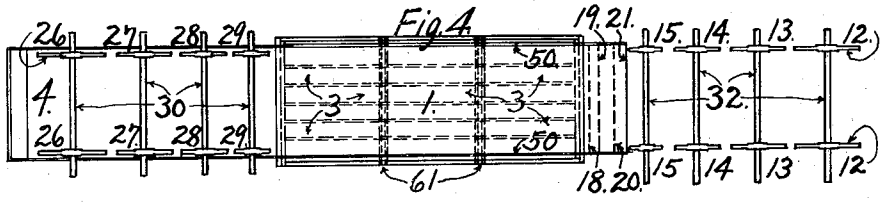
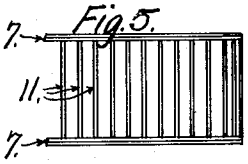
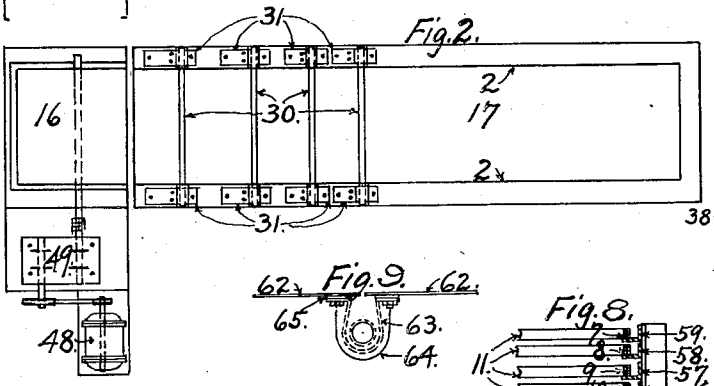
April 9, 1935. J. McGREW 1,996,821

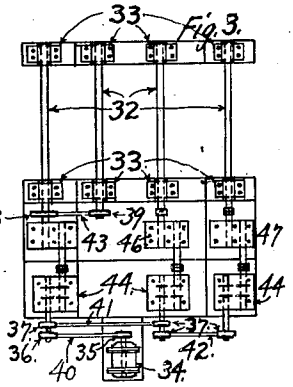
COAL CLEANING DEVICE

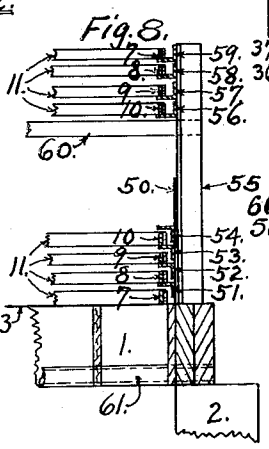
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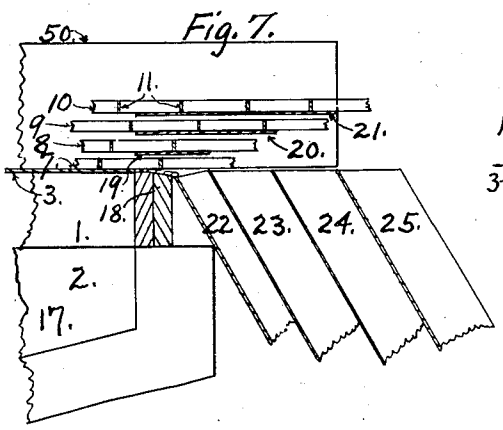


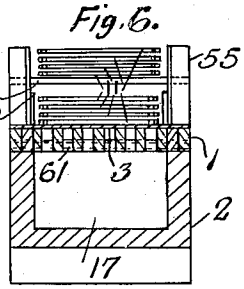












Inventor
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Patented Apr. 9, 1935 1,996,821

UNITED STATES PATENT OFFICE

1,996,821

COAL CLEANING DEVICE

James McGrew, Pittsburgh, Pa.

Application March 30, 1931, Serial No. 526,243

3 Claims. (Cl. 209—474)

The invention relates to improvements in coal cleaning devices, in which drag-chain conveyors operate on a stationary table, with either an air current, or water, assisting in the stratification of the materials of different specific gravities; and the objects of the improvements are, first, to provide a simpler and cheaper method of cleaning coal; second, to eliminate the self-destructive element in former methods, where moving tables are employed; third, to make cleaner separation than other air-process tables; and fourth to avoid wetting of the fine coal, as in the water washeries.

One form of the invention is illustrated in the accompanying drawing, in which Figure 1 is a vertical section of the entire device; Figure 2, a plan view of table foundations and air duct, with table removed; Figure 3 is a plan view of piers for drive supports; Figure 4 a plan view of table with parts above removed; Figure 5, a plan view showing part of one drag-chain, Figure 6 a transverse sectional view through device near center of table; Figure 7 a longitudinal section of spill plates, on a larger scale; Figure 8 a sectional view of side plates, on a larger scale, showing angle guides; and Figure 9, an end view of water connection employed, when water is used.

The table 1 is a wooden frame resting on foundations 2, and covered with perforated metal sheets 3. Plate 4 extends from table back far enough to receive coal from bin 5, with the aid of rotating feeder 6.

Drag-chains 7, 8, 9 and 10 with cross-bars 11, propelled by drive sprockets 12, 13, 14 and 15, drag the coal over table 1. The coal is stratified by the aid of a current of air forced up through perforated metal sheets 3, by fan 16, through air duct 17. Drag-chains 7, 8, 9 and 10 then take the coal and refuse out over spill plates 18, 19, 20 and 21, at the end of the table.

The refuse heavier than coal, which stratifies at the bottom, is dragged by drag-chain 7, over spill plate 18, and falls into refuse chute 22, thence to refuse conveyor not shown.

The coarse coal, which stratifies immediately above the refuse, is dragged by drag-chain 8, over spill plate 19, and falls into coal chute 23, thence to conveyor not shown.

A middle product of fine coal mixed with slate dust, found by experience to stratify above the coarse coal, is dragged by drag-chain 9, over spill plate 20, and falls into chute 24, thence to conveyor not shown.

The clean fine coal, which stratifies on top, is dragged by drag-chain 10, over spill plate 21, and falls into coal chute 25, thence to conveyor not shown. Refuse can be crushed and retreated with middle products, if so desired.

Drag-chains 7, 8, 9 and 10 are returned by means of tail sprockets 26, 27, 28 and 29. Tail sprockets 26, 27, 28 and 29 are supported on shafts 30, which rest in take-up bearings 31, which are on foundation 2.

Drive sprockets 12, 13, 14 and 15 are supported on shafts 32, which rest in bearings 33, and are driven by motor 34.

Motor 34 operates through sprockets 35, 36, 37, 38, 39, and drive chains 40, 41, 42 and 43, and by means of variable speed transmissions 44 and speed reducers 45, 46 and 47 to get the desired speeds with which to drive shafts 32.

Fan 16 is driven by motor 48 through variable speed transmission 49.

Side plates 50 form sides of table 1, and carry guide angles 51, 52, 53 and 54 also post 55, which supports guide angles 56, 57, 58 and 59. Guide angles 51, 52, 53, 54, 56, 57, 58 and 59 support and guide drag-chains 7, 8, 9 and 10. Posts 5 are tied by tie bar 60.

Pipe supports 61 act as beams under table 1, assisting in its support.

Water can be used in place of air, by substituting plates 62 in place of perforated metal sheets 3, and forcing water up by gravity pressure through narrow spaces between plates 62. This is done by means of a bent plate 63, with end plates 64 welded on each end of it. End plates 64 are drilled and tapped for a water pipe at one end, and a plug at the other end, for a clean-out. Bent plate 63 with gasket 65 is bolted to plates 62. The upward flow of the water assists in the stratification of the coal and its impurities. In cleaning large coal, water is preferable to air. In the water process only two drag chains and two spill plates need be used. The fan, and other parts not needed, can be eliminated. The same is true in retreating refuse and the middle product, to reclaim what good coal may be in them.

I am aware that prior to my invention, coal cleaning devices have been in operation, using water and air to assist in the stratification before separation. I therefore do not claim their use broadly; but

I claim:

1. In a machine for grading divided material, a supporting table for said material, means for loading material at one end of said table and discharge means at the other end of said table, a plurality of endless chains arranged in superposed relation above said table adapted to convey the material from the charging to the dis-

charge end of said table, means carried by said chains for engaging the material on said table to stratify the same according to the division thereof with the heavier particles at the bottom of the table, said means being further operative to convey the divided materials in the direction of the discharge means and means for exerting fluid pressure upwardly through the material.

2. In a machine for grading divided material, a supporting table for said material, means for charging material at one end of said table and spill plates in superposed relation at the other end of said table, a plurality of endless chains arranged in superposed relation above said table between the charging means and spill plates, means carried by said chains for engaging the material on said table to stratify the same according to the division thereof, said means being operative to convey the divided materials to the said spill plates, a common drive mechanism for said chains, and means for regulating the relative speeds of said chains.

3. In a machine for grading divided material, a perforate supporting table for said material, means for exerting fluid pressure upwardly through the perforations in the table, a plurality of endless chains arranged in superposed relation above said table, said chains being provided with material engaging members extending transversely of the table to stratify the material according to the division thereof, a charging chute at one end of said table, spill plates at the other end of said table, said spill plates being in superposed relation and cooperating with the respective chains to direct the divided materials to different chutes, drive mechanism for said chains, and means for controlling the relative speeds of said chains independently of each other.

JAMES McGREW.