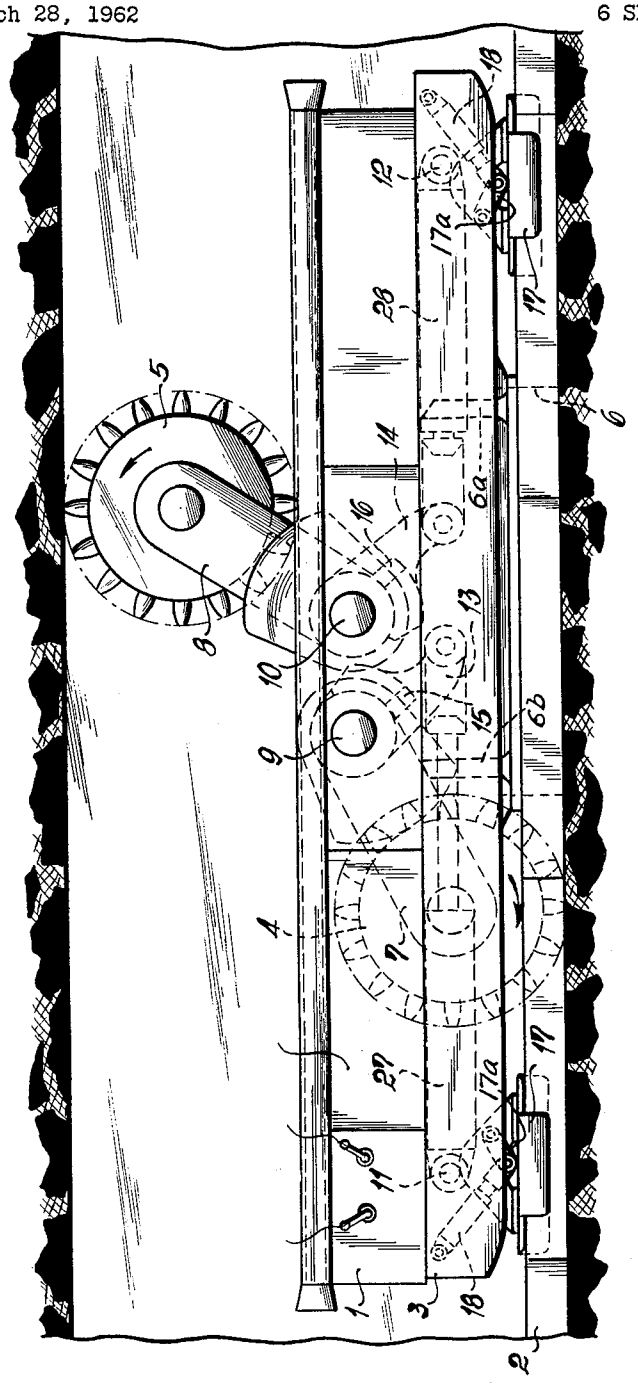
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MINING MACHINE HAVING LATERAL ROLLER CUTTERS

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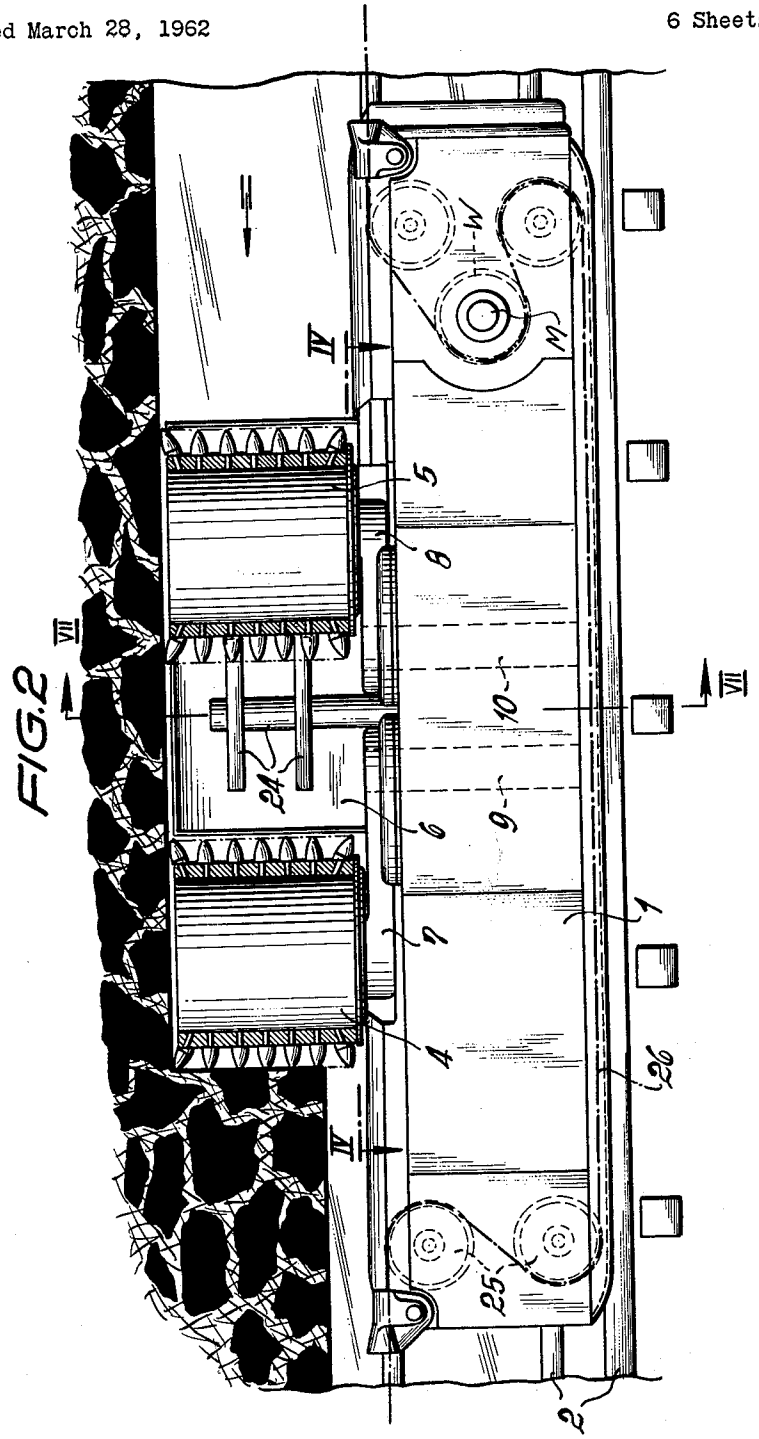


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MINING MACHINE HAVING LATERAL ROLLER CUTTERS

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FIG.2



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FIG.5

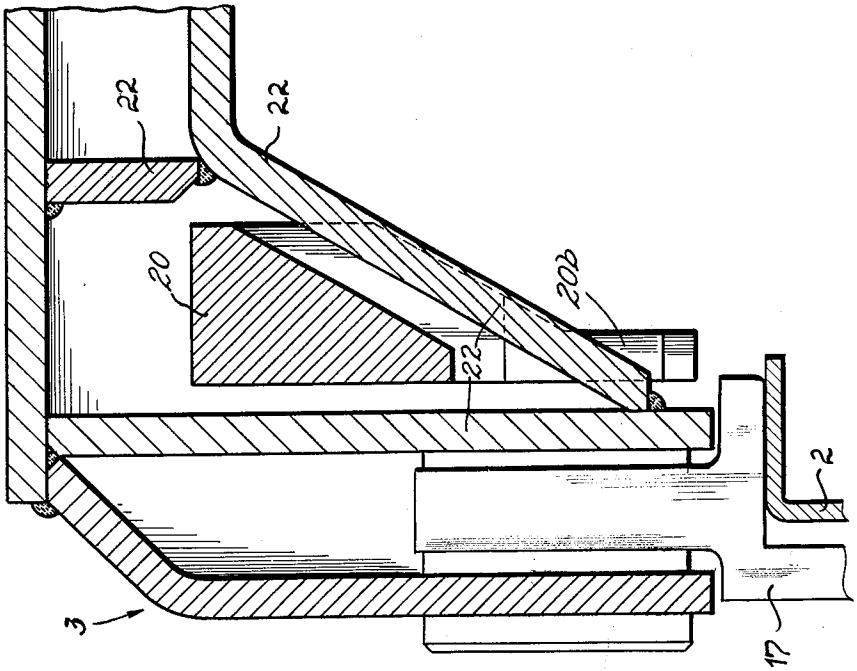
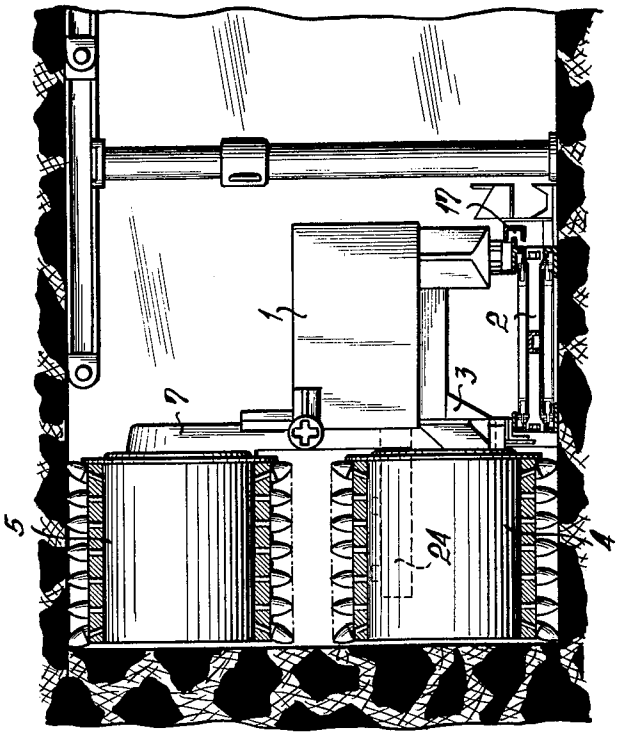


FIG.3

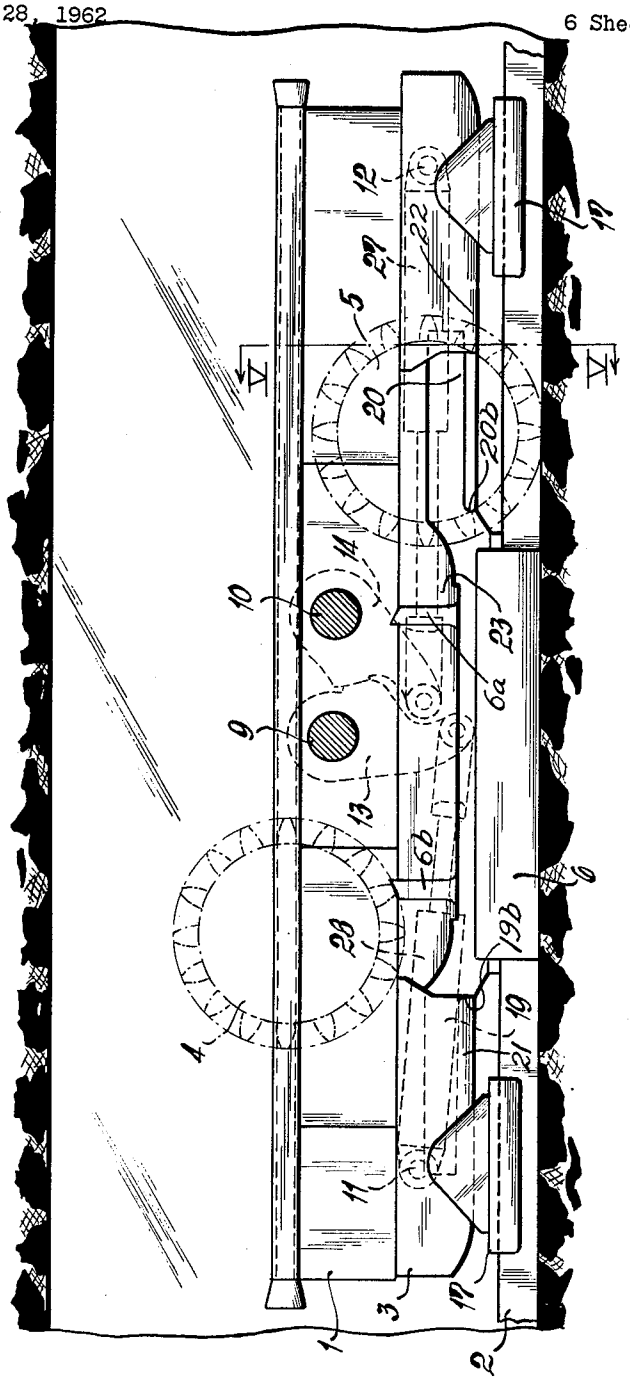


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FIG. 4



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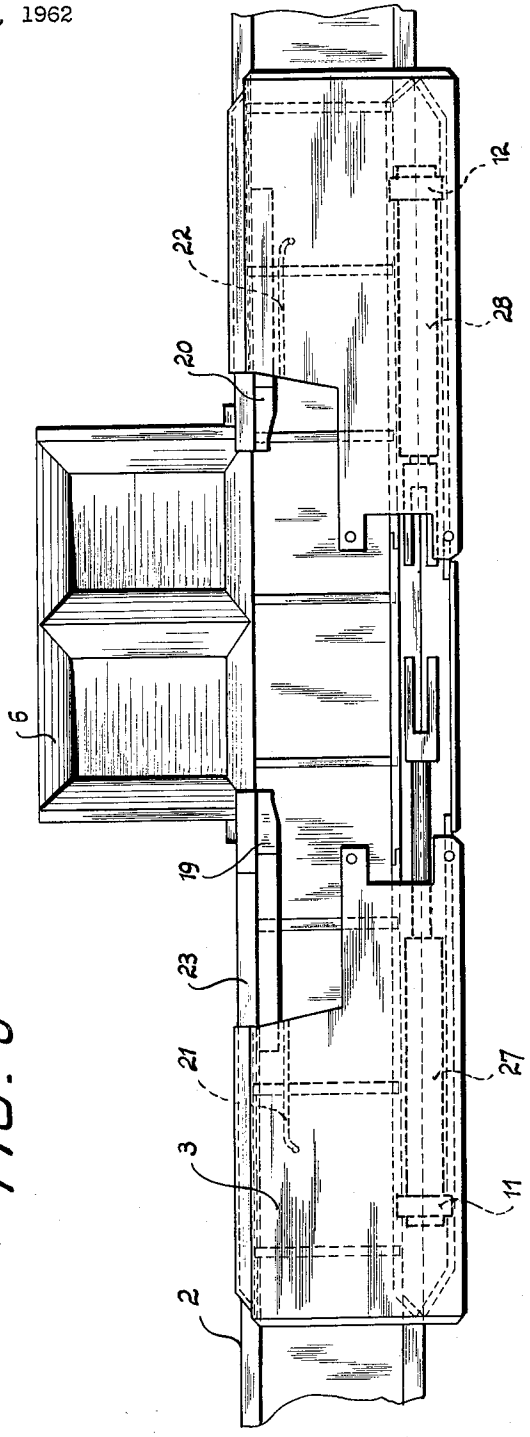


FIG. 6

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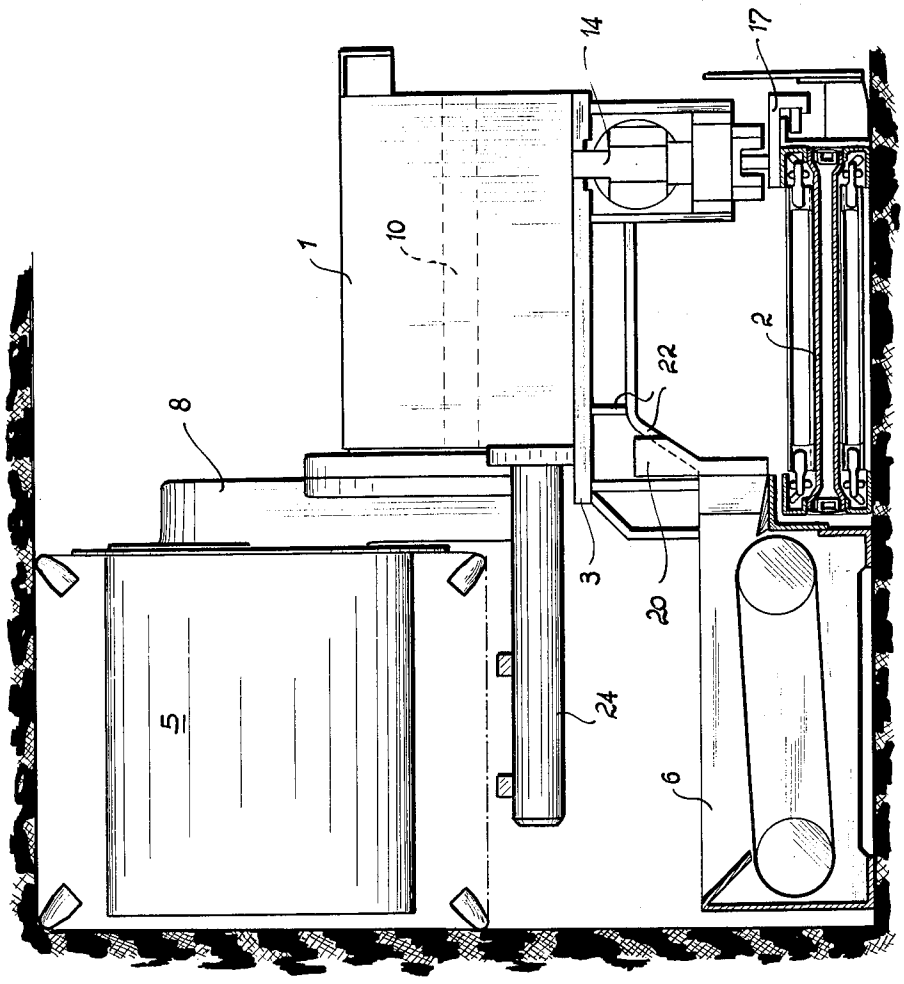


FIG. 7

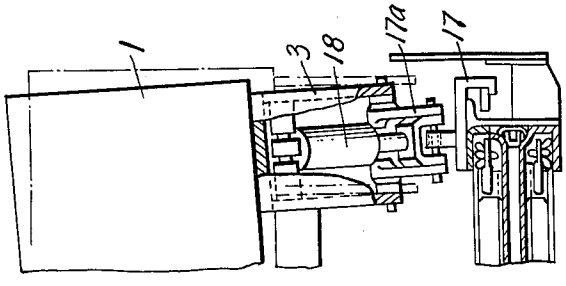


FIG. 8

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MINING MACHINE HAVING LATERAL ROLLER CUTTERS

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Claims priority, application Germany Apr. 1, 1961
9 Claims. (Cl. 262—27)

The present invention relates to mining machinery, especially for mining coal, which comprises two lateral cutting rollers. Mining machinery is known which is mounted on a frame, and which frame moves on conveyor means. With this known type of machinery, specifically designed for potash, the cutter rollers, at disposed opposite ends of the frame are adjustable as to height and protrude laterally of the frame into the adit end and mine the bed in its entire width and height by causing that cutter roller which, when looking in driving direction, is located in the front to cut the bottom of the bed, whereas the rear cutter roller cuts the roof or ceiling of the bed. A transverse conveyor arranged between the two cutting rollers directly above the bottom catches the thus loosened material and conveys it to the said longitudinal prop conveyor means.

When machinery of this nature is employed in connection with the mining of coal, the large coal layers, which frequently cave in behind the first cutting roller, overload the transverse conveyor and, above all, clog up the passages of the machine frame which lead into the prop conveying means and thus disturb the operation.

It is, therefore, an object of the present invention to provide a mining machine for the mining of coal seams, which by means of two cutter rollers loosen not only the seam to be mined in its entire magnitude but also operate in both driving directions and by means of a transverse conveyor between said two cutter rollers conveys the loosened material to the prop conveying means.

It is another object of this invention to provide a mining machine as set forth in the preceding paragraph, by means of which large coal layers which might cave in behind the first cutter roller will be crushed or broken down to such an extent that the transverse conveyor will be able to convey the same through the passage into the prop conveying means.

It is a still further object of the present invention to provide a mining machine of the above mentioned type in which the rear cutting roller will be able, when mining an upwardly inclined seam, in spite of the inclined position of the machine, completely to convey the loosened material into the transverse conveyor so that also in this instance the coal obtained in front of the cutting rollers will be completely conveyed onto the prop conveying means while behind the mining machine there will be left a clean field for the immediate advance of the prop conveying means.

These and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawings, in which:

FIG. 1 illustrates a side view of a mining machine according to the invention.

FIG. 2 is a top view of the mining machine according to FIG. 1.

FIG. 3 is a front view of the mining machine with a section through the prop conveying means.

FIG. 4 is a section taken along the line IV—IV of FIG. 2, the upper cutter roller being shown in its lowest position.

FIG. 5 represents a section along the line V—V of FIG. 4 but on a scale larger than the latter.

FIG. 6 is another top view of the mining machine according to FIG. 1, the cutter rollers and the guiding rollers for the pulling members being omitted.

FIG. 7 represents a section taken along the line VII—VII of FIG. 2 on a larger scale showing the transverse conveyor which is an endless belt conveyor.

FIG. 8 is a fragmentary view showing how the machine can be tilted laterally.

General Arrangement

The present invention starts wtih a mining machine of the above outlined heretofore known type and is characterized in that the width of the transverse conveyor is equal to or larger than the maximum distance between the two cutter rollers, and is furthermore characterized in that the transverse conveyor is mounted on the mining machine or its frame so as to be displaceable within certain limits parallel to the prop conveyor means along guiding means provided therefor whereby the material of the seam in front of the cutter rollers can be completely conveyed to said prop conveyor means. To this end, the space provided in the machine housing or frame for the transverse conveyor is wider than the width of the transverse conveyor by the distance of the displacing stroke. Due to the selected width of the transverse conveyor, the total material being obtained, which by necessity has to pass through the space between the rollers, will be taken up by the transverse conveyor, even if the seam inclines.

The displacement of the transverse conveyor with regard to the mining machine may be effected by mechanical means such as pressure fluid cylinder piston systems or the like. It is however, also possible to effect this displacement by the advance of the machine and the friction between the bottom and the transverse conveyor. In this instance, the transverse conveyor is carried along with the frame by the abutment limiting the guiding means at the rear end thereof, whereas when the advancing direction is reversed the transverse conveyor will shift in the frame and will be moved along with the frame by an abutment at the other end of said guiding means. The position in this last mentioned instance is spaced from the said rearmost position by the distance of the displacement stroke. At the same time, the transverse conveyor will be held in this position by the supporting arm of the respective cutter roller which is located in front when looking in the driving direction, said arm being inclined with regard to the bottom.

A further feature of the invention is obtained by a grate located between the two cutter rollers above the transverse conveyor and preferably located symmetrically with regard to the horizontal tilting axes of the rollers. This grate, which sub-divides the distance between the two cutter rollers, will allow the passage of such coal sizes only which are suitable for the transverse conveyor while sizes in excess thereof will be passed into the range of one of the two cutter rollers.

In order to prevent that adjustable cutter roller which, during the operation represents the rear cutter roller, from engaging the transverse conveyor therebelow for instance when the magnitude of the seam varies considerably, the range of adjustability of the respective rear cutter roller is limited in the downward sense. This limitation is obtained by the two segment-shaped extensions of the lever journalled on the tilting shafts. Of the said two extensions, the respective extension associated with the front cutter roller limits the freedom of movement of the rear cutter roller to the permissible extent.

Structural Arrangement

Referring now to the drawings in detail, the mining machine 1 is by means of the gate-shaped machine frame 3 displaceably mounted on the prop conveyor means

2. The mining machine 1 is provided with two cutter rollers 4, 5 which laterally extend into the coal seam and which may be driven by a common drive or motor or by different motors. The cutter rollers loosen the strip or seam being mined at the bottom and at the top over the width of the rollers and thus move the broken-down material onto the conveyor means 2 by means of the transverse conveyor 6 located between the two rollers 4 and 5 at the bottom. Both cutter rollers 4 and 5 are mounted on supporting arms 7 and 8, which are journalled on tilting shafts 9 and 10. Below the machine body on studs 11, 12 there are tiltably journalled hydraulically or pneumatically operable double-acting cylinder piston systems 27, 28 which, through the intervention of levers 13 and 14 engage the tilting shafts 9 and 10 and give the operator of the mining machine the possibility to move the cutter rollers by a switch-button control into the desired elevated position. Protruding segments 15, 16 mounted on the hub of levers 13, 14 are so shaped that they limit merely the adjustability of the respective rear cutting roller cutting at the ceiling. In this way, a lowering of this cutting roller too far and thereby its engagement with the transverse conveyor 6 will be prevented.

By means of the pressure cylinder 18 connected to the moveable skids 17 pertaining to the gate-like frame 3 on the right side and facing the back filling FIG. 3, the mining machine can be tilted about its longitudinal axis. The skids 17 are pivotally connected to the one ends of links 17*a*, which have their other ends pivotally connected to the machine frame. The lower one of the two cutting rollers 4, 5 can, therefore, be adapted to the contour of the bottom also in a direction toward the adit end. When cylinders 18, which are connected to links 17*a* at the pivotal connection thereof to the skids, are operated, the links 17*a* and skids 17 are pushed downwardly and the machine is tilted upwardly about the skids at the left of conveyor 2 as shown in FIG. 8. Skids 17 on the right side of the machine of course, remain in engagement with the rail at the right side of conveyor 2 (FIG. 8).

In order to assure the loading of the material onto the transverse conveyor 6 also when the seam is rising, the width of the transverse conveyor 6 is so selected as to equal at least the maximum distance between the cutter rollers, and the transverse conveyor 6 is to a limited extent displaceably guided on the machine frame 3 parallel to the conveyor means 2. To this end, by means of lateral extensions 19, 20, the transverse conveyor 6 engages guiding means 21, 22 of the machine frame 3. The conveyor 6 can thus be moved longitudinally in the machine frame and can be brought into its rearmost position with regard to the advancing device for example, by the machine advance in cooperation with the friction between the frame of conveyor 6 and the floor of the passage being worked. In this position, the transverse conveyor 6 will then be located directly behind the leading cutter roller at the bottom and below the rear cutter roller at the ceiling. When the mining machine 1 reverses its advancing direction and the cutting roller at the bottom is lifted, the conveyor will move, when the machine frame moves so as to occupy that position in the machine frame which is the rearward position when looking in the direction of machine advance. A passage 23 provided in the machine frame and intended for the piled-up material extends to this end over the width of the transverse conveyor means 6 and the path of displacement thereof.

The movement of the conveyor means 6 is limited by stop elements engageable with the lowered one of arms 7, 8. Such elements are shown at 6*a* and 6*b* in FIGS. 1 and 4. In FIG. 1 element 6*b* is shown engaging arm 7. When an arm is elevated the travel of the conveyor in that direction is limited by stop means pertaining to the respective extensions 19, 20 such as shoulders 19*b* and 20*b* shown in FIG. 4 which are engageable with the ends of the respective guide means 21, 22 to stop the conveyor in its opposite directions of movement. FIG. 4 shows shoulder 19*b* engaging the end of guide means 21 while FIG. 5 shows shoulder 20*b* of extension 20.

The space between the two cutter rollers is sub-divided by means of a grate 24 connected to the machine body. Therefore, only such coal will be able to pass onto the transverse conveyor 6 which is able unimpededly to move through the grate to the passage 23 of the machine frame 3. Coarser pieces of coal, on the other hand, will not pass by the grate 24 and will be cut down by the rollers to the required size.

On that end of the housing which is remote from the winch there are provided guiding rollers 25 which hold the pulling member 26 (FIG. 2) stretched out over the prop over its entire length on the adit end of the conveyor means 2. This cable is fixed at its opposite ends remote from the machine and operation of motor M attached to winch W will move the machine along the cable. In this way, the advancing force acting upon the mining machine 1 will be effective in the plane of the resistance to advance of the mining machine whereby the machine guiding will be considerably improved.

It is, of course, to be understood that the present invention is, by no means, limited to the particular construction shown in the drawings but also comprises any modifications within the scope of the appended claims.

What I claim is:

1. A mining machine, especially for mining coal, which comprises: frame means, supporting arms respectively pivotally supported by said frame means, two cutting rollers supported by said supporting arms and movable into engagement with a bottom and a ceiling portion of a mine seam to be mined, transverse conveyor means arranged between said cutting rollers for receiving material cut by said cutting rollers, the width of said transverse conveyor means equalling at least the maximum distance between said two cutting rollers, and longitudinal conveyor means for receiving mined material from said transverse conveyor means, said transverse conveyor means being displaceable within certain limits on said frame means and substantially parallel to said longitudinal conveyor means.

2. A mining machine according to claim 1, in which said transverse conveyor means includes a portion resting on the bottom of the seam being mined whereby the advance of said mining machine and the friction between said portion and the bottom of the mine seam being mined will cause said transverse conveyor means to move into the rearmost position of the displacement stroke when looking in the direction of movement of said mining machine.

3. A mining machine according to claim 1, in which said frame means comprises a passage extending over the width of the transverse conveyor means and the displacement path thereof.

4. A mining machine, especially for mining coal, which comprises: frame means, supporting arms respectively pivotally supported by said frame means, two cutting rollers supported by said supporting arms and movable into engagement with a bottom and a ceiling portion of a mine seam to be mined, transverse conveyor means arranged between said cutting rollers for receiving material cut by said cutting rollers, the width of said transverse conveyor means equalling at least the maximum distance between said two cutting rollers, longitudinal conveyor means for receiving mined material from said transverse conveyor means, said transverse conveyor means being displaceable on said frame means substantially parallel to said longitudinal conveyor means, and guiding means limiting the displacement stroke of said transverse conveyor means and displaceably connecting said transverse conveyor means to said frame means.

5. A mining machine, especially for mining coal, which comprises: frame means, supporting arms respectively

pivotally supported by said frame means and normally pointing to the bottom of the mine seam to be mined and the ceiling thereof, two cutting rollers supported by said supporting arms and movable into engagement with a bottom and a ceiling portion of the mine seam to be mined, transverse conveyor means arranged between said cutting rollers for receiving material cut by said cutting rollers, the width of said transverse conveyor means equalling at least the maximum distance between said two cutting rollers, longitudinal conveyor means for receiving mined material from said transverse conveyor means, said transverse conveyor means being displaceable within certain limits on said frame means and substantially parallel to said longitudinal conveyor means, and means associated with that supporting arm which points toward the bottom of the seam for arresting said transverse conveyor means.

6. A mining machine, especially for mining coal, which comprises: frame means, supporting arms respectively pivotally supported by said frame means, two cutting rollers suspended by said supporting arms and movable into engagement with a bottom and a ceiling portion of a mine seam to be mined, transverse conveyor means arranged between said cutting rollers for receiving material cut by said cutting rollers, the width of said transverse conveyor means equalling at least the maximum distance between said two cutting rollers, grate means arranged between said two cutting rollers and above said transverse conveyor means, and longitudinal conveyor means for receiving mined material from said transverse conveyor means, said transverse conveyor means being displaceable within certain limits on said frame means and substantially parallel to said longitudinal conveyor means.

7. A mining machine according to claim 6, in which said grate means is arranged symmetrically with regard to the pivotal connection of said supporting arms with said frame means.

8. A mining machine, especially for mining coal, which comprises: frame means, supporting arms respectively pivotally supported by said frame means, two cutting rollers supported by said supporting arms and movable into engagement with a bottom and a ceiling portion of a mine seam to be mined, transverse conveyor means arranged between said cutting rollers for receiving material cut by said cutting rollers, the width of said transverse conveyor means equalling at least the maximum distance between said two cutting rollers, longitudinal conveyor means for receiving mined material from said transverse conveyor means, said transverse conveyor means being displaceable within certain limits on said frame means and substantially parallel to said longitudinal conveyor means, and means associated with said supporting arms for limiting the downward movement of the respective rear cutting roller for cutting the ceiling portion of the mine seam.

9. A mining machine according to claim 8, which includes segmental extensions on said supporting arms and operable in cooperation with each other to limit the adjustment as to height of the rear cutting roller.

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