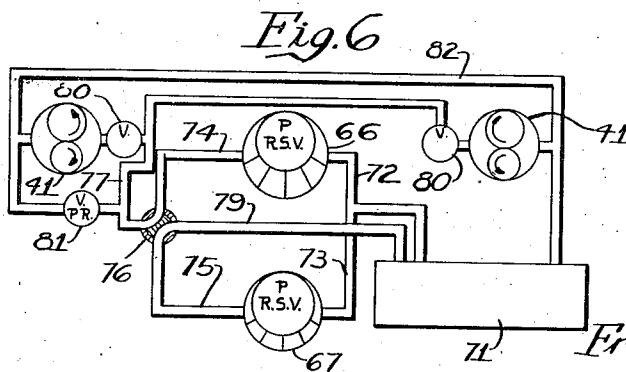
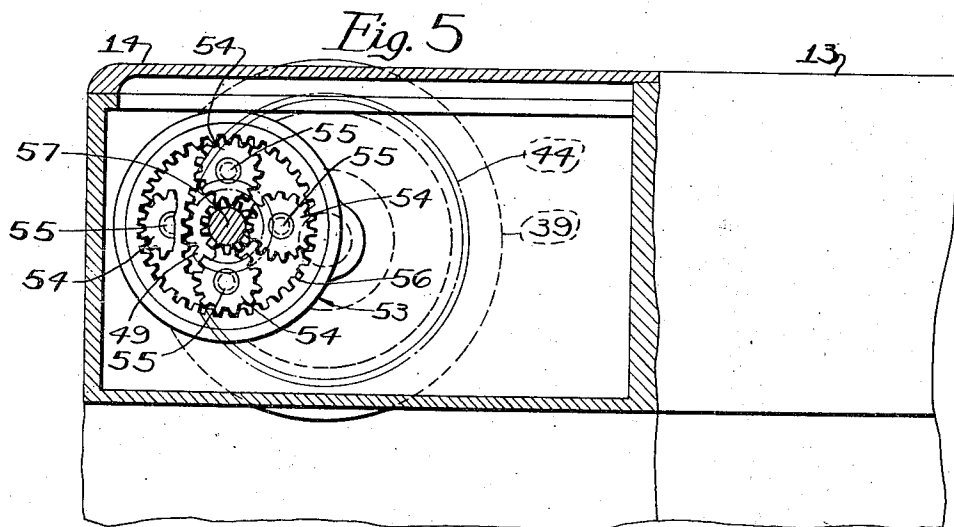
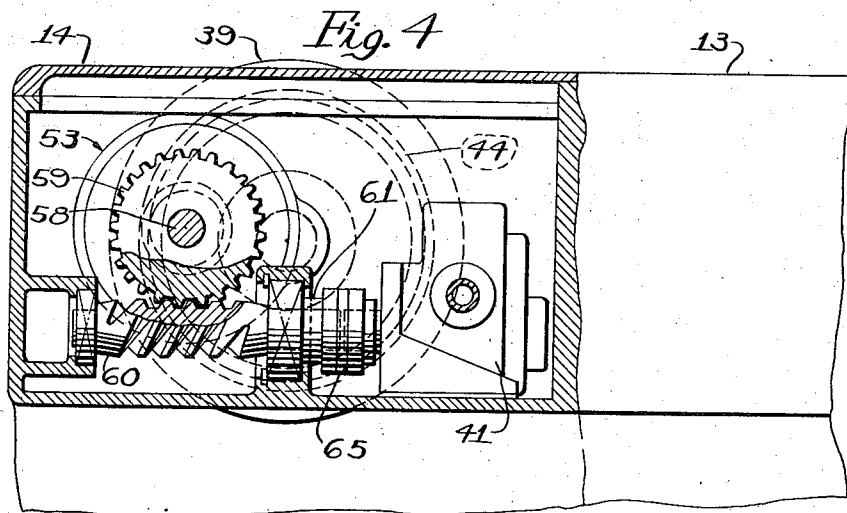
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KERF-CUTTING MACHINE

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3 Sheets-Sheet 3



INVENTOR
Frank A. Lindgren
BY *Clarence T. Poole*
ATTORNEY

UNITED STATES PATENT OFFICE

2,308,451

KERF-CUTTING MACHINE

Frank A. Lindgren, Western Springs, Ill., assignor
to Goodman Manufacturing Company, Chicago,
Ill., a corporation of Illinois

Application January 24, 1941, Serial No. 375,734

1 Claim. (Cl. 262—30)

This invention relates to improvements in kerf-cutting machines of the room and pillar type, and has as its principal objects to provide a novel and improved form of machine of the class described of a more compact and simplified construction than formerly, and arranged with a view towards simplicity and ease in operation and control.

A more specific object of my invention is to provide a machine of the class described including a plurality of winding drums for feeding the machine in either direction of cutting and including a novel and simplified form of plural speed fluid drive for these winding drums.

Other objects of my invention will appear from time to time as the following specification proceeds and with reference to the accompanying drawings wherein:

Figure 1 is a plan view of a kerf-cutting machine constructed in accordance with my invention, with certain parts broken away and certain other parts shown in horizontal section;

Figure 2 is a view in side elevation of the machine shown in Figure 1, with certain parts broken away and certain other parts shown in substantially longitudinal section;

Figure 3 is a fragmentary transverse sectional view taken substantially along line 3—3 of Figure 1;

Figure 4 is a fragmentary sectional view taken substantially along line 4—4 of Figure 1;

Figure 5 is a fragmentary sectional view taken substantially along line 5—5 of Figure 1; and

Figure 6 is a diagrammatic view illustrating the fluid circuit of the machine.

In the drawings, the machine illustrated includes an underframe 10 formed from a bottom plate 11 having upturned side walls 12, 12 and herein shown as extending the length of the machine and as being in two sections. Said underframe forms a support for a motor 13 disposed at the forward end thereof and for a frame and gear housing 14 disposed at the rear end thereof. Said frame and gear housing is adapted to house and form a bearing supporting means for the drive from said motor to the feed gearing and cutter chain drive mechanism, as will hereinafter more clearly appear as this specification proceeds.

A cutter bar generally indicated by reference character 16 is mounted on the underside of the motor 13 and gear housing 14 and projects forwardly from the forward end of said motor. Said cutter bar is of a usual construction having a channelled guide extending along the periphery

thereof for guiding a cutter chain 17 for orbital movement thereabout in a closed path. The arrangement of the side walls 12, 12 of the underframe 10 and the mounting of a cutter bar on the underside of the motor casing are such that the cutter chain moves in the space between the top of said bottom plate and the bottom of said motor and gear housing, to a point adjacent the rear end of said underframe, to discharge cuttings from the rear end of the machine through said underframe.

The cutter chain 17 is driven from a cutter chain drive sprocket 19 keyed on the lower end of a vertical shaft 20. Said shaft is disposed adjacent the rear end of said gear housing and is journaled therein on spaced bearings 21, 21 (see Figures 2 and 3). One of said bearings is disposed just above the hub of the sprocket 19 and the other is disposed at the upper end of said vertical shaft and is mounted in a bearing support portion 22 of the frame 14. A hub 23 of a bevel gear 24 is journaled on said vertical shaft on bearings 25, 25. A clutch member 26 is splined on the outer periphery of said hub and is provided with jaws 27, 27 adapted to engage jaws 28, 28 formed in a clutch collar 29 secured to said vertical shaft. A suitable system of links and levers (not shown) is provided to shift said clutch member vertically along said shaft, to selectively drive said vertical shaft from said bevel gear.

The drive from the motor 13 to the bevel gear 24 includes an armature pinion 30 which meshes with a spur gear 31 on the forward end of a longitudinal shaft 32. A bevel pinion 33 is keyed on said longitudinal shaft, adjacent the rear end thereof, and meshes with and drives the bevel gear 24.

A truck driving socket 34 is mounted on a shaft 35 journaled in the bearing support member 22 in alignment with the shaft 32 and driven from said shaft 32 by means of a flexible coupling 36, connecting said shafts together. The truck is driven from said socket by means of a detachable coupling pin (not shown). The truck and truck drive are no part of my present invention so are not herein shown or described.

A pair of winding drums 39, 39, having flexible cables 40, 40 adapted to be wound thereon, are provided for moving the machine about the mine floor on its own bottom and for sumping the cutter bar and chain endwise into the coal face and feeding said cutter bar and chain laterally across the coal face when sumped therein, in a manner well known to those skilled in the art, so not

herein described in detail. Said winding drums are herein shown as being mounted on opposite sides of the machine, adjacent the rear end thereof and are each adapted to be driven at either a high traveling speed or a low feeding speed by means of a separate fluid motor 41 in a similar manner, and are each of a similar construction, so the drive to only one of said winding drums need herein be described in detail.

Each winding drum 39 is mounted on a stub shaft 42, mounted in one side of the frame and gear housing 14 and projecting laterally therefrom. Said winding drum is provided with an inwardly projecting flanged portion 43 having an internal gear 44 mounted therein, for free rotation with respect thereto. Said internal gear is provided with a plurality of apertures 45, 45, adapted to be engaged by a pin 46 for selectively connecting said internal gear with said winding drum, for driving said drum.

The outer periphery of the flanged portion 43 of each winding drum is adapted to be engaged by a friction brake band 47, for retarding rotation of the winding drum which serves as the tail rope drum, during cutting across the face, for maintaining the machine in substantially perpendicular relation with respect to the coal face. Said friction band is applied to or released from its winding drum by means of a suitable linkage arrangement (not shown).

The drive to the internal gear 44 includes a pinion 49, which is meshed therewith. Said pinion is keyed to the hub of a cage 51 of a planetary geared reduction device 53. Said hub is journaled in a bearing 59. A plurality of planetary pinions 54, 54 are mounted in said cage on pins 55, 55. Said pinions mesh with an internal gear 56, fixedly secured to the frame and housing 14, and are driven from a sun gear 57 on a transverse shaft 58. A worm gear 59 is keyed on said shaft and is meshed with and driven from a worm 60 on a longitudinally extending shaft 61. Said worm and worm gears are of a self-locking type, to permit said winding drums to hold said machine in position on a pitching seam without the application of the friction bands 47, 47 to their associated winding drums. The forward end of said longitudinally extending shaft is connected with and driven from one of the fluid motors 41 by means of a flexible coupling 65.

Referring now in particular to the means driven from the motor 13, for supplying fluid under pressure to the fluid motors 41, 41 and for driving said motors independently or simultaneously at either a high or low speed, a pair of fluid pumps 66 and 67 are provided. Said pumps are arranged in tandem and, as herein shown, the fluid pump 66 is of a greater capacity than the fluid pump 67, so that the pump 66 may supply fluid to either or both of the fluid motors 41, 41 at one pressure, for driving said motors at a relatively high speed, and the other pump may supply fluid to either or both of the motors 41, 41 at a lower pressure, for driving said motors at a lower feeding speed. Said fluid pumps may be of any suitable construction, but are herein preferably shown as being rotary pumps of a well known sliding vane type, driven from a common, longitudinally extending shaft 69. Said shaft is driven from the armature pinion 30 by means of a spur gear 70.

Referring now in particular to Figure 6 and the fluid system, a fluid storage tank 71 is provided. Fluid is supplied to the pumps 66 and 67 from said tank by means of pipes 72 and 73. Pipes 74 and 75 lead from the pressure ends of said pumps to a valve 76. Said valve is herein shown as being a simple form of 4-way valve, so arranged that when in one position, fluid under pressure may be circulated from the pump 66 through a pipe 77 to either or both of the fluid motors 41, 41. When said valve is in this position, the pump 67 will circulate fluid through a pipe 79 back to the tank 71. When said valve is in its other position, the pump 67 may circulate fluid through the pipe 77 to either or both the fluid motors 41, 41. The pump 66 will then circulate fluid through the pipe 79 and back to the tank 71. Valves 80, 80 are provided to control the admission of fluid under pressure to the fluid motors 41, 41, and a pressure responsive relief valve 81 is connected between the pipe 77 and a return pipe 82, to relieve pressure from the pipe 77 upon overload of either motor, and to permit the circulation of fluid back to the tank 71 when the valves 80, 80 are closed.

It may be seen from the foregoing that either or both of the fluid motors 41, 41 and their associated winding drums 39, 39 may be driven from either of the pumps 66 or 67, thus providing a fluid drive to said winding drums for independently or simultaneously rotating said drums at either a high positioning speed or a low feeding speed, and arranged to relieve power from said drums upon overload, by means of the relief valve 81.

While I have herein shown and described one form in which my invention may be embodied, it will be understood that the construction thereof and the arrangement of the various parts may be altered without departing from the spirit and scope thereof. Furthermore, I do not wish to be construed as limiting my invention to the specific embodiment illustrated, excepting as it may be limited in the appended claim.

I claim as my invention:

In a kerf-cutting machine, a frame, a motor, a projecting cutter chain-carrying cutter bar, means for feeding said cutter bar into and transversely across a coal face including a pair of winding drums, each of which has a flexible feeding member adapted to be wound thereon, means for restraining movement of either of said drums in an unwinding direction, and means for independently driving said winding drums at either a high or low speed including a plurality of fluid pumps, a spur geared drive connection between said motor and said pumps, a fluid motor disposed on each side of said pumps behind said motor but in advance of the axes of rotation of said winding drums, selectively operable fluid connections, connecting said pumps and motors, for independently driving said motors from said pumps at either a high or low speed, a drive connection from each fluid motor to an associated winding drum including a planetary pinion, a cage rotated thereby, a pinion driven by said cage and meshing with an internal gear on said drum, and a single pressure responsive relief valve for relieving fluid pressure from either motor upon overload of its associated winding drum.

FRANK A. LINDGREN.