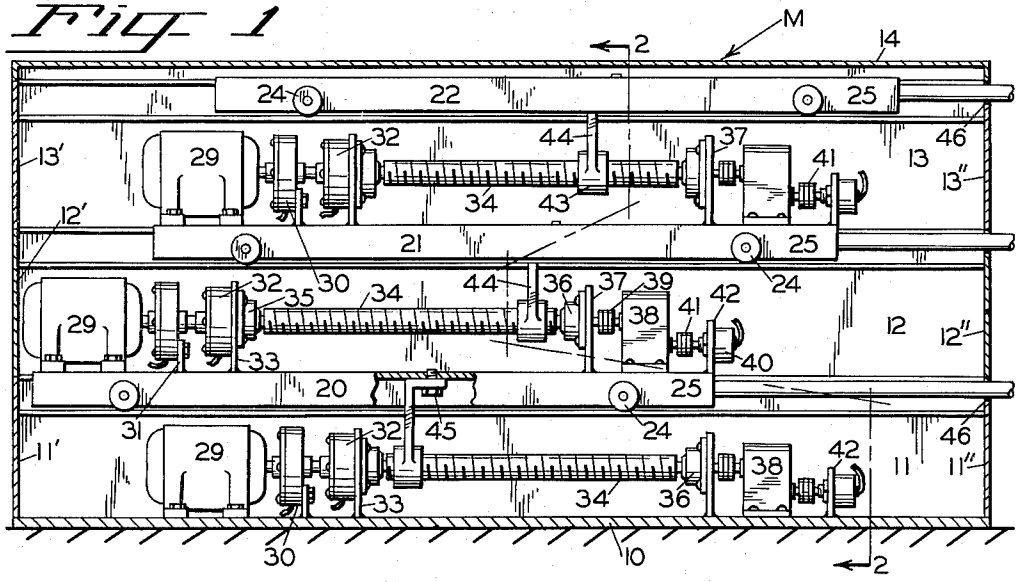
July 18, 1961 M. L. BURELBACH 2,992,661

AUTOMATIC SAW SET POWER UNIT

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Fig. 1



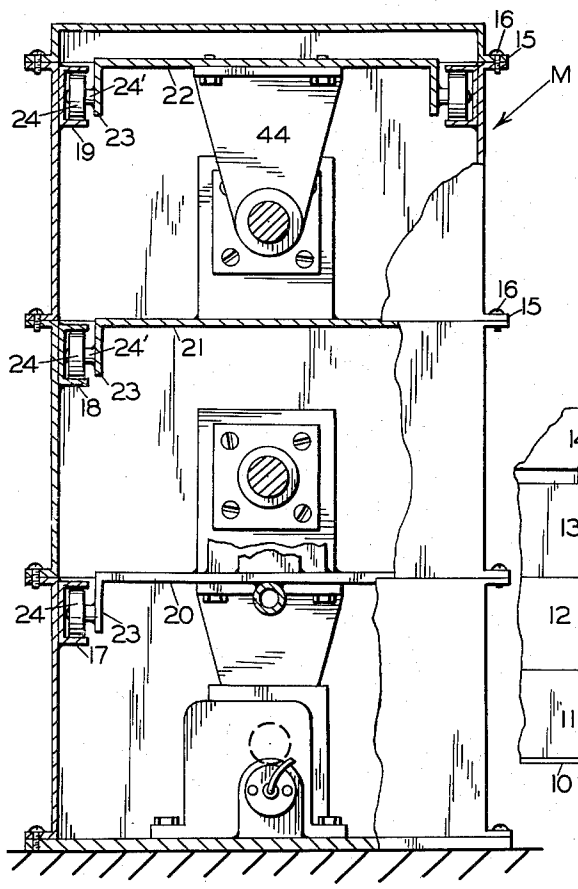


Fig. 2

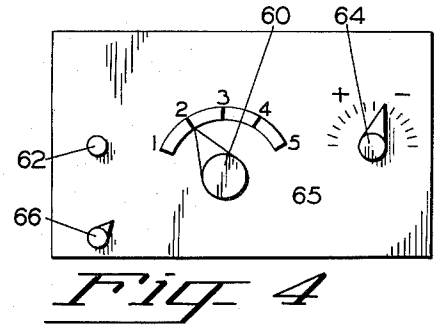


Fig. 4

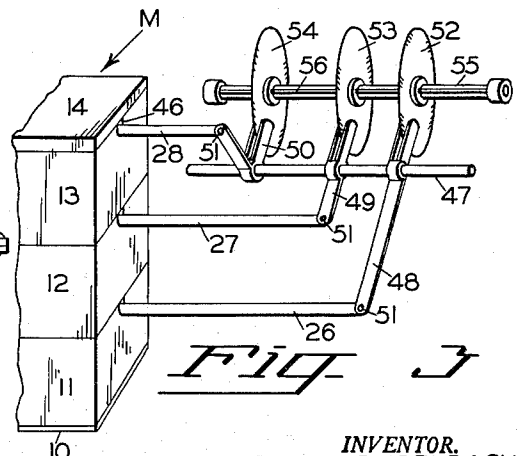


Fig. 3

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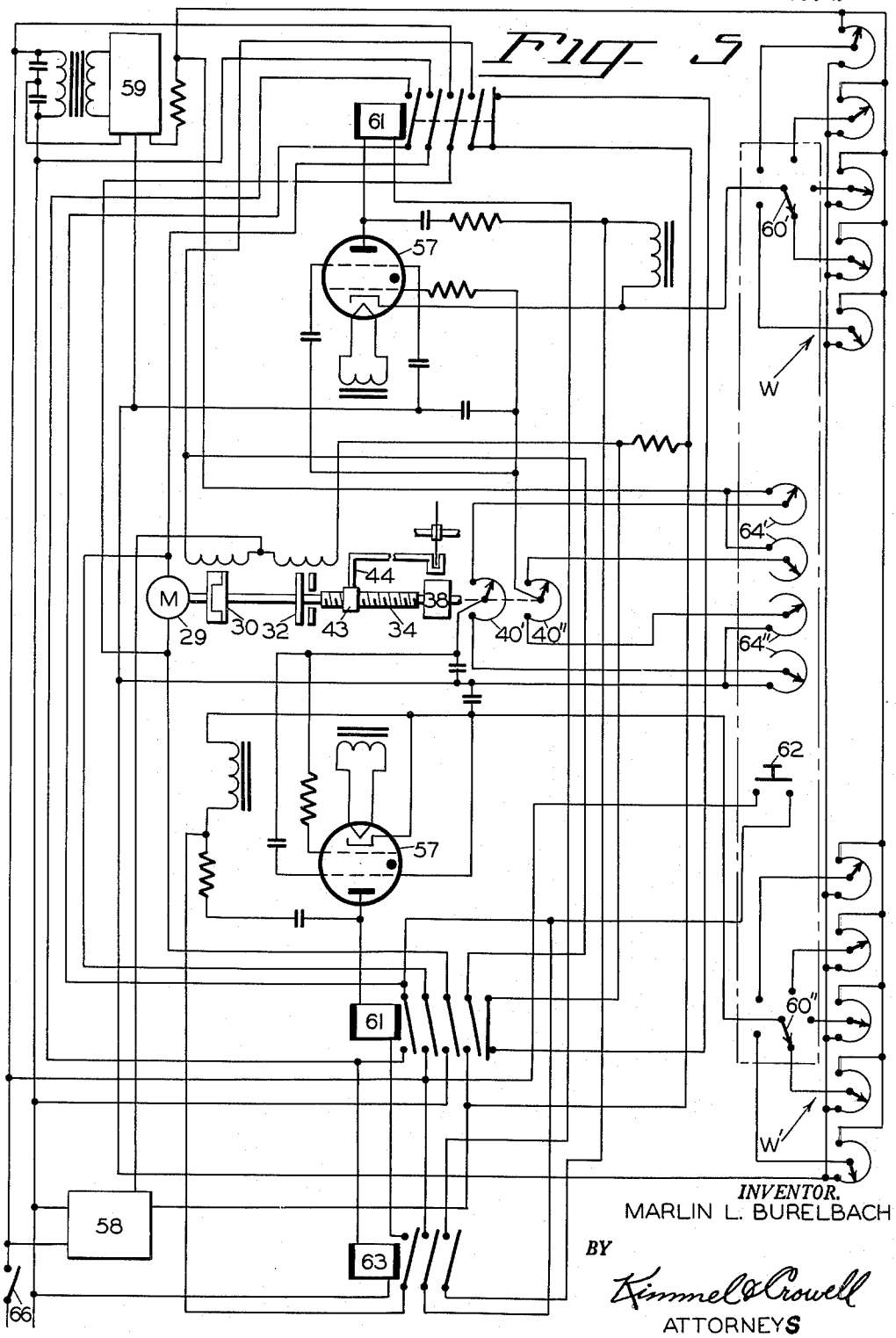
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Fig. 3



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AUTOMATIC SAW SET POWER UNIT

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3 Claims. (Cl. 143—37)

This invention relates to an automatic saw set works power unit, and is particularly adapted for the operation of a plurality of rotary edging saws and the control of the same.

A primary object of this invention is the provision of an improved power unit for controlling the setting of edging saws which can be preset to a new setting while the existing setting is still operational.

An additional object of the invention is the provision of a setworks power unit of this character which effects the resetting of the saws with a minimum of down or inoperative time.

A further object of the invention is the provision of such a setworks power unit which can be remotely operated electronically from a remotely positioned console or the like.

Still another object of the invention is the provision of a setworks power unit of this character which allows either independent settings or a new setting for one saw while maintaining the existing spacing of the other saws.

Still another object of the invention is the provision of an electrically controlled setworks whereby the adjustment of a plurality of edging saws may be effected independently from each other with a minimum of inoperative or down time.

Still another object of the invention is the provision of an improved remote control means located in an operator's station and employing an electrical control panel.

Still other objects reside in the combination of elements, arrangements of parts, and features of construction.

Other objects will in part be obvious and in part be pointed out as the description of the invention proceeds, and shown in the accompanying drawings wherein there is disclosed the preferred embodiment of this inventive concept.

In the drawings:

FIGURE 1 is a side sectional view of one form of mechanical setworks mechanism, parts thereof being broken away for convenience of illustration.

FIGURE 2 is an enlarged fragmentary sectional view taken substantially along the line 2—2 of FIG. 1 as viewed in the direction indicated by the arrows.

FIGURE 3 is a diagrammatic perspective illustration showing the linkage of the control rods of this invention to the edging saws.

FIGURE 4 is a plan view of a control console for one saw operation.

FIGURE 5 is a schematic wiring diagram.

Similar reference characters refer to similar parts throughout the several views of the drawing.

The electro-mechanical mechanism assembly is generally indicated at M and comprises a housing consisting of a base 10, side walls 11, 12 and 13, rear walls 11', 12' and 13', front walls 11'', 12'' and 13'', and a top 14, all of which are demountably secured together by flanges 15 and screws 16.

Secured longitudinally along the tops of the side walls 11, 12 and 13, are channel-shaped guide members 17, 18 and 19. Movable frames 20, 21 and 22 are provided and each consists of an inverted channel with downwardly disposed flanges 23, having rollers 24, affixed thereto mounted on axle 24'. Mounted at the forward ends 25, of the frames 20, 21 and 22, are control rods 26, 27 and 28. Mounted on the base 10 and on movable frames 20 and 21, are motors 29, electric clutches 30, mounted by way of ears 31, and electric brakes 32, mounted by way of ears 33. Enlarged threaded shafts 34 are journalled within bearings 35 and 36 and associated with each motor. Bearings 35 are mounted on ears 33, and bearings 36 are mounted by way of ears 37. Shafts 34 transmit power to gear boxes 38, by way of universal joints 39. Rheostats 40 are driven at reduced speed through the universal joints 41, these rheostats being mounted by way of ears 42. Mounted on shafts 34 are threaded bosses 43, with integrated connecting members 44, which are secured to the movable frames 20, 21 and 22 by means of bolts 45.

Forward walls 11'', 12'' and 13'' have slots 46 at their tops to allow for the passage of the control rods 26, 27 and 28. Slidably mounted on a shaft 47 are saw guiding members 48, 49 and 50, which are each pivotally connected at 51 to control rods 26, 27 and 28. Edging saws 52, 53 and 54 are slidably mounted upon a powered shaft 55, which has a keyway 56 along its length. The source of power for shaft 55 and their related saws is not shown.

It should be noted that the design of these edging saws, including their saw guiding members, is well known and need not be elaborated upon here.

FIGURE 5 illustrates the electronic control for predetermining a setting of the saws. The electrical diagram as shown is not, per se, a part of this invention, and is disclosed to clarify the over all operation.

Basically, the electrical electronic control equipment uses thyratron controlled tubes 57, with a voltage regulated A.C. power 59 on their plate circuits and a very minutely regulated D.C. current 58 on the cathode grid or triggering circuits. A minute regulation on voltage is such that the control is not influenced by a normal power fluctuation as encountered in industrial plants. It will be noted that one thyratron tube controls a saw in one direction only whereas the second thyratron tube controls the movement of the saw in the other direction. Machines of this type are more limber in one direction than the other and such a system is necessary for accurate setting from both directions.

Basically, the thyratron tubes 57 are connected up in modified Wheatstone bridge circuit, signified by W, the potentiometers being connected to selector switches 60 and 60', and so arranged so that they can be switched in or out of one leg of the bridge. Potentiometers 40 and 40', in the grid circuits of the thyratrons 57, are mechanically connected to a worm screw 34, through a mechanical gear reduction system 38, so that the potentiometers 40 and 40' in the grid circuit of the thyratron move through from approximately a minimum resistance to a maximum resistance while a threaded boss 43 moves from left to right or vice versa along the threaded shaft. In other words whatever position boss 43 assumes on worm screw 34, there is one, and only one, resistance on each of the potentiometers W, in the grid circuit of that particular grid circuit of the thyratron tube 57.

The capacitors shown in the grid and cathode circuits of the thyratrons 57 are only for purposes of grounding out erroneous signals that would cause erratic setting. The resistor and capacitor circuit shown in the plate circuit of the thyratron is an anti buzz or hum circuit so that the relays in the plate circuit of the thyratron will not chatter.

From the foregoing it will be noted that when a selector switch 60 is set to pick up a definite voltage from one of the potentiometers W as switched into the circuit the thyratron associated with that circuit will only fire or conduct when the potentiometer 40 in its grid circuit has

been moved to a point where the voltage on the grid in relationship to the voltage on the cathode will cause it to conduct. Because this is a very exact and precise point the set works control is extremely accurate.

Thus, a different potentiometer W in the cathode circuit of the tube can be set for different resistance values and by switching them in and out by means of the switch 60, they can cause the thyratron tube 57 to fire only when the potentiometer 40 and its grid circuit is in a different but exact position and, of course, is mechanically tied in with the position of the saw. From the foregoing it will be seen that any time a predetermined position has been reached by a saw, the thyratron 57 associated with that particular movement will cease firing and it will cause the relay 61 in its plate circuit to open. Therefore, any time a new set for the saw is required, the sawyer operating the equipment makes a new set on the selector switch 60. This will cause either one or the other thyratrons 57 to fire if the relay 61 in the plate circuit of the thyratron tube 57 can only be energized by pressing an automatic button 62 causing one of the relays 61 in the plate circuit of the thyratron 57 to close, sealing itself in through its own contacts and remaining closed until the thyratron 57 ceases to fire or conduct, which can only occur when the saw has reached its new position. When the saw reaches this new position the thyratron 57 ceases to fire or conduct; the relay 61 in its plate circuit opens, thus breaking the circuit to a holding coil 63 in the automatic push button circuit. Through such a system as decribed above the plate current to the thyratron tubes 57 is only applied during the time that the saw is seeking its new position. At the time the saw seeks its new position and the thyratron tubes 57 cease to fire, then the circuit associated with the automatic push button 62 is de-energized and de-activated until the next set is selected and the automatic button 62 is again depressed.

Each electric reversing motor 29 drives its associated saw shifter through electrically operated clutch 30, and then through electrically operated brake 32 so that it is possible to reverse the motor, de-activate the clutch and energize the brake as needed automatically in the circuit. It will be noted that clutches 30 and brakes 32 receive their power from a typical D.C. power supply 58. It will also be noted that one thyratron tube 57 is connected through the motor starting circuit so that it drives its associated motor 29 only in one direction, whereas the second thyratron 57 on a particular saw also controls the speed of that motor 29 in the opposite direction. The circuit is also designed so that any time the saw has reached its predetermined position that the electric brake 32 comes on automatically and stays on until such a time as it is desirable to move the saw to a new position. When it is desirable to move the saw to a new position after the sawyer has selected the new position he must press the automatic button 62. At that moment the brake 32 automatically is de-energized while the clutch 30 is energized and the motor 29 is energized in the proper direction to drive the shifter arm which is mechanically connected to the saw in the right direction to seek its new predetermined position. At the moment the saw reaches its new position, the thyratron tube 57 causing that particular movement ceases to fire which automatically de-energizes the clutch 30 to get rid of the WR square in the motor 29 and automatically energizes the brake 32 immediately to stop the positioner in the correct position.

Potentiometers 64′ and 64″, or a variable resistance system can be applied to the grid circuit of the thyratron 57 so that the firing point of the tube can be changed slightly, as shown in the drawing. These potentiometers 64′ and 64″ in the grid circuits are mechanically connected together in such a way that the firing point of the thyratron can be shifted slightly either way in relationship to the threaded shaft 34 and fractional adjustments can be added to the saw as desired. These fractional adjustments can also be made in a similar manner by adding similar circuits to the cathode circuit of the tube.

The manual switch is shown at 66 (see FIG. 4).

The basic electric circuits used in the thyratron tubes in this application are more fully disclosed in the control schemes as set forth in patent application Serial No. 524,519, filed on July 26, 1955 by Donald E. Johnson.

While only one setwork control is shown in FIGURE 5, any desired number of saws can be controlled by this system. These systems would be interlocked so that all the saws can be preselected and the saws will not take their preselected positions until the switch 62 is closed which causes all the saws to move to their new position. An arbitrary three unit shifting assembly is shown in FIGURES 1, 2 and 3 for a typical installation. Single shifting units can be used for making sets on a resaw line bar, with the bar being shifted instead of the saw.

This system results in great accuracy in saw setting as compared with heretofore manual setting means, and eliminates such detrimental factors as fatigue, carelessness, etc.

These systems can be applied to all existing setworks installations without any alteration. The existing saw guiding members 48, 49 and 50 are merely connected at 51 to the control rods 26, 27 and 28. The electromechanical mechanisms M, associated with these said rods are then positioned conveniently, as is the remote control console 65.

While in the foregoing the power unit of the instant invention has been disclosed particularly in connection with a saw setworks, it is to be understood that the device may be equally applicable to other forms of apparatus wherein a similar control is desired.

From the foregoing it will now be seen that there is herein provided an improved automatic saw set works power unit which accomplishes all the objects of this invention, and others, including many advantages of great practical utility and commercial importance.

As many embodiments may be made of this inventive concept, and as many modifications may be made in the embodiment hereinbefore shown and described, it is to be understood that all matter herein is to be interpreted merely as illustrative and not in a limiting sense.

I claim:

1. In a power unit for the control of a saw set works, the combination of a housing, a plurality of tracks in said housing, a frame linearly mounted for movement on each track, a linearly movable operating rod connected to each frame, a guide shaft positioned exteriorly of said housing, a power shaft mounted adjacent said guide shaft, a plurality of saws on said power shaft, a linkage pivoted on said guide shaft connecting each control rod with a saw, and remotely controlled electrical means for moving each frame and hence its associated control rod and saw, said last-mentioned means including an electric motor mounted on each frame, a worm rotatable by said motor, and a threaded boss fixed in said housing co-acting with each said worm.

2. In a power unit for the control of a saw set works, the combination of a housing, a plurality of tracks in said housing, a frame linearly mounted for movement on each track, a linearly movable operating rod connected to each frame, a guide shaft positioned exteriorly of said housing, a power shaft mounted adjacent said guide shaft, a plurality of saws on said power shaft, a linkage pivoted on said guide shaft connecting each control rod with a saw, and remotely controlled electrical means for moving each frame and hence its associated control rod and saw, said last-mentioned means including an electric motor mounted on each frame, a worm rotatable by said motor, a threaded boss fixed in said housing co-acting with each said worm, a clutch, and a brake positioned between said motor and said worm.

3. In a power unit for the control of a saw set works,

the combination of a housing, a plurality of tracks in said housing, a frame linearly mounted for movement on each track, a linearly movable operating rod connected to each frame, a guide shaft positioned exteriorly of said housing, a power shaft mounted adjacent said guide shaft, a plurality of saws on said power shaft, a linkage pivoted on said guide shaft connecting each control rod with a saw, and remotely controlled electrical means for moving each frame and hence its associated control rod and saw, said last-mentioned means including an electric motor mounted on each frame, a worm rotatable by said motor, a threaded boss fixed in said housing co-acting with each said worm, a clutch, a brake positioned between said motor and said worm, a thyratron control circuit governing each motor, and a remote console controlling each circuit.

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