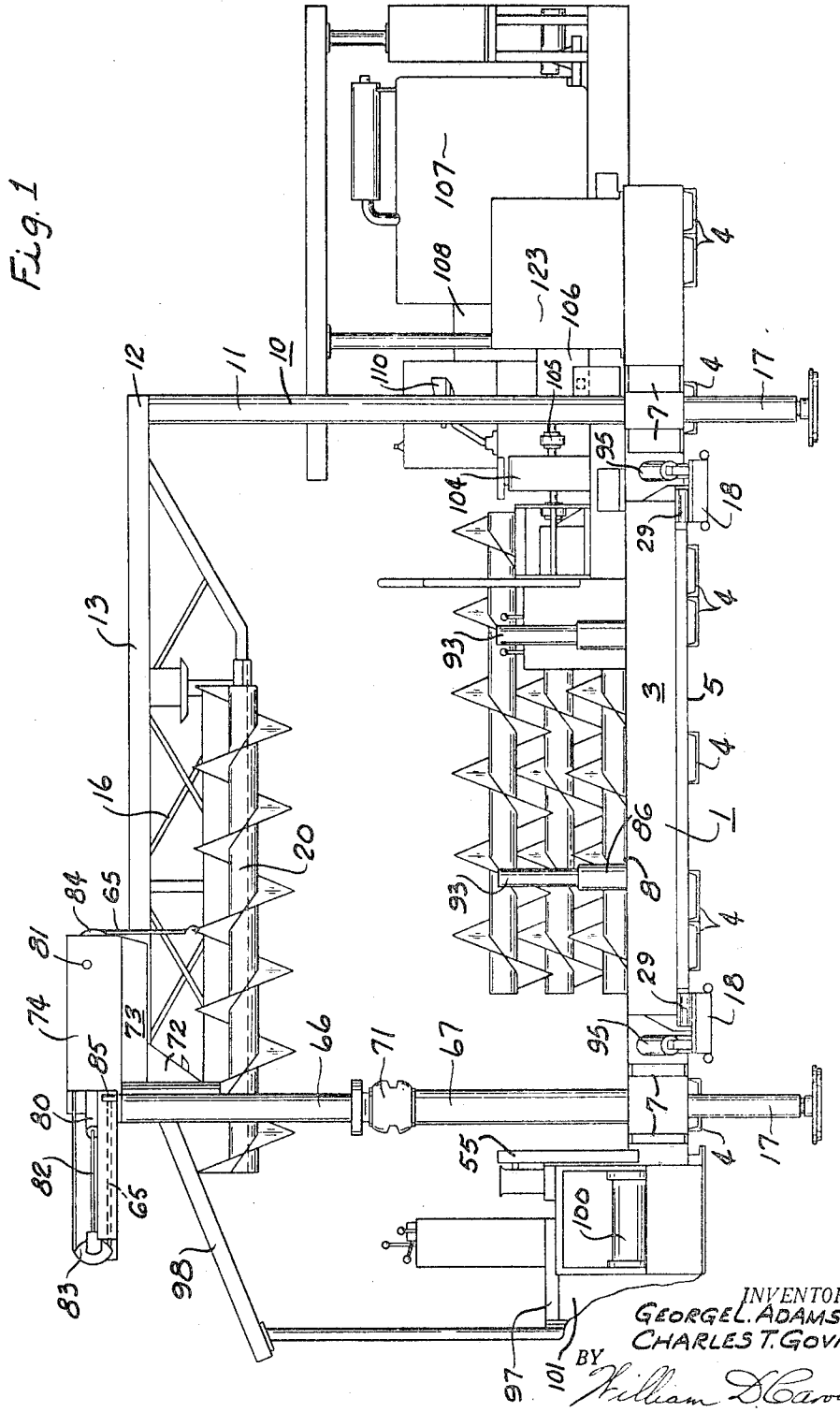
Oct. 11, 1966 G. L. ADAMS ETAL 3,278,236

DUAL AUGERING MACHINE

Original Filed June 20, 1960 2 Sheets-Sheet 1

Fig. 1



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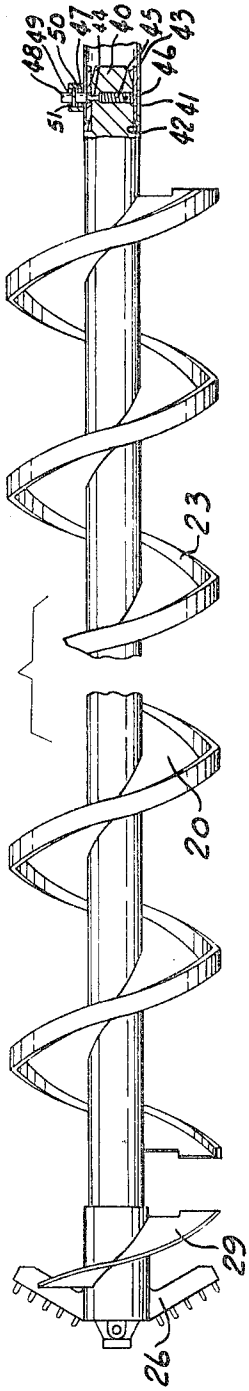
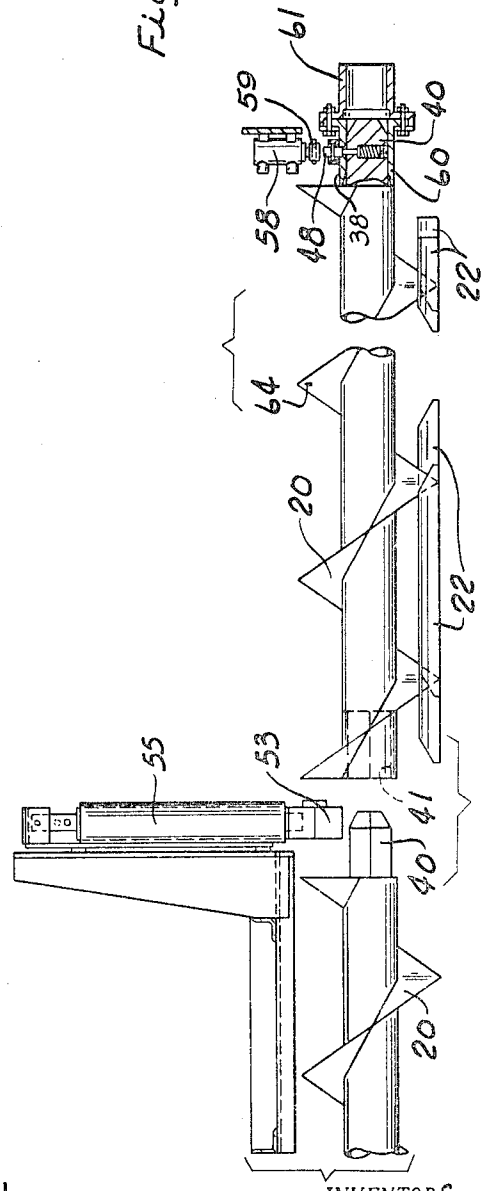


Fig. 2

Fig. 3



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DUAL AUGERING MACHINE

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Original application June 20, 1960, Ser. No. 37,490, now Patent No. 3,091,439, dated May 28, 1963. Divided and this application July 5, 1962, Ser. No. 207,637
3 Claims. (Cl. 299—55)

This invention is a division of application Serial No. 37,490, filed June 20, 1960, for Dual Auger Mining Machine.

This invention relates generally to auger mining machines and more particularly to an auger mining machine.

The principal object of this invention is the provision of automatic locking means that permit interengagement and locking of adjacent auger sections together with a release for detachable securing either end of each auger section when it is to be removed or disengaged from the drive of the mining machine. This materially aids in decreasing the time in changing augers or loading or unloading auger sections which represents the nonproductive time of the mining machine. This also includes a device for pre-setting each of the auger strings so that they may be released or uncoupled from their adjacent coupling by machine. This release may also be augmented by providing an arcuate shoe on the release mechanism to insure engagement with the release pins within a reasonable tolerance of misalignment of the auger sections in their rotary position.

Other objects and advantages appear hereinafter in the following description and claims.

The accompanying drawings show for the purpose of exemplification without limiting the claims thereto, certain practical embodiments illustrating the principles of this invention wherein:

FIG. 1 is a side elevation of the augering machine.

FIG. 2 is an enlarged plan view of the cutting head and the initial augering sections.

FIG. 3 is a view in side elevation showing the front and rear auger latch release mechanisms.

Referring to FIG. 1 of the drawings the augering machine consists of the frame **1** constructed of a pair of longitudinally disposed parallel I-beams **3** joined by a plurality of channel members **4** on the under side thereof and connected by the continuous belly plate **5** that extends from one I-beam to another and is braced by a series of brace plates. The outer face of the I-beams **3** are provided with the outboard brace plates **7** along the sides of the frame to provide for the walkways **8**. The frame members **10** which consist of the raiser posts **11**, the cross members **12** and the longitudinal beam **13** function to support the auger baffle frame **16** as well as the four vertical jacks **17** in the riser tubes **11**. The vertical lifting jacks **17** are capable of lifting the whole of the machine and their large disc type feet are enabled to be raised above the skids **18** which support the mining machine for guiding movement and travel along the ground. The underside of the skids **18** represent the lowermost surface of the mining machine when the jacks **17** are retracted. These skids are retained to the under side of the frame **1** by brackets, not shown and the frame **1** in turn is provided with rollers **29** to support the movement of the frame on the skids.

The belly plate **5** supports the auger sections **20**. These auger sections are couped to the mining head shown in detail in FIGS. 2 and 3 wherein the first auger section is preferably provided with a tread section **23**. The auger **20** is provided with the cutting head **26**. The forward end of each auger section is preferably provided with a non-

round pin to be received in the nonround socket of the cutting heads **26**. The cutting head is provided with its own sectional flight **29** to feed the coal from the cutting head rearwardly to the auger flight section **20**.

The rear pins **40** of which will receive the ordinary flight sections of the augers wherein the front of each auger section will be provided with a socket **41** and the rear of each auger section will be provided with a similar pin **40** to mate with the nonround socket of the next succeeding auger section or the nonround coupling socket **41** on the drive. It will be noted that these sockets have an outer nonround bore **42** to receive the nonround end **43** of the pins **40**. The sloping walls **38** of the nonround bores **42** engage and depress the latch **44** biased by the spring **45** which is set by the thread plug **46**.

A socket **41** also carries a collar **47** that receives the unlatch pin **48** which is provided with an annular flange **49** and is biased by the spring **50**. The outer surface of the flange is stopped by the split ring **51**. When the unlatch pin **48** is depressed it will shove the latch **44** within the pin **40** and release the auger section carrying the pin **40** from the socket **41**. To perform this function the front auger latch release member as illustrated in FIG. 3 is employed. This latch release is indicated by the cam member **53** actuated by the cylinder **55** supported from the frame. When this cylinder is energized its piston is as shown in FIG. 1, and extends the cam surface **53** to engage the unlatch pin **48**. While the cam is thus extended holding the unlatching pins **48** depressed, the rear auger sections or the coupling on the drive are retracted to release from the forward auger sections.

In similar manner the machine is provided with a rear auger latch release cylinder **58** which carry the cam section **59** for engaging the unlatch pins **48** on the driving coupling **60** which is bolted to the coupling bit **61** attached to the drive shafts of their respective gearboxes **62** and **63** as shown in FIG. 3. In order to actuate the automatic front and rear latch release mechanisms it is necessary to stop the auger sections in a predetermined position which position as shown in FIG. 3 leaving the hole **64** in the center of the auger flight on the top of the auger which permits the same to be engaged by hook members from the hoist lines **65**.

The hoists **66** are positioned outwardly of the front lifting jacks **11** and are stepped in the deep tubular sockets **67**. Each hoist is driven by a chain from a sprocket on a shaft of the motor **71**. Each hoist member **66** thus may be made to swivel on its step bearing through 360° if necessary. The upper end of the hoist is provided with a bracket member **72** that supports the outwardly projecting box member **73** that slidably supports the boom member **74** that is guided by the box member **73** that functions as a track for the boom. The boom **74** is provided with a depending bracket to which is secured a piston extending from a cylinder, not shown, the opposite end of which is pivotally secured to the inner end of the box **73**. Thus by energizing the cylinder the piston moves the boom forwardly for the full length of the piston.

The boom is in turn provided with the cylinder **80** which is pivotally secured as indicated at **81** to the boom and extending from its opposite ends is the piston **82** which carries a pulley **83** at its outer end or at the back of the boom **74**. A hoist line **65** travels over the pulley **84** pivoted to the forward end of the boom **74** and travels backwardly over the top of the pulley **83** and returns to the anchor **85** on one of the brackets that supports the cylinder **80** within the boom. Thus when the cylinder **80** is energized to retract the piston **82**, the hook and the weight on the end of the hoist line **65** will descend and if it is necessary to extend the position of this hook from the center of rotation of the hoist mast **66**, the cylinder

is energized to run the boom outwardly. Thus the hook is enabled to function within the varying radius of the center of rotation of the hoist mast **66** by the extension of the piston from the extension cylinder and the hook is enabled to be raised and lowered by the extension and contraction of the piston **82** within the cylinder **80**. As shown in FIG. 1 the boom **74** can be swung outwardly at different radii to receive and discharge auger sections from their loading position on the machine bed to the auger storage racks **86** of which there is one on each side of the augering machine.

The auger storage frames **86** are provided to support four auger flights in the bottom of the pile on which are stacked a row of three auger sections which in turn provide with the extensible posts posts **93** for four additional auger sections in the next level. If the posts **93** are extended any higher they can be made to stack a considerable number of auger sections. However, as shown in FIG. 1 the augers are stacked in elevations but they may be increased or be reduced in number as they pyramid.

The racks **86** have secured to their under sides the rollers **94** which ride on the inner side of the top flat surface of the skids **18**, the outer sides of which are occupied by the skid operating jacks **95**.

Thus each of the hoists **66** with their expansible boom **74** may raise a pair of augers from the storage racks **86** on each side of the frame **1** and swing them into position against the auger baffle **16** to steady and straighten the same and then drop them down onto the bed plate **5** within the guides **22** in proper position so that they may be readily coupled. Since the hoist openings **64** in each auger section properly locks the auger section when lowered to the bed plate they may be readily coupled with the automatic latching means by merely moving the carriage forward to connect the couplings at the rear and at the front of the newly inserted auger section.

As shown in FIG. 1 a platform **97** is provided in front of the forward lifting jacks and the hoist controls show three control levers for each hoist for the purpose of swinging the hoist in either direction, extending or retracting the boom or raising and lowering the hoist line **65**. Above the platform **97** is a screen canopy **98** which protects the hoist operator from falls from the face, high wall or hill. This also protects the forward end of the machine as well as the conveyor section indicated at **100** which withdraws the coal as it is carried over the extensible auger guide section **101** and drops onto the conveyor **100** from whence it is conducted to an elevating conveyor to a truck or other transportation means.

As shown in FIG. 1 in back of the gearbox is the chain drive **104** that extends from the shaft driving the gearbox and thence through the coupling **105** and the transmission **106** to the diesel engine **107**. An auxiliary powered diesel engine **108** is placed on the side of the machine for operating a hydraulic pump that serves all of the hydraulically actuated controls. The controls for operating the auger sections and feeding them forward is shown at the operator station **110** in FIG. 1.

We claim:

1. An auger mining machine having a frame supporting a rotary mining assembly operated by a feed and rotary drive means, the rotary mining assembly including auger sections connected by a pin and socket joint and a biased latch means, one of said sections having biased unlatch means in operative position to disengage said latch means, said rotary mining assembly with said auger sections being stopped in said frame at predetermined rotary and longitudinal positions for changing auger sections, and servomotor means mounted on said machine in position to operate said prepositioned unlatch means to disengage said latch means to permit separation of said auger section from said rotary mining assembly.

2. An auger mining machine having a frame supporting a rotary mining assembly operated by a feed and rotary drive means, the rotary mining assembly including auger sections connected by a pin and socket joint and a biased latch means, said sections having biased unlatch means in operative position to disengage said latch means, said rotary mining assembly with said auger sections being stopped in said frame at predetermined rotary and longitudinal positions for changing auger sections, and servomotor means mounted on said machine in position to operate said prepositioned unlatch means at opposite ends of a prepositioned auger section to disengage said latch means to permit separation of said prepositioned auger section from said rotary mining assembly.

3. An auger mining machine comprising a mining machine frame, a rotary auger mining assembly including a plurality of connected auger carried by said frame to rotate and move said augers along said frame in mining, each auger having a pin of polygon cross section at one end and a mating socket at the other end, and which also consists of a biased latch projecting from each pin, a sloping bell surface in at least one face of said polygon socket in the end of said socket to depress said latch when said pin in entering into said socket, an outwardly projecting unlatch member on each socket aligned with said recess to force the latch therefrom when depressed and a servomotor supported from said frame to depress said unlatch member to inturn push said latch out of said recess and unlock said pin from said joint, and wherein there are two servomotors mounted adjacent opposite ends of augers in said mining assembly to release both ends of the auger, and a hoist to remove the same.

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