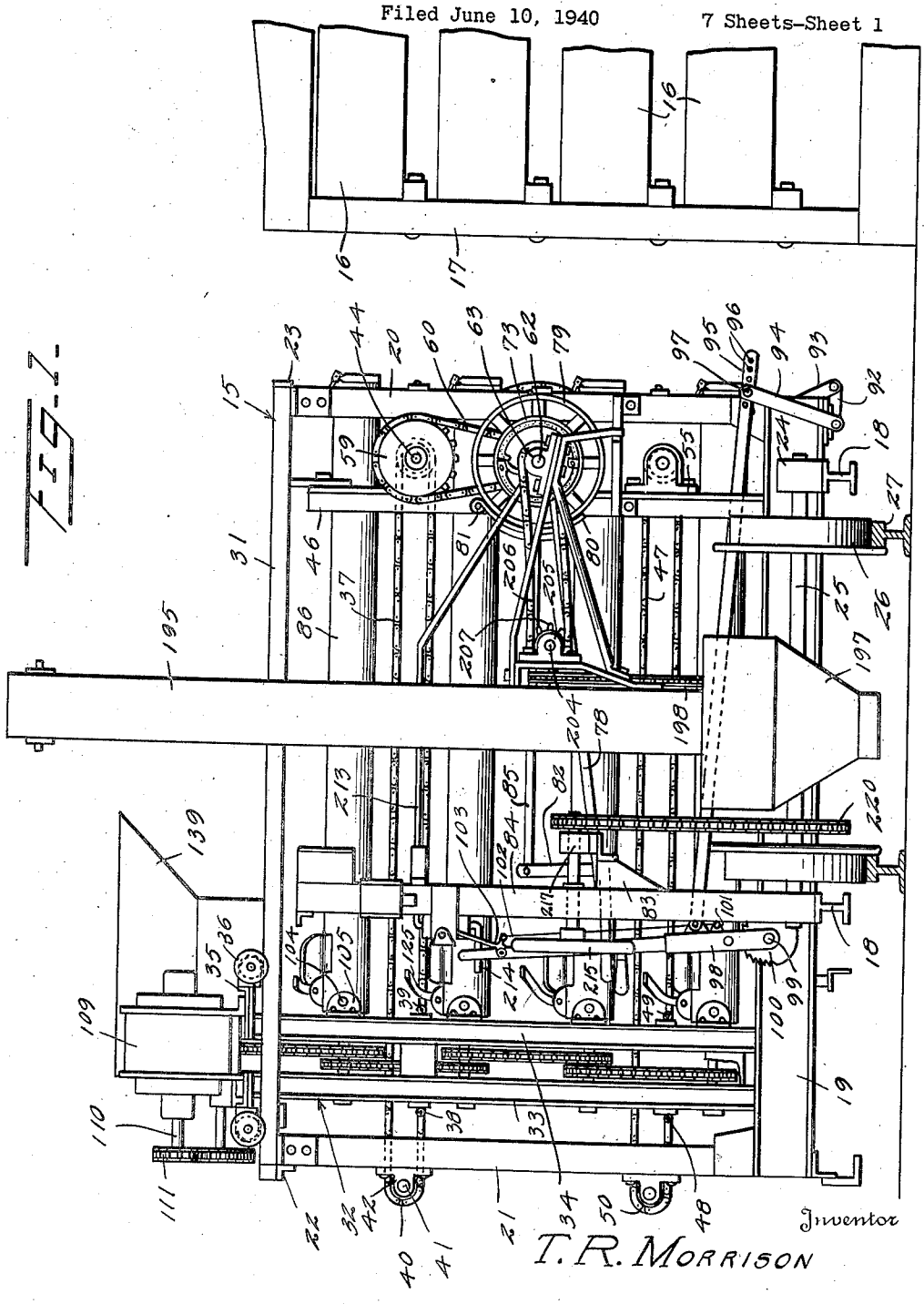
Jan. 20, 1942. T. R. MORRISON 2,270,381

ZINC SMELTER RETORT CHARGING MACHINE

Filed June 10, 1940 7 Sheets-Sheet 1

FIG. 1.



Inventor
T. R. MORRISON

By Kimmel & Crowell
Attorneys

Jan. 20, 1942. T. R. MORRISON 2,270,381

ZINC SMELTER RETORT CHARGING MACHINE

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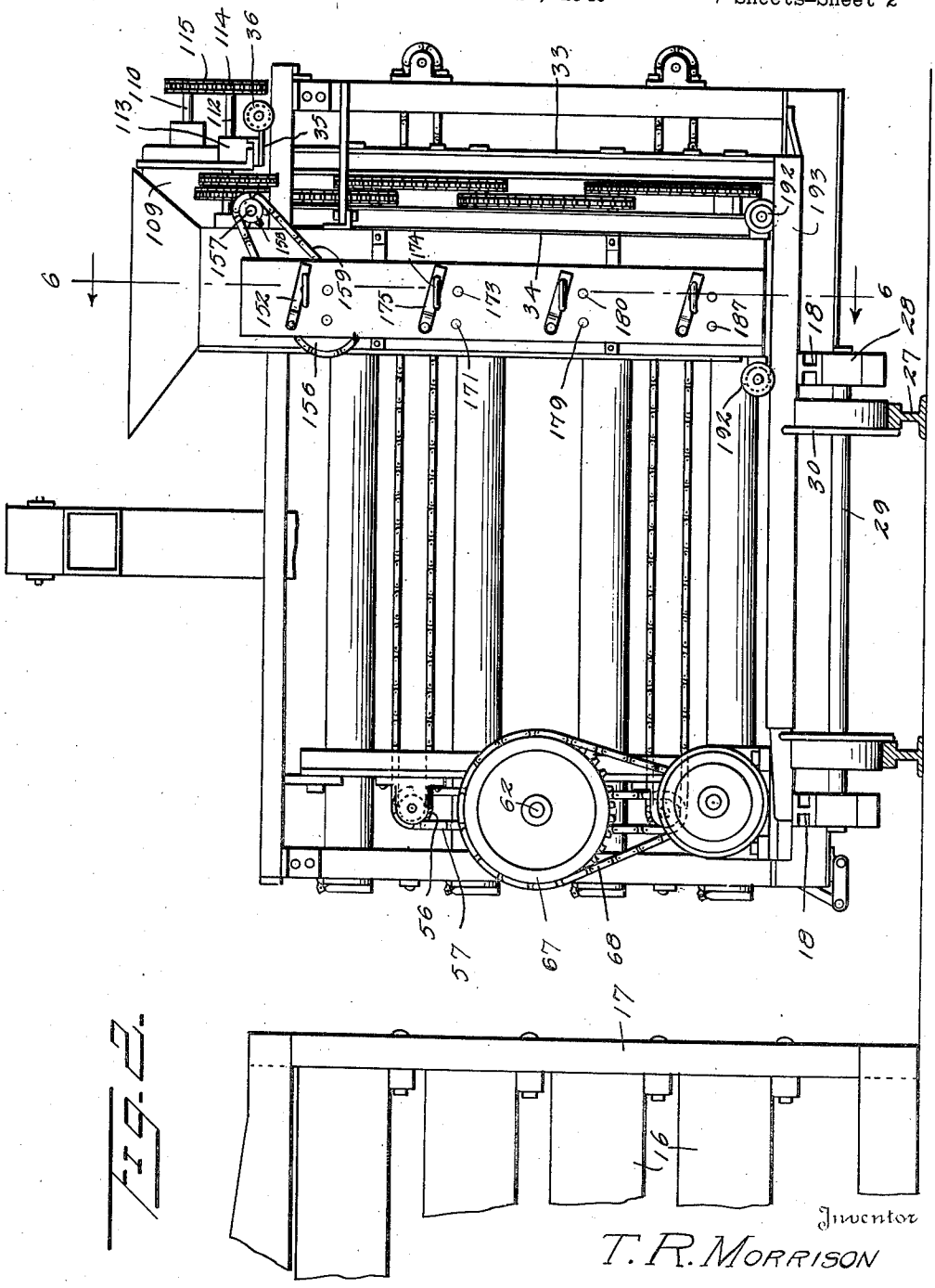


Fig. 2.

Inventor

T. R. MORRISON

By Kimmel & Crowell

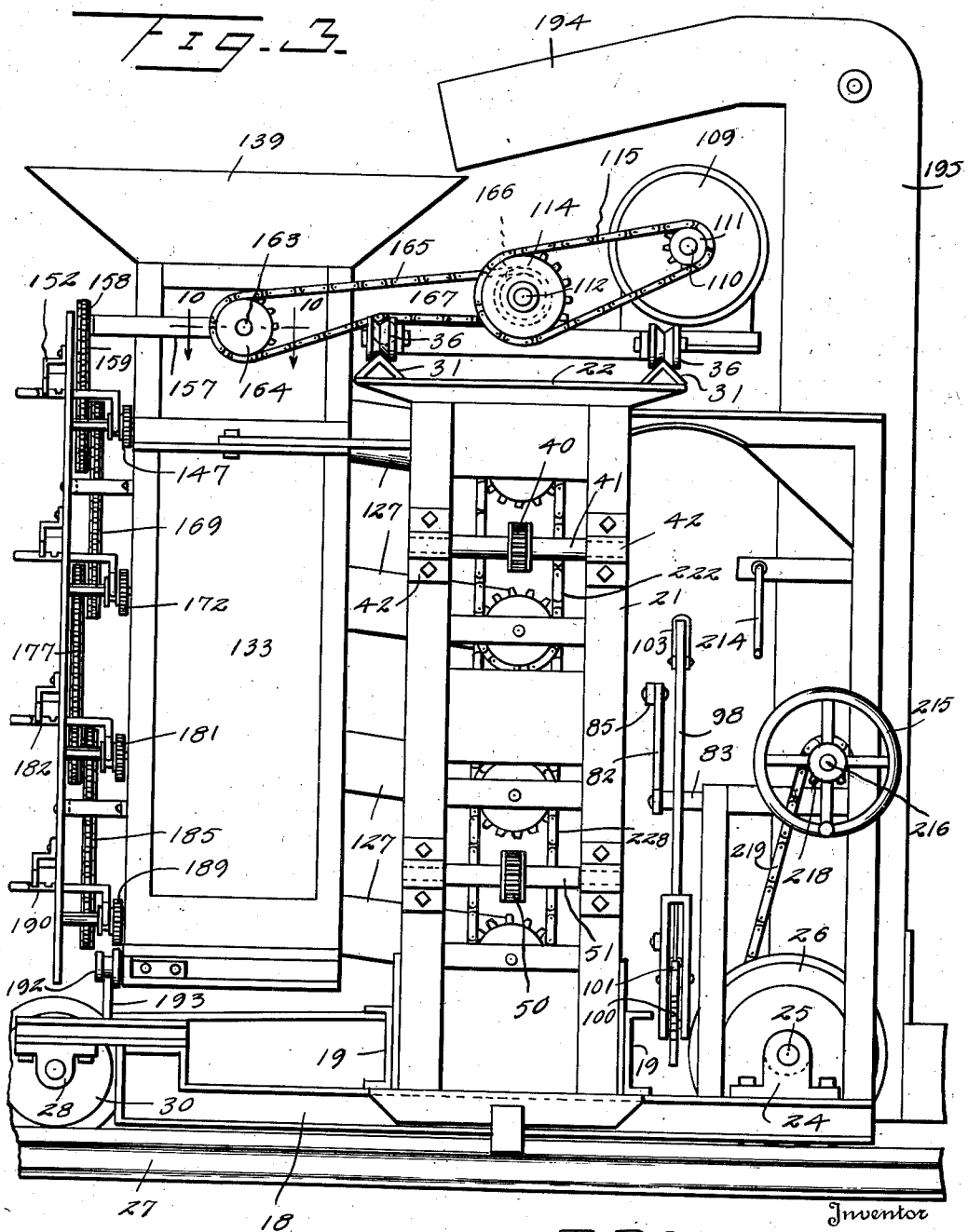
Attorneys

Jan. 20, 1942. T. R. MORRISON 2,270,381

ZINC SMELTER RETORT CHARGING MACHINE

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Fig. 3.



Inventor

T. R. MORRISON

By Kimmel & Crowell

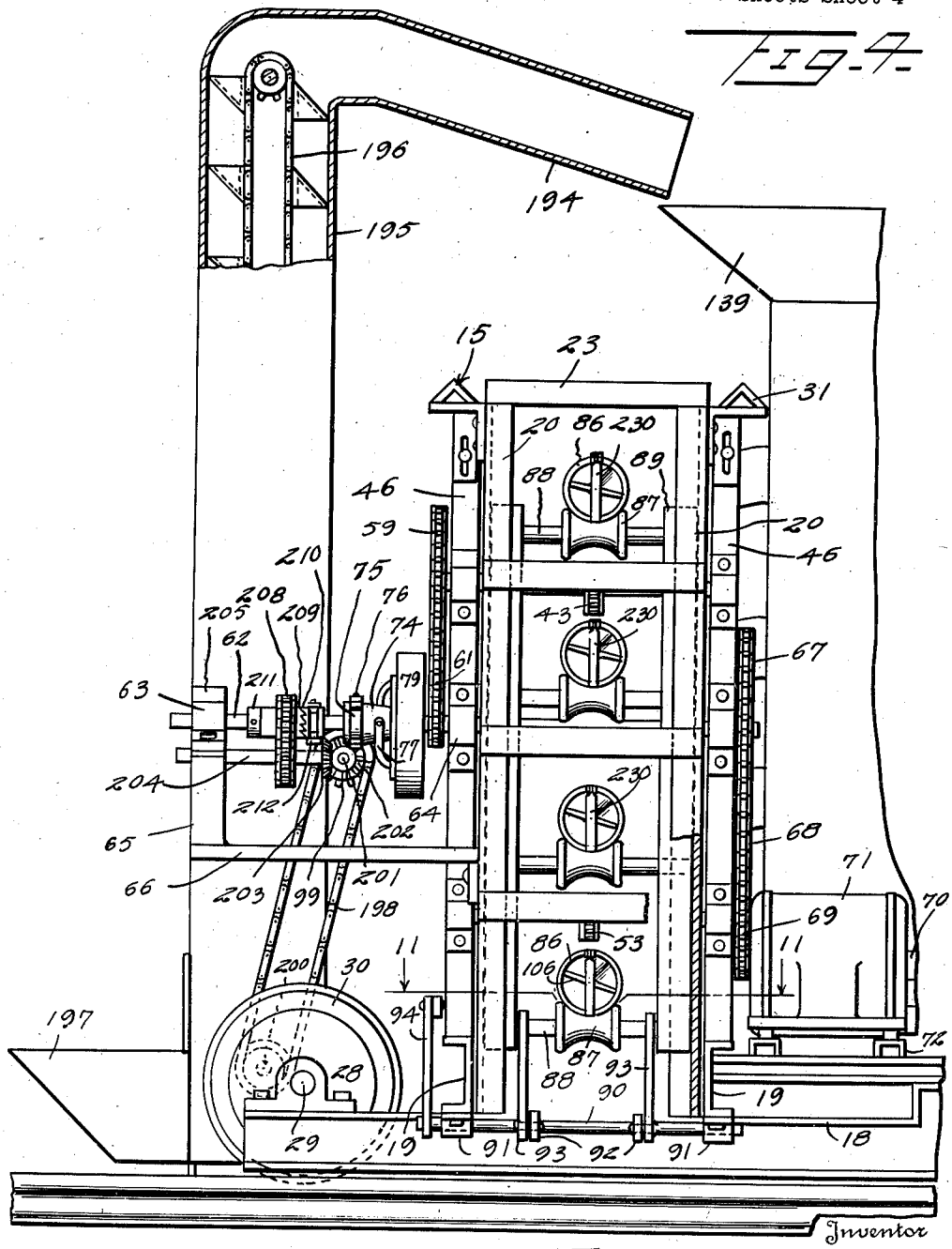
Attorneys

Jan. 20, 1942. T. R. MORRISON 2,270,381

ZINC SMELTER RETORT CHARGING MACHINE

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Fig. 4.



Inventor

T. R. MORRISON

By Kimmel & Crowell

Attorneys

Jan. 20, 1942. T. R. MORRISON 2,270,381

ZINC SMELTER RETORT CHARGING MACHINE

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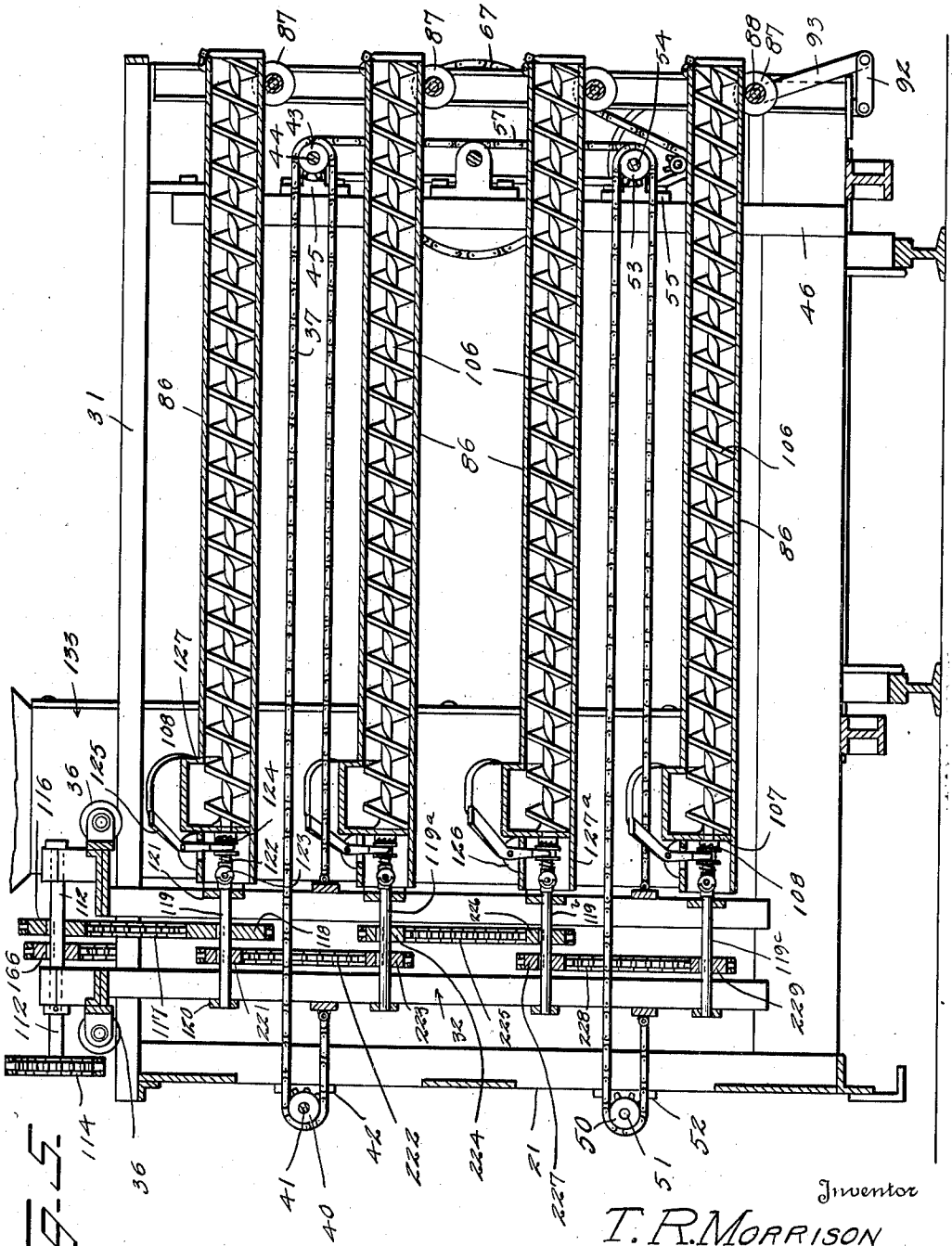


FIG. 5.

Inventor
T. R. MORRISON

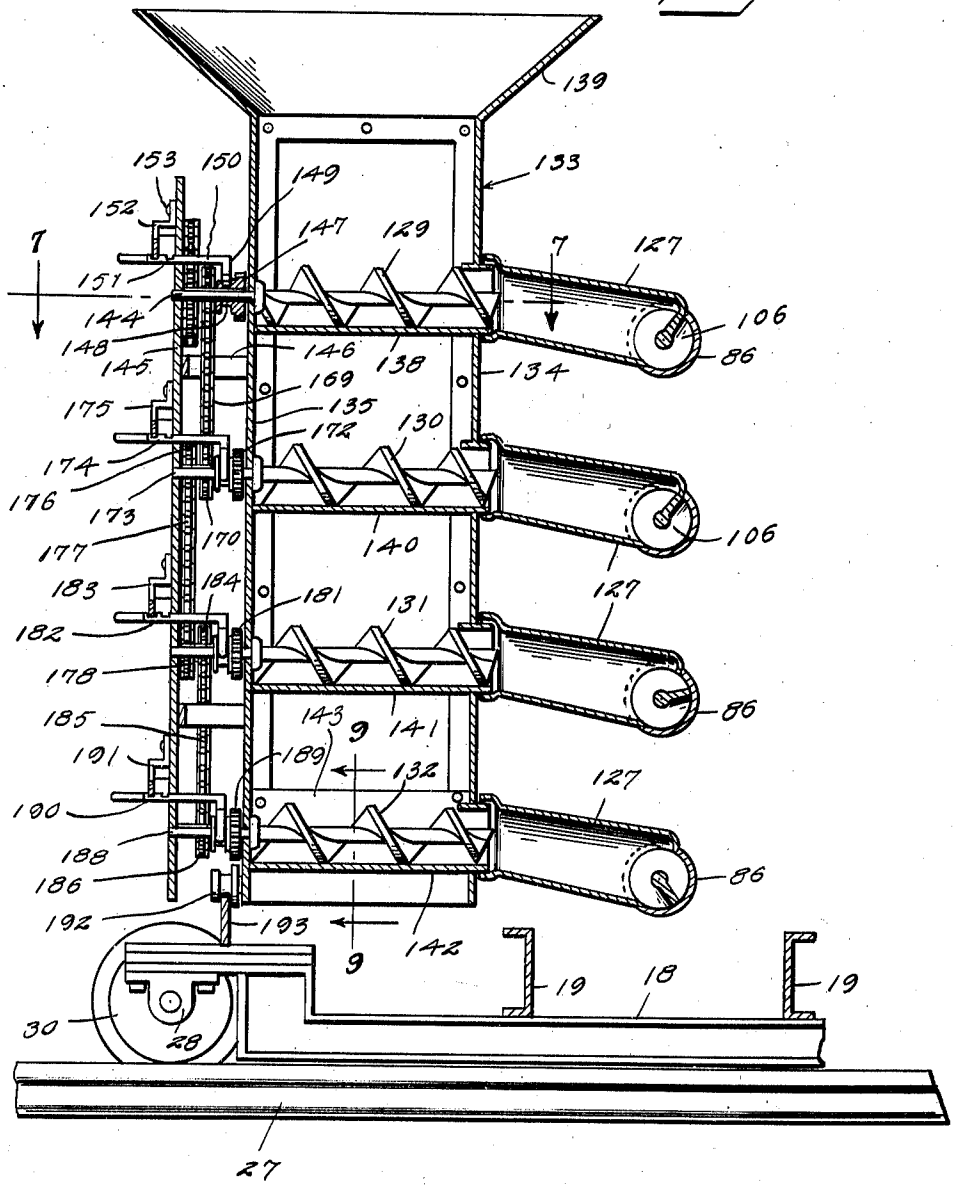
By Kimmel & Crowell
Attorneys

Jan. 20, 1942. T. R. MORRISON 2,270,381

ZINC SMELTER RETORT CHARGING MACHINE

Filed June 10, 1940 7 Sheets-Sheet 6

Fig. 6.



Inventor

T. R. MORRISON

By Kimmel & Crowell

Attorneys.

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ZINC SMELTER RETORT CHARGING MACHINE

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Fig. 7.

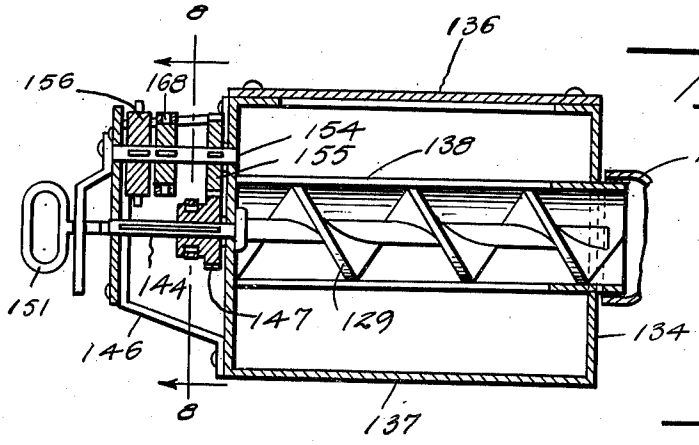


Fig. 8.

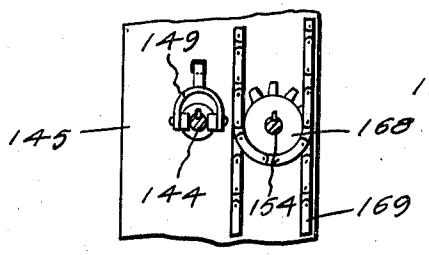


Fig. 9.

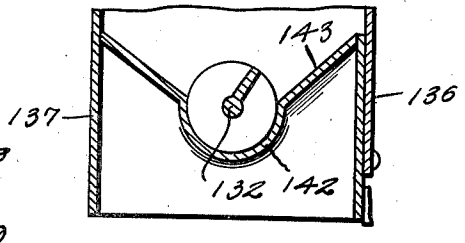


Fig. 12.

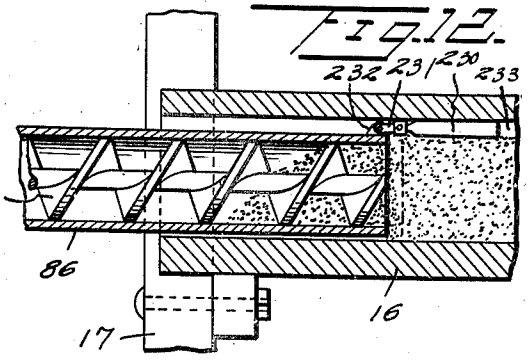


Fig. 11.

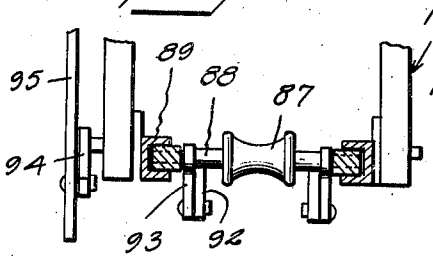
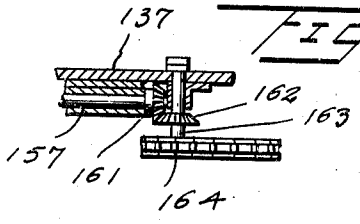


Fig. 10.



Inventor

T. R. MORRISON

By Kimmel & Crowell

Attorneys

Patented Jan. 20, 1942

2,270,381

UNITED STATES PATENT OFFICE

2,270,381

ZINC SMELTER RETORT CHARGING MACHINE

Thomas Richard Morrison, Blackwell, Okla.

Application June 10, 1940, Serial No. 339,805

14 Claims. (Cl. 214—24)

This invention relates to zinc smelter retort charging devices.

An object of this invention is to provide a retort charging device for charging a bank of retorts in a single operation.

Another object of this invention is to provide a retort charging apparatus whereby any one or more of a bank of retorts may be charged in one operation.

A further object of this invention is to provide an apparatus of this character whereby the loose material may be discharged into a retort and simultaneously the material may be packed into the retort so that the density of the material will be the same throughout the length of the retort.

A still further object of this invention is to provide an apparatus of this kind including an improved means for feeding the loose material to the combined chargers and packers.

A further object of this invention is to provide an apparatus of this kind in which selected ones of the chargers may be operated and the remaining chargers may be rendered inoperative.

A further object of this invention is to provide an apparatus of this kind including an improved means for regulating the packing of the material in the retorts, the regulating means being so constructed that the operator of the machine may obtain the desired packing of the material throughout the length of a retort.

A further object of this invention is to provide a machine of this kind in which the material conveyor also constitutes a packing element so that the loose material may be simultaneously discharged into and packed within the retort, thus eliminating the necessity of first discharging the material in a retort and subsequently packing the material by a separate tool. Where the material is first discharged into the retort and subsequently packed, the density of the packed material is not uniform throughout the retort with the result that the capacity of the retort is thereby reduced. By providing a machine which simultaneously discharges and packs the material, the retort can be filled to its full capacity.

To the foregoing objects and to others which may hereinafter appear, the invention consists of the novel construction, combination and arrangement of parts as will be more specifically referred to and illustrated in the accompanying drawings wherein are shown embodiments of the invention, but it is to be understood that changes, variations and modifications may be resorted to which fall within the scope of the invention as claimed.

In the drawings—

Figure 1 is a detail side elevation of a zinc smelter retort charging machine constructed according to an embodiment of this invention.

Figure 2 is a detail side elevation of the machine on the side thereof and opposite from that shown in Figure 1.

Figure 3 is a detail rear elevation of the machine.

Figure 4 is a detail front elevation of the machine partly broken away and in section.

Figure 5 is a vertical section taken longitudinally through the machine.

Figure 6 is a sectional view taken on the line 6—6 of Figure 2.

Figure 7 is a sectional view taken on the line 7—7 of Figure 6.

Figure 8 is a sectional view taken on the line 8—8 of Figure 7.

Figure 9 is a sectional view taken on the line 9—9 of Figure 6.

Figure 10 is a fragmentary sectional view taken on the line 10—10 of Figure 3.

Figure 11 is a sectional view taken on the line 11—11 of Figure 4.

Figure 12 is a fragmentary sectional view of a charging member disposed in a retort.

Referring to the drawings, the numeral 15 designates generally a mobile frame which is adapted to be positioned in front of the open ends of a bank of retorts generally designated as 16. There are a plurality of superposed retorts 16 which are of cylindrical configuration and these retorts 16 are secured at their outer ends to a supporting structure 17.

The frame 15 comprises a pair of horizontal beams 18 which are disposed in spaced apart parallel relation and which may be formed from I beams. The beams 18 are secured to the undersides of a pair of transversely disposed lower I beams or frame members 19 and a pair of front upright frame members 20 are secured at their lower ends to the beams 19 and extend upwardly therefrom in spaced apart parallel relation. A pair of rear upright beam frame members 21 are secured at their lower ends to the transverse beam members 19 and the upper ends of the rear frame members 21 are connected together by means of an upper connecting bar 22.

The front uprights 20 are connected together at their upper ends by a connecting frame member 23. The lower beam members 18 have se-

cured to one end thereof a pair of bearings 24 through which an axle 25 is journalled. A pair of flanged wheels 26 are secured to the axle 25 and these wheels 26 engage rails 27 which may be fixed in any suitable manner to the floor or other supporting means in front of the retorts 16. The opposite ends of the beams 18 have secured thereto a pair of bearings 28 and an axle 29 is journalled in the bearings 28.

A pair of flanged wheels 30 are secured to the axle 29 and engage the rails 27. The frame 15 at its upper end has a pair of V-shaped rails 31 secured thereto which extend in parallel relation to the lower beam members 19 and which are connected to the front uprights 20 and the rear uprights 21. A carriage generally designated as 32 is movably disposed within the frame structure 15 and comprises a pair of rear vertical body or frame members 33 which are disposed in spaced apart parallel relation and a pair of front vertical body or frame members 34 which are parallel with the rear frame members 33. The members 33, 34 are of bar-like form. The frame members or bars 33 and 34 are secured at their upper ends to a trolley member 35 which has a plurality of wheels or rollers 36 engageable with the rails 31.

The rollers or wheels 36 are provided with V-shaped peripheral grooves engageable with the rails 31 so that the carriage 32 may be moved lengthwise of the stationary frame structure 15. The carriage 32 is moved toward or from the retort 16 by means of a flexible drive member 37 in the form of a chain. The chain or flexible member 37 has one end thereof secured as at 38 to the rear carriage members 33 and the other end thereof secured as at 39 to the front carriage members 34. The chain or flexible member 37 engages a rear idler sprocket 40 which is carried by an idler shaft 41 journalled in bearings 42 carried by the rear frame members 21.

The chain 37 is also trained over a driving sprocket 43 which is fixed to a drive shaft 44. The shaft 44 is journaled in a pair of bearings 45 which are carried by a pair of intermediate uprights 46. The intermediate uprights 46 are secured between the rails 31 and the lower beams 19 rearwardly of the front uprights 20. A second flexible carriage operating member 47 has one end thereof secured as at 48 to the rear carriage members 33 and the opposite end thereof secured as at 49 to the front carriage members 34 at a point below the coupling or fastening members 39. The chain or operating member 47 is trained over a rear sprocket 50 which is carried by a sprocket shaft 51 journalled in bearings 52 which are fixed to the rear uprights 21 below the bearings 42. The flexible member 47 is also trained over a front sprocket 53 which is fixed to a shaft 54 journalled in bearings 55. The bearings 55 are fixed to the intermediate uprights 46 at a point below the bearings 45. The upper sprocket shaft 44 also has fixed thereto a sprocket 56 about which a chain 57 engages. The chain 57 is an endless chain and is trained about a sprocket 58 which is fixed to the lower sprocket shaft 54. In this manner rotation of the upper sprocket shaft 44 will simultaneously rotate the lower sprocket shaft 54.

A relatively large sprocket 59 is fixed to one end of the upper sprocket shaft 44 at one side of the frame 15 and an endless chain 60 is trained about the sprocket 59. The chain 60 is also trained about a sprocket 61 which is carried by a drive shaft 62. The drive shaft 62 is journalled in bearings 63 and 64 which are carried by the front uprights 20 and by a laterally disposed support 65 which is supported laterally of the frame 15 by means of a horizontal and laterally extending support 66. A driven sprocket 67 is fixed to the shaft 62 and a chain 68 is trained about the sprocket 67. The chain 68 is also trained about a driving sprocket 69 carried by a motor shaft 70. The motor shaft 70 is operated by means of a motor 71 which is mounted on a pair of supporting members 72 which are fixed to the lower beam members 18 and to the lower beam members 19.

A clutch 73 is connected to the sprocket 61 and is rotatable on the shaft 62. The clutch element 73 is adapted to be coupled with the shaft 62 by means of a clutch element 74 which is splined on the shaft 62 and is slidable lengthwise thereof. The clutch element 74 is substantially conical in configuration and is provided with a peripheral groove 75 within which a pair of clutch operating fingers 76 engage. The clutch element 74 is adapted to engage clutch fingers 77 for rocking these fingers and thereby coupling the clutch element 73 with the clutch element 74. The clutch element 74 is moved to a clutching or declutching position by means of a clutching lever 78 which extends rearwardly from the shaft 62 in a direction of the rear frame members 21 and at one side of the carriage 32.

The clutch element 73 has secured thereto a brake drum 79 which is substantially larger in diameter than the clutch element 73 and a brake shoe 80 is pivotally carried at one end on a pivot member 81 carried by an upright 46 and is adapted to be moved to a drum engaging position by means of a bell crank 82 which is pivotally supported from a supporting member 83 carried by a rear intermediate upright 84. The upright 84 is fixed relative to the frame 15 at one side of the carriage 32 and the bell crank 82 is connected to the brake shoe 80 by means of a link 85. The brake drum 79 and the brake shoe 80 provide a means whereby the rearward movement of the carriage 32 during the changing of the retorts 16 may be frictionally retarded so that the material being discharged into the retorts 16 will be packed simultaneous with the discharge of the material therein.

A plurality of tubular or cylindrical charging members 86 are disposed in superposed parallel relation within the frame 15 and the charging members 86 at their forward ends loosely engage on peripherally grooved rollers 87 which are carried by shafts 88. The shafts 88 are secured at their opposite ends to a vertically movable frame structure including a pair of upright parallel members 89 which are slidable between the forward frame members 20. There is a roller 87 for each charging member 86 and in order to provide a means whereby the charging members 86 may be adjusted to a position in axial alignment with the retorts 16, I have provided a rock shaft 90 which is rockably carried by bearings 91 fixed to the lower beam members 19. A pair of forwardly extending arms 92 are fixed to the shaft 90 and a pair of links 93 are connected at one end thereof to the forward ends of the arms 92 and at the opposite ends thereof are connected to the lowermost roller shaft 88. A lever 94 is fixed to one end of the rock shaft 90 and the lever 94 at its upper end is secured to the forward end of a link 95. Preferably the link 95 is provided with a plurality of spaced apart holes 96 in one of which the pivotal coupling member

97 is adapted to engage. The rear end of the link 95 is connected to an adjusting lever 98 which is rockably mounted on a shaft 99 carried by a toothed quadrant 100.

The quadrant 100 is fixed relative to the upright 84. The lever 98 has a spring pressed pawl 101 which is engageable with the teeth of the quadrant 100 and the pawl 101 is connected by means of a link 102 to a pawl operating lever 103 which is pivotally carried by the upper end of the rock lever 98.

The charging housing members 86 are each pivotally secured at their rear ends to a shaft 104 which is carried by bearing members 105 fixed to the carriage member 34. The shaft 104 is disposed in a horizontal position so that the tubular charging members 86 may be vertically rocked with vertical movement or shifting of the roller carriage 89.

Each charging member 86 has rotatably mounted therein a screw conveyor 106 which terminates at its forward end substantially flush with the forward end of the charging member 86. The rear end of the conveyor 106 is rotatably carried by a bearing member or rear wall 107 and the shaft of the conveyor 106 at its rear end is provided with one element 108 of a toothed clutch by means of which the conveyor 106 may be selectably connected to a driving means as will be hereinafter described.

A conveyor operating motor 109 is mounted on the motor carriage 35 and the shaft 110 of the motor 109 has a driving gear 111 fixed thereto. A counter-shaft 112 is journalled in bearings 113 which are fixed to the carriage 35 and a sprocket 114 is fixed to one end of the counter-shaft 112. A chain 115 is trained over the two sprockets 111 and 114. The counter-shaft 112 also has secured thereto a second sprocket 116 and a chain 117 is trained over the sprocket 116 and extends downwardly and is trained over a sprocket 118 which is carried by a conveyor operating shaft 119. The shaft 119 is journalled in bearings 120 and 121 which are carried by the carriage members 33 and 34. A stub shaft 122 is connected to the sprocket shaft 119 by means of a universal coupling or joint 123 and the stub shaft 122 has splined thereon a second element 124 of a conveyor clutch which is adapted to be selectively engaged with the clutch element 108.

A clutch operating lever 125 is rockably carried by a bearing 126 which is fixed to an extension 127 formed as part of a charging member 86. The universal coupling or joint 123 is disposed substantially in axial alignment with the pivotal member 104 for a retort charging member 86. In this manner the retort charging member 86 with its conveyor 106 may be vertically adjusted at its forward end and at the same time the conveyor 106 may be rotated through the chain connections from the motor 109.

Each tubular conveyor housing or charging member 86 adjacent the rear thereof is provided with an intake housing 127 which communicates with the rear end of the conveyor 106. The intake housing 127 extends laterally and upwardly from a conveyor housing member 86 and is provided at its outer end with an enlarged collar or coupling member 128. A plurality of conveyor feeding screws 129, 130, 131 and 132 are rotatably carried by a vertically disposed housing generally designated as 133. The housing 133 is formed with an inner wall 134, an outer wall 135 and front and rear walls 136 and 137, respectively. The feeding screw 129 is disposed in a substantially semi-cylindrical trough 138 which is disposed in a horizontal position and is fixed to the two walls 134 and 135. A hopper 139 is disposed at the upper end of the housing 134 and the loose material is adapted to be discharged, as will be hereinafter described, into the hopper 139 and then gravitatingly move downwardly in the housing 133.

The screw 130 is rotatable in a horizontally disposed semi-cylindrical trough 140 which is fixed to the walls 134 and 135 and the screw 131 is rotatable in a semi-cylindrical trough 141 disposed in a horizontal position and fixed to the two walls 134 and 135 below the trough 140. The lower screw member 132 is rotatable in a substantially semi-cylindrical trough 142 and preferably a pair of downwardly convergent walls or plates 143 are secured to the upper edges of the trough 142 and are also secured to the front and rear walls 136 and 137, respectively.

The feeding screw 129 has secured in axial alignment therewith a screw shaft 144 which is journalled through the outer wall 135 and is also journalled in a plate 145 which is supported in laterally spaced relation to the outer wall 135 by means of a plurality of brackets or supporting members 146. The screw shaft 144 has splined thereon a gear 147 formed with a grooved hub 148 and a fork or gear shifting member 149 engages in the grooved hub 148 and is provided with a right angular extension 150 which is slidable through the plate 145. The operator or extension 150 is formed with a pair of notches 151 and a locking lever 152 is pivotally mounted on a shaft 153 carried by the plate 145. The locking lever 152 is adapted to engage in a selected notch 151 so as to hold the gear operator or shifter 149 in either operative or inoperative position. The shaft 144 is rotated by means of a sprocket shaft 154 which is rotatably mounted at one side of and in parallel relation to the shaft 144. The shaft 154 has a gear 155 fixed thereto which is adapted to mesh with the gear 147 and the shaft 154 is rotated by means of a sprocket 156 which is fixed to the shaft 154.

A counter-shaft 157 is rotatably carried by the carriage 35 and the shaft 157 has a sprocket 158 fixed thereto. An endless chain 159 is trained over the two sprockets 156 and 158. The shaft 157 has a bevelled gear 161 at the end thereof opposite from the sprocket 158 and the gear 161 meshes with a bevelled gear 162 carried by a right angularly disposed shaft 163. The shaft 163 has a gear 164 fixed thereto which is rotated by means of a chain 165. The counter-shaft 112 has a gear 166 fixed thereto about which the chain 165 is trained. Preferably the lower run of the chain 165 engages over an idler sprocket 167 which is carried by the carriage 35.

The shaft 154 also has a second sprocket 168 fixed thereto and a chain 169 engages over the sprocket 168 and extends downwardly therefrom, being trained over a sprocket 170 which is fixed to a shaft 171. The shaft 171 is provided with a gear member similar to that shown in Figure 7 which is adapted to selectively mesh with a clutching gear 172 which is slidable on a screw shaft 173 disposed in axial alignment with the screw 130. The gear 171 is moved to an operative or inoperative position by means of an operating lever 174 similar to the operator 149. The operator 174 is adapted to be locked in either operative or inoperative position by means of a

locking lever 175. The shaft 171 also has a second sprocket 176 fixed thereto about which a chain 177 is trained. The chain 177 is also trained about a sprocket 178 carried by a shaft 179. The shaft 179 is adapted to be coupled to the screw shaft 180 which is fixed to or integral with the screw 131. The screw 131 is coupled to the shaft 179 by means of a clutch gear 181 operated by means of a clutch operator 182. The operator 182 is held in either operative or inoperative position by means of a locking member 183 which is pivoted to the plate 145. The shaft 147 has fixed thereto a second sprocket 184 about which a chain 185 engages, the chain 185 also engaging about a gear 186 which is fixed to a lower shaft 187. The lower shaft 187 is adapted to be coupled to the screw shaft 188 which is integral with the screw member 132.

A clutch gear 189 is slidable on the shaft 188 and is moved to an operative or inoperative position by means of a gear operator 190. The operator 190 is adapted to be held in a selected position by means of a locking lever 191. By means of the chains 169, 177 and 185 the feeding screws 129, 130, 131 and 132 may be selectively operated as a unit or if desired, certain ones of the feeding screws may be declutched or uncoupled from the driving mechanism.

The housing 133 is adapted to move with the carriage 32—35 and preferably the housing 133 is provided with a pair of rollers or wheels 192 which engage a track or rail 193 disposed in parallel relation with the frame 15. The track 193 is fixedly secured to the beam members 18.

The loose material is discharged to the hopper 139 when the charging members including the tubular housings 86 and the conveyors 106 are disposed within the retort 16, the hopper 139 at this time being disposed beneath a trough or chute 194 which communicates with the upper end of an elevator housing 195. The elevator housing 195 is disposed in a substantially vertical position and is fixed relative to the frame 15. An endless conveyor structure 196 is disposed in the elevator housing 195, the conveyor or elevator 196 being of the bucket type and the elevator housing 195 at its lower end has secured thereto a hopper 197 which communicates with the lower end of the housing 195 so that the material may be elevated in the housing 195 and then discharged into the trough or chute 194. The elevator 196 is operated from a chain 198 which is trained about a driving sprocket 199. The chain 198 is also trained about a sprocket 200 connected to the lower end of the elevator 196.

The sprocket 199 is carried by a countershaft 201 having a bevelled gear 202 fixed thereon and the gear 202 meshes with a bevelled gear 203 carried by a sprocket shaft 204. The shaft 204 is carried by bearings 205 fixed to the adjacent side of the elevator housing 195 and a chain 206 engages about a sprocket 207 which is fixed to the shaft 204. The chain 206 also engages about a sprocket 208 which is loose on the shaft 62. One part 209 of a toothed clutch is carried by the sprocket 208 and this clutch element 209 is adapted to engage a second clutch element 210 which is splined on the shaft 62. A thrust collar 211 is fixed to the shaft 62 and bears at one side against the hub of the sprocket 208.

A clutch operating fork 212 engages the clutch element 210 and the fork 212 is operated by means of an elongated clutch operating member 213 extending toward the rear of the frame 15 and terminating in a bell crank 214.

The frame structure 15 may be shifted relative to the retort structure 16 by means of a hand wheel 215 which is fixed to a shaft 216. The shaft 216 is journalled in a bearing 217 carried by the upright 84 and a sprocket 218 is fixed to the shaft 216. A chain 219 engages over the sprocket 218 and also engages over a sprocket 220 which is fixed to the axle 25.

The shaft 119 has a second sprocket 221 fixed thereto about which a chain 222 engages. The chain 222 also engages about a sprocket 223 which is fixed to the next succeeding shaft 119^a and the shaft 119^a has a sprocket 224 fixed thereto about which a chain 225 engages. The chain 225 extends downwardly from the sprocket 224 and is trained over a sprocket 226 carried by a shaft 119^b. The shaft 119^b also has a second sprocket 227 fixed thereto and about which a chain 228 is trained. The chain 228 also is trained about a sprocket 229 carried by a lower shaft 119^c so that when all of the charging conveyors 106 are coupled together, they will operate in unison. It will also be understood that the shaft 119^a, 119^b and 119^c are connected to their associated charging members 106 by means of a universal joint and a toothed clutch similar to the clutch elements 108 and 124.

In the use and operation of this retort charging machine, the machine is shifted to a position confronting the retort members 16 by rotating the hand wheel 215 so as to thereby shift the entire machine on the rails or tracks 27. When the charging members 86 are in a confronting position relative to the retort members 16, the motor 71 may be operated so as to move the carriage 32 forwardly relative to the frame 15. The forward movement of the carriage 32 will move the tubular members 86 into the retort members 16 and when the tubular members 86 are in an extended position telescoping within the retort members 16, the hopper 139 will be disposed in a receiving position beneath the chute or trough 194. The movement of the carriage 32 is effected by clutching the clutch element 73 through the clutch element 94 to the shaft 62.

This will cause the chain 60 to rotate the shaft 44 and pull the lower runs of the chains 37 and 47 forwardly. When the charging members are in an extended or telescoped position within the retort 16, the clutch element 210 may be shifted to a clutching position so as to couple the conveyor 196 with the driving shaft 62. After the housing 133 and the hopper 139 have been filled, the clutch element 210 may be shifted by means of the operator 213 and the crank 214 to a declutched position. At this time the motor 109 may be operated so as to rotate the feeding screws 129, 130, 131 and 132 and thereby feed the material to the charging members 86. The charging conveyors or screws 106 may be rotated simultaneously with the rotation of the feeding screws in the hopper housing 133 and if desired all of the charging screws or conveyors 106 may be operated or selected ones of the charging screws 106 may be declutched by shifting the associated clutching lever 125. It will also be understood that where one or more of the charging screws 106 are declutched, the associating feeding screw may also be rendered inoperative by shifting the associated clutching gear.

As the material is discharged or forced into

the inner ends of the retort members **16**, the pressure of the discharged material will progressively force the charging members **86** and the charging screws **106** outwardly of the retort members **16**. The discharged material at the forward ends of the charging screws **106** may be firmly packed within the retort members **16** by rocking the brake lever or bell crank **82** so as to shift the brake shoe **80** into engagement with the brake drum **79**. As the rearward movement of the charging members **86** and the charging screws **106** will cause rotation of the shaft **44** by pull from the chain **37**, the rearward movement of the carriage with the charging tubes **86** may be retarded by engagement of the brake **80** with the brake drum **79**. This will cause the discharged material to progressively be packed within the retort members **16**.

With a construction of this kind, the density of the discharged material will be uniform through the length of the retort members **16** and will eliminate the necessity of using a plunger or other tool in order to pack the loose material in the retort member **16**. Heretofore, the material has been packed by shifting the charging machine laterally of the retort members and then forcing a plunger or other packing member into the forward ends of the retort members **16**. However, this procedure did not produce a uniform density or packing of the material as the material in the far ends of the retort members would usually be fairly loose and thus the retort members would not be packed to their full capacity.

While the charging members **86** have been shown in substantially horizontal position, it will be understood that where the retorts **16** are inclined to the horizontal the charging members **86** may be supported on a similar inclination so that the charging members **86** will move axially of the retorts **16**.

In order to provide a means whereby a tunnel or gas passage may be provided in the packed material within the retort **16**, I have provided a tunnel forming member **230** which is preferably round in transverse section. The tunnel or passage forming member **230** is pivotally connected to a link **231** which is swingably mounted between a pair of ears **232** carried by the forward ends of the charging tubes **86**. The link **231** provides a means whereby the tunnel forming member **230** is adapted to depend diametrically across the open end of a charging tube **86** when the charging machine is disengaged from the retort structure.

At the time the charging tubes **86** are extended into the retorts **16**, the tunnel forming members **230** will be disposed diametrically across the ends of the charging tubes **86**. As the material is forced out of the charging tubes **86** by the conveyors **106**, the tunnel forming members **230** will be swung upwardly to the position shown in Figure 12 so that when the charging tubes **86** move outwardly during the packing of the material, the tunnel forming member **230** will be drawn outwardly with the charging tubes and will thus form a gas passage **233** in the material so that the gases arising from the heating or melting of the material may be discharged through the outer open ends of the retorts **16**. In this manner the retorts **16** will not be damaged by the accumulation of gases in the rear ends thereof and in addition the melting of the ore will not be affected by the gases and the ore will be able to more evenly melt throughout the length of each retort than is the case where the ore is packed tightly within the retort without the provision of the tunnel for the escape of the gases.

What I claim is:

1. A retort charging machine comprising a frame, a carriage having a part depending into said frame, means for slidably supporting said carriage from the top of said frame, a plurality of charging members within the frame, bodily moving with the carriage and pivotally supported at one end thereof from said part, vertically adjustable rotatable means carried by said frame for movably supporting the other ends of said members, shifting means for the carriage, a retort charging screw rotatable in each member, operating means for said screws mounted on said carriage, and means correlating with the shifting means for the carriage for resisting movement of said carriage during the charging operation whereby to pack the discharged material in the retorts simultaneously with the discharge of the material into the retorts.

2. A retort charging machine comprising a frame, a plurality of retort charging members movably carried by said fame, opeating means for said members, and manually controlled means correlating with said operating means for resisting endwise movement of said members relative to the frame and the retort during the charging operation to thereby uniformly pack the material in the retort.

3. A retort charging machine comprising a mobile frame, a carriage supported from and movable relative to and having a portion depending into the frame, operating means for moving said carriage in one direction and being connected to said part at spaced points to the latter, a plurality of retort charging members movable with said carriage connected to said part and formed with intakes, laterally disposed feeding means for said members bodily moving with the carriage and common to said intakes, and means carried by said frame for discharging material to said feeding means when said members are in charging position.

4. A retort charging machine comprising a mobile frame, a carriage supported from and movable relative to and having a portion depending into the frame, operating means for moving said carriage in one direction and being connected to said part at spaced points to the latter, a plurality of retort charging members movable with said carriage connected to said part and formed with intakes, means movable with said carriage for feeding material to said intakes, and manually controlling means correlating with the means for moving the carriage for holding said carriage against movement in the opposite direction to thereby uniformly pack the material in the retorts simultaneous with the discharge of the material.

5. In a retort charging machine, a plurality of charging members projectable into a retort structure, said charging members including tubular housings and rotatable conveyors supported within the housings and bodily moving with the latter, means for projecting said members into the retort structure, means for rotating said conveyors to thereby discharge the material into the retort structure while simultaneously moving said members outwardly of the retort structure, and manually controlled means correlating with the means for projecting said members for holding said members against outward movement to

thereby pack the material in the retort structure.

6. In a retort charging machine, an endwise movable charging device including charging elements and operating means for said elements, declutchable operating means for moving said device to a charging position interiorly of a retort structure, and braking means correlating with said declutchable operating means for resisting movement of said device outwardly of the retort structure to thereby pack the material in the retort structure.

7. A retort charging machine comprising a frame, a carriage movably carried by said frame, a plurality of charging members pivotally connected to and bodily movable with said carriage, a guide means for said members, means within the frame for vertically adjusting said guide means relative to said frame, means movable with said carriage communicating with and common to said members for feeding material to the latter, and means carried by the frame for supplying the material to said feeding means.

8. A retort charging machine comprising a frame, a carriage movably carried by said frame, a plurality of charging members connected at one end thereof to said carriage, a vertically movable charging member guide means carried by said frame and supporting the opposite ends of said members, means for vertically adjusting said guide means, a carriage operating shaft, flexible means operatively connecting said carriage with said shaft, a combined clutch and braking means carried by said shaft, and a manually operable controlling lever for said braking means, said braking means retarding the endwise movement of said charging members during the charging operation to thereby pack the material in the retorts.

9. A retort charging machine comprising a plurality of tubular members, a helical charging screw in each member, means supporting said members for endwise movement, operating means for moving said members endwise to an extended discharging position telescoping into a retort structure, means for selectively rotating said screws, means for feeding material to said members for discharge by said screws, and means correlating with said operating means retarding the endwise movement of said members to a retracted position to thereby progressively pack the material in the retort structure during the discharge of the material.

10. A retort charging machine comprising a plurality of tubular members pivotally supported at one end, a helical charging screw in each member, vertically adjustable means supporting said members for endwise movement, operating means for moving said members endwise to an extended discharging position, means for rotating said screws, said members in proximity to their pivoted ends being provided with intakes, means communicating with said intakes for feeding material to said members for discharge by said screws, operating means for said feeding means, means selectively coupling said feeding means with said latter operating means, and means correlating with said operating means for moving said members for retarding the endwise movement of said members to a retracted position to thereby progressively pack the material in a retort structure.

11. In a retort charging machine of that type including a plurality of retort charging members having intakes, the combination of a feeder housing for said members, a hopper carried by said housing, superposed conducting means leading from said housing to said intakes, a plurality of semi-cylindrical troughs carried by said housing in superposed relation and aligned with said conducting means, a feeding screw rotatable in each trough, and declutchable operating means for said screws.

12. A retort charging machine comprising a frame, a carriage supported from the frame, a plurality of retort charging members bodily carried by said carriage, shifting means for said carriage, operating means for said members, means correlating with said shifting means for resisting endwise movement of said members relative to the frame and the retort during the charging operation to thereby uniformly pack the material in the retort, and normally inactive shiftable means carried by each charging member and automatically shifted by the charge to active position for forming a gas escape passage in the packed material.

13. A retort charging machine comprising a frame, a carriage supported from the frame, a plurality of retort charging members arranged within the frame and bodily movable with said carriage, each of said members including a tubular housing having rotatably supported therein a charging element, shifting means for said carriage, operating means for said elements, means correlating with said shifting means for resisting endwise movement of said members relative to the frame and the retort during the charging operation to thereby uniformly pack the material in the retort, and means pivotally connected to and normally disposed in inactive position diametrically of the outlet end of each tubular housing and automatically shifted to a horizontal active position by the charge and thereby form a gas escape passage in the packed material.

14. A retort charging machine comprising a mobile frame, a carriage supported from the frame and including a depending part, a plurality of retort charging members connected to said part and bodily movable with said carriage, shifting means for said carriage on said frame, means for selectively operating said members on said carriage, and means correlating with said shifting means for the carriage for resisting endwise movement of said members relative to the frame and retort during the charging operation to thereby uniformly pack the material in the retort.

THOMAS RICHARD MORRISON.