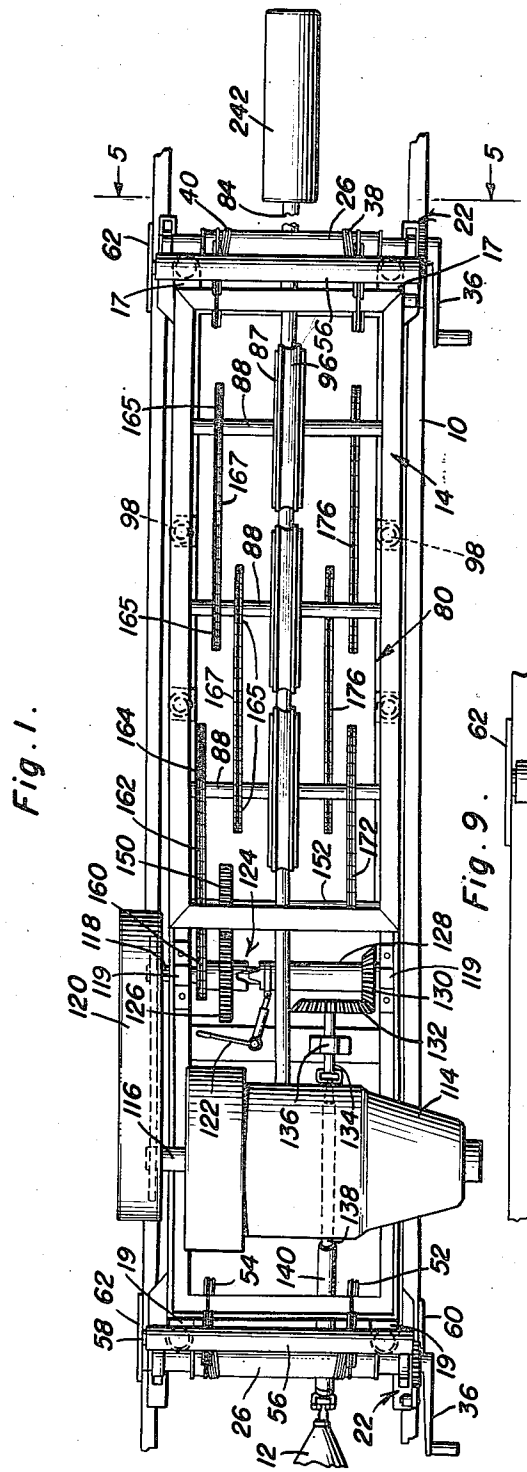
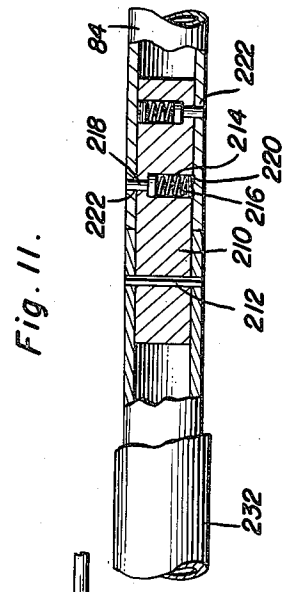
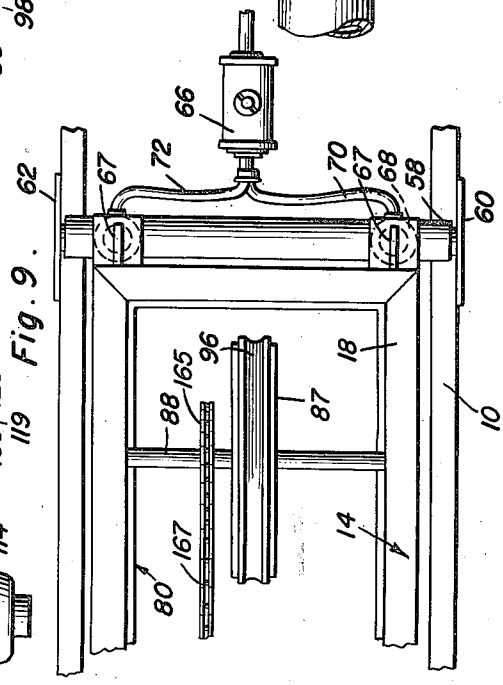
Nov. 11, 1952 W. V. STYLES ET AL 2,617,542

BLAST HOLE LOADING MACHINE

Filed March 1, 1948 6 Sheets-Sheet 1







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BLAST HOLE LOADING MACHINE

Filed March 1, 1948 6 Sheets-Sheet 2

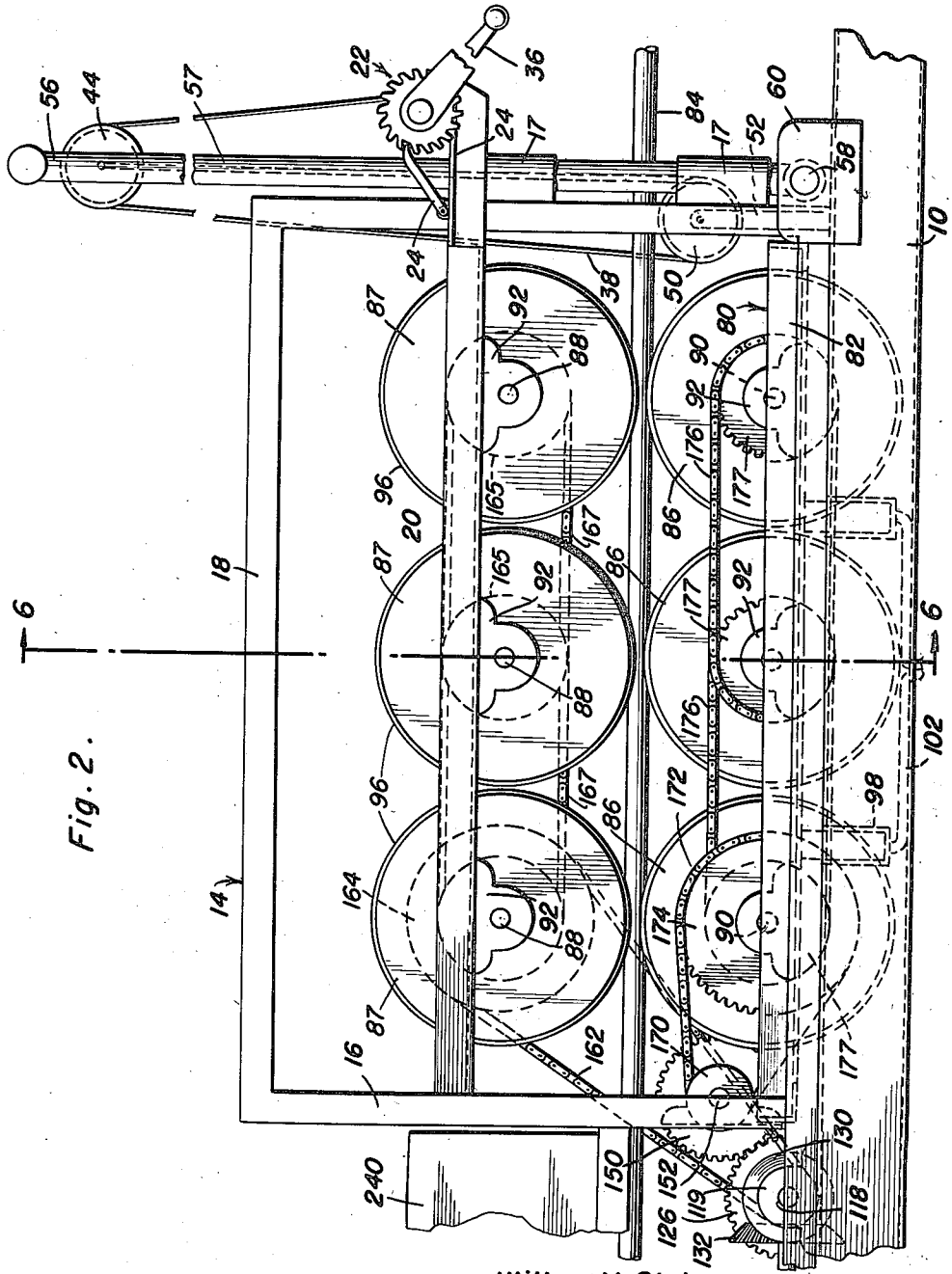


Fig. 2.

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BLAST HOLE LOADING MACHINE

Filed March 1, 1948 6 Sheets-Sheet 3

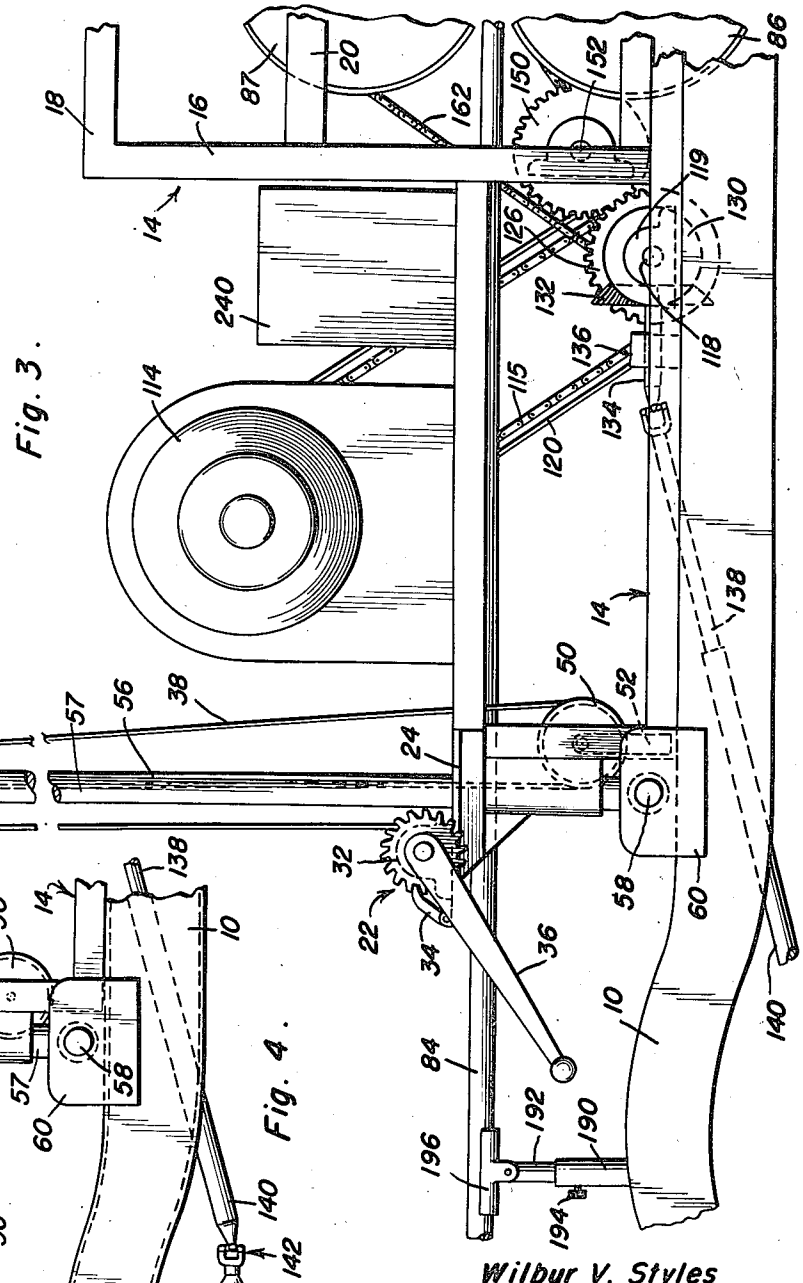


Fig. 3.

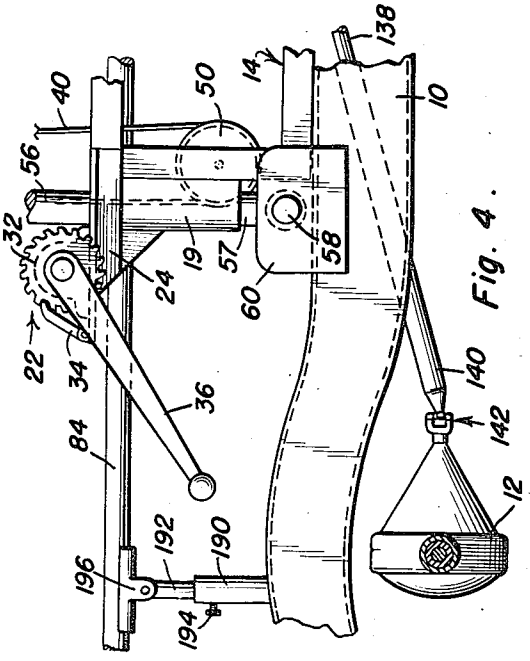


Fig. 4.

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BLAST HOLE LOADING MACHINE

Filed March 1, 1948 6 Sheets-Sheet 4

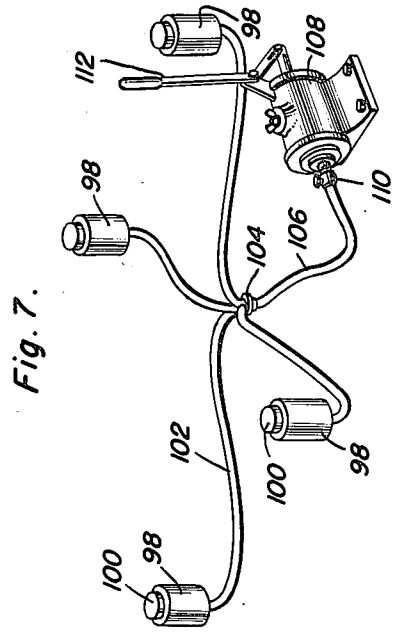


Fig. 7.

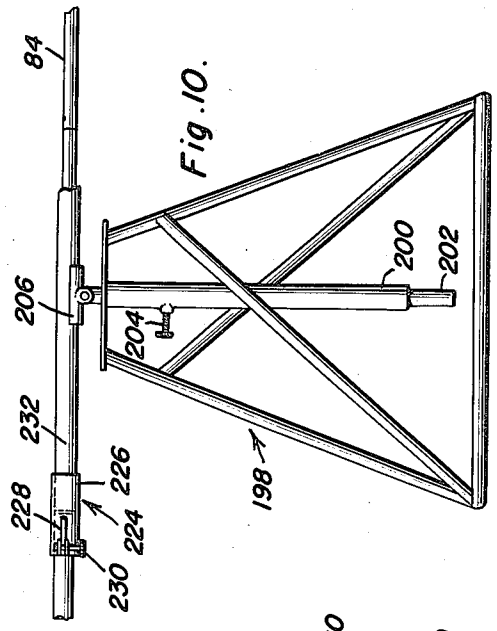


Fig. 10.

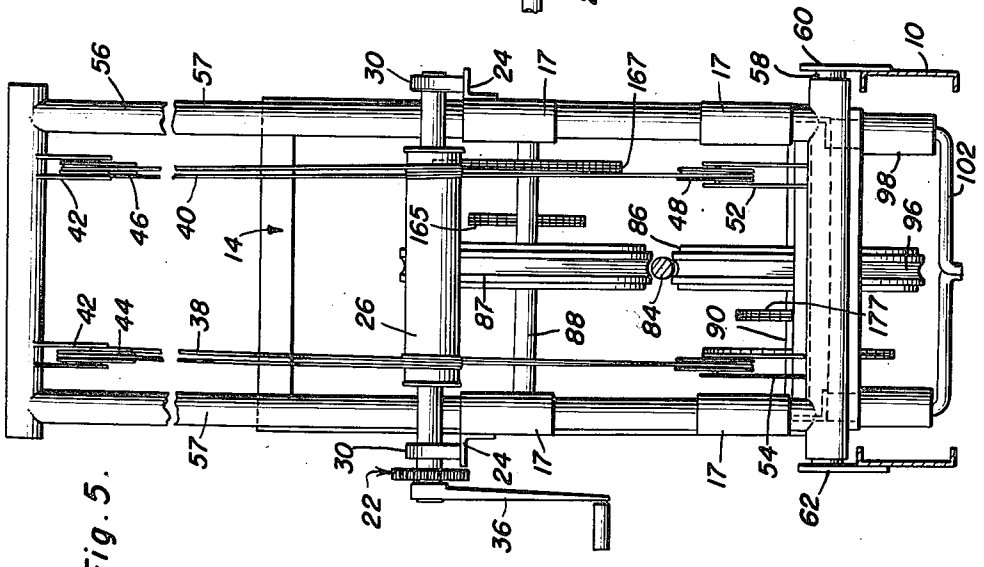


Fig. 5.

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BLAST HOLE LOADING MACHINE

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Fig. 8.

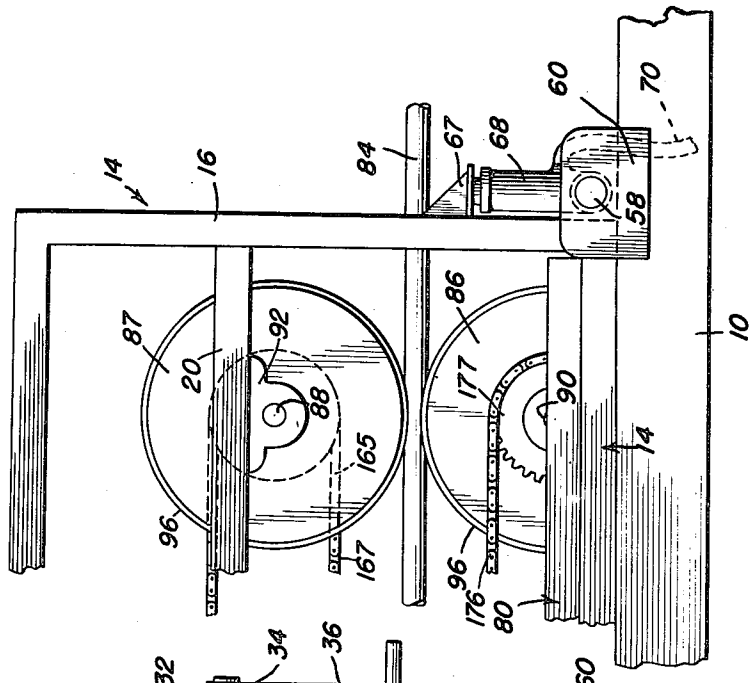
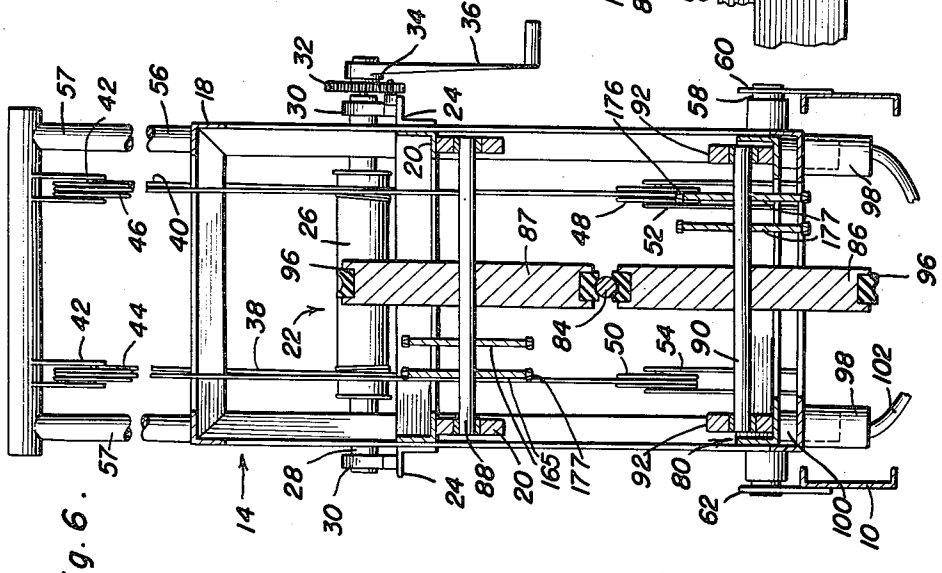


Fig. 6.



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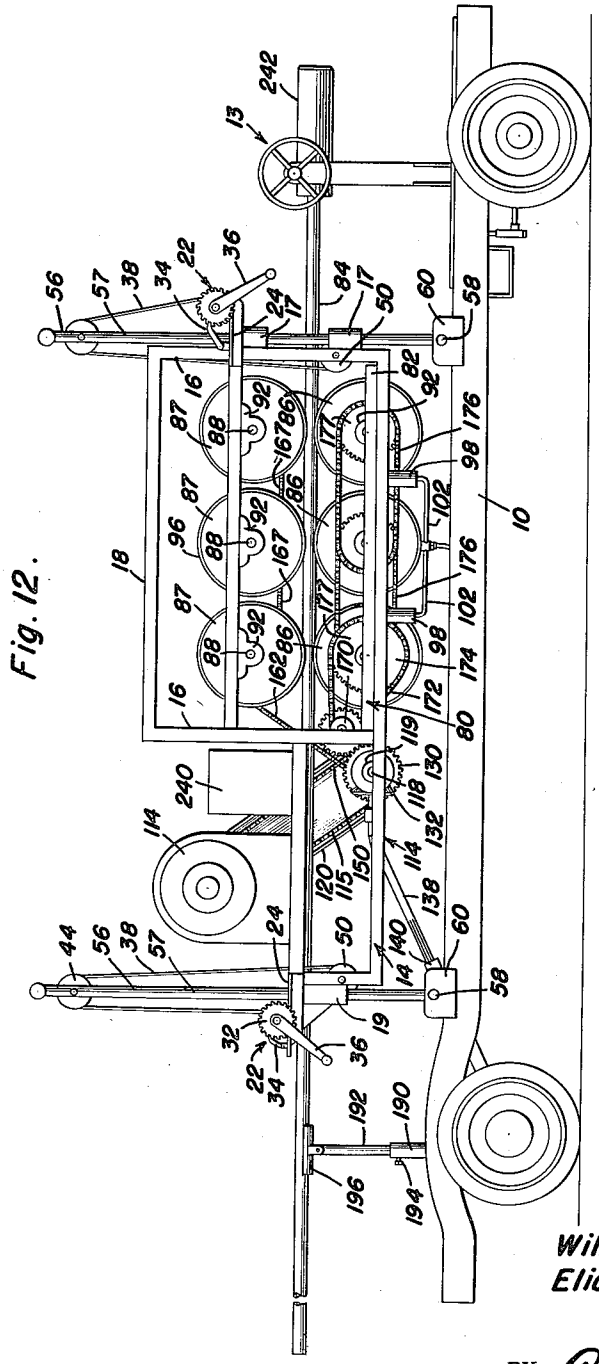
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BLAST HOLE LOADING MACHINE

Filed March 1, 1948 6 Sheets-Sheet 6

Fig. 12.



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Patented Nov. 11, 1952

2,617,542

UNITED STATES PATENT OFFICE

2,617,542

BLAST HOLE LOADING MACHINE

Wilbur V. Styles and Elias A. Palo,
Colstrip, Mont.

Application March 1, 1948, Serial No. 12,444

14 Claims. (Cl. 214—1)

1

This invention appertains to novel and useful improvements in devices for loading a shaft or cavern for subsequent explosion.

An object of this invention is to urge a ramrod or loading stick into a pre-formed shaft.

Another object of this invention is to tilt the loading stick in accordance with the angularity of the shaft, relative to the grade line or relative to the longitudinal axis of the vehicle utilized in association herewith.

Another object of this invention is to frictionally drive or urge the loading stick and to regulate the amount of friction between driving members and the stick, necessary in such an operation.

A further object of this invention is to pivotally tilt a frame which is supported on a vehicle, the frame being pivoted about opposite ends, whereby the ramrod or loading stick may be directed at various selected angles or to raise and lower the frame as a unit.

Another object of this invention is to raise and lower selectively preferably by hydraulic means, a bank of rollers having friction conductive members on their faces for engagement with a ramrod or loading stick.

Another purpose of this invention is to support the ramrod adjustably in order to prevent it from dragging and to prevent excess sagging thereof.

Another purpose of this invention is to actuate the ramrod urging means and the vehicle on which the various and sundry appurtenances contiguous to the invention are located, by a single prime mover.

Another purpose of this invention is to controllably direct the power output of the prime mover to the ramrod urging means or the vehicle running gear.

Another purpose of this invention is to provide a device which is simplified in character and structure for performing the aforementioned objects.

Ancillary objects and features of novelty will become apparent to those skilled in this art, in following description of the preferred form of the invention, illustrated in the accompanying drawings, wherein—

Figure 1 is a fragmentary plan view of the preferred form of the invention;

Figure 2 is a fragmentary elevational view in enlarged scale illustrating a portion of the frame which is pivoted to a vehicle chassis and also illustrating the urging means for the ramrods;

Figure 3 is an enlarged fragmentary elevational view of the terminal portion of the frame and illustrates the means for adjustably supporting the ramrod as well as selectively raising and lowering the frame, together with the means for actuating the runing gear of a vehicle;

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Figure 4 is an enlarged sectional view showing particularly the running gear of the vehicle and a portion of the frame raising and lowering means;

Figure 5 is a sectional view taken substantially on the line 5—5 of Figure 1 and in the direction of the arrows;

Figure 6 is a sectional view taken substantially on the line 6—6 of Figure 2 and in the direction of the arrows;

Figure 7 is a perspective view illustrating the platform raising and lowering means;

Figure 8 is a fragmentary elevational view showing a modified form of the frame raising and lowering means;

Figure 9 is an enlarged plan view of the detail of construction of the embodiment shown in Figure 8;

Figure 10 is an elevational view illustrating the ramrod and a support therefor;

Figure 11 is a sectional view illustrating particularly the preferred clamps for connecting various sections of the ramrod, and

Figure 12 is an elevational view of the device showing the frame in a raised position with respect to the chassis of the vehicle.

This invention has been developed to provide a device for charging a shaft or cavern which has been preconstructed.

For various uses such as in mining, construction of tunnels, bridges, roads and the like, it is expeditious to blast certain portions of the terrain. One of the major problems in such blasting operations is the actual charging of the shaft with an explosive. Certain apparatus has been devised for such a purpose and in many instances the charging is done manually. It is within the purview of the present invention to provide a mechanical device for charging holes, shafts or the like rapidly and dextrously.

The apparatus is made mobile for the obvious purpose of convenience in such operations and the preferred forms of the invention are practical as a mobile device since the loading of each hole or shaft may be done in a very short time. Therefore, all that is necessary to load a shaft or hole for subsequent blasting is to locate the automotive vehicle adjacent the shaft to be loaded, perform the loading operations and then move to the next adjacent shaft which is to be loaded either

for simultaneous explosion or individual detonation.

In the event that the shaft must be drilled at an angle to the grade line, the present invention in its preferred forms as well as other forms will operate effectively. To this end certain adjustments are supplied on the chassis of the vehicle.

A substantially conventional ramrod or loading stick is utilized in association with this device, it being unnecessary to provide special implements or tools in this connection. Means for urging the ramrod in a selected direction is supplied on the chassis of a vehicle. The urging means may be bodily pivoted on the chassis in order to provide selected degrees of angularity to conform with the angularity of the blast hole or shaft to be loaded.

A problem arising in devices of this nature is that of the loading stick or ramrod dragging on the ground or sagging excessively. Therefore, conveniently placed on the vehicle chassis is an extensible support upon which is mounted a guide pipe within which the ramrod slides and this guide pipe may be extended behind the blast hole loader to any required length, where it is supported at intervals by jack stands of adjustable height.

The amount of force required to actuate the loading stick is not always the same. The amount of pressure required of the driving pulleys against the ramrod varies with the weight of explosives being packed and the degree of adhesion of the loading stick or ramrod and driving pulleys. If several cartridges are pushed into the shaft at one time, a greater pressure against the ramrod is required to propel it than if only one cartridge is pushed at a time. If the ramrod is slippery from mud, a much greater pressure against it is required to propel it than when it is dry. Further, the pressure must be low enough so the driving pulleys can slip on the ramrod when the cartridge being loaded strikes the end of the blast hole, otherwise the machine must either break or push itself back in the direction opposite that of the travel of the ramrod, since the operator cannot stop or reverse the application of power at the exact instant that the charge reaches the end of the shaft.

In order to adjust the pressure between the ramrod and its associated driving pulleys to whatever is required under the varying conditions described and also in order to accommodate various diameter ramrods, the lower bank of pulleys which drive the ramrod may be raised or lowered at will by means of an improved system of jacks operating against the platform on which this bank of driving pulleys is mounted.

A single pump, preferably of the manually operated type is supplied for directing and urging hydraulic fluid to four piston-cylinder assemblies. The piston of each assembly engages a platform, which platform is slidable within guides. It is quite obvious that the lower set of pulleys are also journaled in the platform and are raised and lowered with the pistons. The single pump therefore directs the fluid to the cylinders under substantially equal pressure thereby urging each corner of the platform by an equal amount of force for the purpose of lifting the platform bodily within the guides. This raises all the pulleys on this platform an equal and equivalent amount.

The invention is particularly well adapted for use in blasting overburden in open pit or strip coal mines. In such mines the blast holes are generally drilled into the overburden a few feet above the coal vein either horizontally or at small angles from the horizontal and are loaded by pushing an explosive in cartridge form into the hole with long loading sticks by manual means. The number of men required to charge a hole by this means varies with the weight of the cartridges used, the length and angle of the hole and the time allowable and may require as high as fifteen men. The use of the present invention for this purpose obviously greatly reduces the manual labor involved.

Another method of loading blast holes is to blow the powder into the hole however, this method is rather unpopular due to the increased hazard of accidental explosion and because it requires a chamber or hole of greater diameter than the hole to receive the charge therein.

The present invention has for one of its prime purposes the loading of a blast hole in a safe manner, and depositing the charge at the proper position in the blast hole in an economical, efficient manner.

There are two embodiments of the present invention illustrated herewith, one embodiment differentiating from the other solely in the use of a hydraulic jack in lieu of a manually actuated mechanical jack or winch. The second embodiment of the invention is illustrated in Figures 8 and 9 and will be described subsequently since it embodies all of the structure illustrated in connection with the first embodiment of the invention with the sole exception of the aforementioned jacks.

A vehicle is provided for use in association with the present invention and has a conventional chassis 10 supplied therewith as well as a differential 12 and steering mechanism 13 which is positioned therebeneath. The appurtenances contiguous to vehicles are also utilized in association with this particular vehicle, and since these appurtenances are all conventional, and form no real material part (insofar as specific structure thereof) they will not be illustrated or described.

A frame generally indicated at 14 is seated on the chassis 10 and is composed of any suitable material, preferably essentially of angle iron. The base portion of the said frame is composed of four elements and is substantially rectangular in configuration. Uprights which are all identical and indicated at 16 are secured at the front of this substantially rectangular base portion of the frame and suitable cross members 18 and 20 respectively are supplied in association with the uprights for rigidity of construction. The rectangular base portion with the uprights 16 and strengthening members indicated at 18 and 20 cooperate to form the frame 14. Front bearings 17 and rear bearings 19 are secured to a pair of uprights 16 and to the rear part of the frame respectively.

The entire frame 14 is pivotable about opposite ends by a selection of means, which means may be seen by inspection of Figures 3 and 8 respectively.

The tilting or pivotally lifting means illustrated in Figure 3 exemplifies one embodiment of the invention and is composed of a manually operative winch construction 22, seated on a shelf 24.

The winch construction consists primarily of a drum 26 attached to a suitable shaft 28 which is in turn journaled in bearings 30. These bearings seat upon the shelf 24 and a ratchet gear 32 with an associated pawl 34 are supplied in conjunction with the shaft 28. A handle 36 may

be detachably connected with one terminal portion of the said shaft 28 for manual operation of the drum 26. Cables 38 and 40 respectively are each secured at one end to the drum 26 while the other end of each is attached to one of the hangers 42. Also, suspended from the hangers 42 is a pair of sheaves or pulleys 44 and 46 respectively having a portion of the cables extending therearound.

The lower portions of the cables extend around complemental pulleys 48 and 50 respectively which are attached to brackets 52 and 54 which are rigidly attached to the frame 14; whereupon actuation of the drum 26 will selectively play and wind an amount of cable therearound, thereby lifting one end of the frame 14 or lowering the same end.

In order to maintain the hangers 42 in the elevated position, a substantially U-shaped member 56 having legs which form rails or guides 57 is secured to the chassis 10 and is journaled on a shaft 58. This shaft is in turn mounted in end plates 60 and 62 respectively which are rigidly attached to the chassis 10. By this construction the U-shaped member 56 is pivotable about the shaft 58 as an horizontal axis in order to ride with the moving of the said frame 14 upon movement thereof.

There are two of such constructions provided, one at one end of the said frame 14 while the other is at the opposite end. By this medium either the front or rear end of the frame 14 may be raised and lowered.

Referring now to Figure 8 it will be noted that the end plates 60 and 62 respectively are provided with the shaft 58 therein. However, in place of the U-shaped frame member and the winch construction 22, there is provided a simple hydraulic jack assembly. A pump 66 of any suitable, conventional type is supplied and a jack 68 is arranged to urge upwardly the bracket 67 which is secured to the frame 14, said jack being pivoted on the shaft 58. Upon actuation of the pump 66, the jack 68 may be raised or lowered selectively through the medium of urging hydraulic fluid through the conduit 70 and the conduit 72. It is noted at this point that there are four of such jacks used with the preferred form of the invention in order to raise the four corners of the frame 14 with substantially equal forces at the corners. The jacks 68 are pivotable about the shaft 58 as an axis, as are the winch and U-shaped member assemblies.

Referring now again primarily to Figure 2 it will be noted that the winch construction is duplicated at the forward end of the frame 14 and since each element is identical to the above described pertinent winch and U-shaped member elements, the same reference numerals are carried throughout. Further, there is provided a platform generally indicated at 80 and substantially rectangular in configuration. This platform is composed of a plurality of longitudinal members 82 and more specifically composed of four sides. The platform is slidably received within the flanges of the angle iron uprights 16 and these flanges cooperate with the platform 80 to form guides.

Means for urging a ramrod or loading stick 84 in a blast hole is disposed on the frame and the platform. The preferential means is a plurality of rollers which are identical in character. Each roller 87 of an upper series is journaled by means of a suitable shaft 88 and each roller 86 of a lower series is disposed on a shaft 90, all of

these shafts being received in bearing carrying bosses 92. Each of the said bosses are attached to either the cross member 20 or the sides of the said platform 80. By this construction opposed pairs of rollers are supplied, the lower series of rollers being selectively adjustable vertically with the said platform 80.

In order to increase or decrease the friction between the loading stick 84 and the faces of the rollers, the platform 80 is selectively raised and lowered by hydraulic means to be described subsequently.

In order to insure a firm grip between the loading stick 84 and the rollers 86, each of the rollers is faced with a grooved resilient material 96. This assists in producing the additional friction necessary for gripping the loading stick 84.

The means for raising and lowering the platform 80 may be seen in Figure 7 wherein a plurality of jacks 98 are supplied with a piston 100 therein. The jack housings are secured to the frame 14 and the pistons 100 engage the lower surface of the platform 80 for lifting purposes. A conduit 102 extends from each cylinder to a common manifold 104, thence by means of a supply line 106 extends to a manual pump 108. A valve 110 is supplied in the line 106 and a lever is secured to the pump 108 for actuation purposes. Upon actuation of the pump and proper setting of the valve 110, each of the four illustrated jacks 98 urge with equal force the lower surface of the platform 80 for adjusting the opposed rollers relative to each other, selectively increasing or decreasing the distance between the relatively stationary series of rollers and the adjustable rollers.

Common means for actuating the rollers and the running gear of the vehicle is provided. This common means may be seen as preferably an electric motor 114 however, it is apparent that a diesel engine, gasoline fired internal combustion engine, turbine or the like may be utilized in lieu of the motor.

The drive consists primarily of a driven shaft 116 extending from the motor 114 having a drive gear thereon. This gear has a chain 115 extending therearound and around a suitable gear attached to a shaft 118 which is mounted in bearings 119 secured to the base portion of the frame 14. A cover 120 is supplied over the chain and gears for obvious purposes.

A lever 122 is pivoted to a cross member in the lower part of the frame 14 for the purpose of actuating a conventional clutch mechanism 124 which slides a collar having a gear 126 on the shaft 118. This gear 126 is selectively freely rotatable on the shaft 118 or drivingly connectable with a sleeve 128. This sleeve 128 is also received on the shaft 118 and has a bevel gear 130 attached thereto. A complemental bevel gear 132 having a shaft 134 attached thereto is enmeshed with the first mentioned bevel gear 130. The shaft 134 is journaled in a suitable bearing 136 and a universal joint fitting is at the free end thereof.

Referring now to Figure 4 it will be seen that a telescopic shaft construction is supplied in association with the said shaft 134. This telescopic shaft is composed of two parts one being a rod 138 having a universal joint end connected with the aforementioned universal joint connection and the other being a sleeve 140 splined or otherwise associated with the rod 138. The terminal portion of the sleeve 140 connects with

the differential 12 through the medium of a universal joint 142. This construction is provided in order that when the frame 14 is pivoted about either the forward or rear shafts 58 or the drive shaft 138—140 may be extended and retracted without binding.

In Figure 1 it will be seen that the gear 126 is enmeshed with a gear 150 which is journaled on the shaft 152. This last mentioned shaft is received in suitable bearings in the said frame 14 and is utilized for the purpose of imparting torque to the roller bearing shafts 88 and 90. The clutch mechanism 124 is of the nature of a collar having protuberances thereon engageable with the complemental notches in the sleeve 128 and sleeve bearing gear 126. The clutch mechanism is utilized for the purpose of selectively actuating the running gear of the vehicle (through the medium of the differential 12) and the rollers, from a common prime mover 114.

Attached rigidly to the gear 126 and spaced therefrom is a sprocket 160 having a chain 162 extending therearound. This chain 162 attaches to the first of the shafts 88 through the medium of a suitable sprocket 164. The remaining shafts 88 of the top bank or series of pulleys or sheaves are driven from the torque derived in this manner, that is through the medium of a plurality of sprockets 165 fixed to the shafts 88 interconnected by chains 167.

The lower series or bank of pulleys is driven from the torque derived from the shaft 152. A sprocket 170 is attached to the shaft 152 and has a chain 172 extending therearound. This chain also extends around a suitable gear or sprocket 174 which is rigidly attached to the first of the lower pulley supporting shafts 90. Through the medium of chains 176 and associated sprockets 177 which are fixed to the shafts 90, the entire lower bank of pulleys is driven in unison. It is now appreciated that upon actuation of the clutch mechanism 124 by means of the pivoted handle or link 122, the actuation of the upper and lower rows of pulleys may be effected.

Means for supporting the loading stick or ramrod 84 is provided on the vehicle chassis 10. The preferential means may be seen best in Figure 3 wherein there is disclosed a sleeve 190 having a telescopically adjustable bar 192 therein. A set screw 194 or the like is provided in the said sleeve engageable with the rod 192 in order to maintain selected, adjusted positions thereon. A bearing cradle 196 is secured to the said rod 192 whereon the guide pipe 232 seats. This guide pipe supports the ramrod 84 which slides within it.

Reference is now made to Figure 10 wherein a jack stand generally indicated at 198 is shown. Several of these jack stands are used at intervals distant from the vehicle to support the guide pipe 232 within which the ramrod 84 slides. Each jackstand has attached therein a sleeve 200 with a rod 202 slidably and adjustably received therein. Attached to the top of the rod is a cradle 206 whereon the guide pipe 232 may seat and a set screw 204 is provided in the sleeve 200 to hold rod 202 in any desired position. This means provided on the jack stand, Figure 10, for raising and lowering the guide pipe is similar to that provided on the vehicle chassis, Figure 3, for the same purpose.

Means for extending the ramrod 84 is utilized in connection with the present invention and may be seen by correlating Figures 11 and 10. The ramrod 84 may be provided with a hollow bore wherein a dowel type connecting member 210 is supplied. This dowel type connecting member 210 is pinned to one end of a length of ramrod by means of the pin 212 while the other end of the dowel type connector is formed with bore 214 having a spring 216 seated therein. This spring urges a lug 218 exteriorly of the bore 214 and a cap screw 220 is used for seating the spring.

The opposite end of each length of ramrod is provided with apertures 222 so placed that when this end is butted against an end containing the connecting member, the lugs in the connecting member may snap into the apertures and lock the two ends together. Breaking the connection is accomplished by depressing the lugs with a tool, turning one length of rod and then pulling it off.

A conventional quick connection mechanism 224 of a different type is used to connect the various lengths of the guide pipe within which the ramrod slides. The specific structure of this mechanism is simply a sleeve 226 welded at one end to a length of guide pipe 232 and having a slit or cut 228 at the other end with clamping screw extending through suitable brackets attached to marginal edges of said cut portion. The plain end of a length of guide pipe is inserted into the slit end of the sleeve and the screw tightened to attach the two lengths firmly together.

In operation of the invention, when the electric motor 114 is utilized a starter resistor box 240 may be supplied on the frame 14 for the usual purpose and function in supplying resistance to the armature and coils of the motor in accordance with the desired operation. Further, it is readily apparent that a conventional cartridge terminal portion 242 is supplied on the ramrod or loading stick 84 as is well known in the art.

Having described the invention, what is claimed as new is:

1. A mechanical loader comprising a vehicle having a chassis, a frame adjustably supported on said chassis, means for raising and lowering selected ends of said frame, a lower set of rollers, means for adjustably supporting said rollers in said frame, a motor disposed on said chassis, means operatively connected with said motor for actuating said rollers and means operatively connected with said motor for actuating said vehicle, said rollers support means including a platform, means associated with said frame for guiding said platform when it is raised, an upper set of rollers journalled in said frame, and means connected to said platform for raising and lowering said platform.

2. A mechanical loader comprising a vehicle having a chassis, a frame adjustably supported on said chassis, means for raising and lowering selected ends of said frame, a lower set of rollers, means for adjustably supporting said rollers in said frame, means for actuating said rollers and said vehicle, said rollers support means including a platform, means associated with said frame for guiding said platform, an upper set of rollers journalled in said frame, means connected with said frame for raising and lowering said platform, said vehicle and roller actuation means including a prime mover, and means for drivingly attaching said prime mover to said rollers and the vehicle running gear.

3. A mechanical loader comprising a vehicle having a chassis, a frame adjustably supported on said chassis, means for raising and lowering selected ends of said frame, a lower set of rollers,

means for adjustably supporting said lower set of rollers in said frame, means for actuating said rollers, said rollers support means including a platform disposed in said frame, an upper set of rollers carried by said frame, means for raising and lowering said platform, said frame raising and lowering means including a pair of shafts attached to said chassis adjacent the ends of said frame, and lifts pivotally associated with said shafts and connected with said frame.

4. The combination of claim 3, and resilient grooved faces on said rollers for gripping a ramrod.

5. The combination of claim 4 and extensibly adjustable means attached to said chassis for guiding the ramrod toward and from said rollers.

6. In a mechanical loader, a vehicle including a chassis, means mounted on said chassis for urging a ramrod, means for tilting said urging means to selected poistions of angularity, a frame associated with said chassis, means for pivoting said frame about opposite ends and for vertically displacing said frame, said urging means including a platform slidably positioned within said frame, said tilting means including spaced shafts attached to said chassis, and lifts pivotally associated with said shafts and said frame.

7. In a mechanical loader, a vehicle including a chassis, means mounted on said chassis for urging a ramrod, means for tilting said urging means to selected positions of angularity, a frame associated with said chassis, means for pivoting said frame about opposite ends, said urging means including a platform slidably positioned within said frame, said tilting means including shafts attached to said chassis, lifts pivotally connected with said shaft and said frame, and said rollers having ramrod supporting grooves in the peripheries thereof.

8. A mechanical loading device comprising a vehicle which has a chassis, a frame which includes vertical members forming guides, means adjustably supporting said frame on said chassis for pivotal movement about the forward and rearward end of said frame, structural members constituting a part of said frame and having a series of rollers carried thereby, a platform disposed between said guides and arranged for vertical adjustment, a second series of rollers carried by said platform and cooperable with the first mentioned series of rollers to feed a rod disposed between the series of rollers, and means for lifting said frame selectively so that it pivots about the ends thereof and so that it is vertically raised whereby both ends are lifted substantially an equal amount, lifts secured in spaced relationship with respect to each other on said chassis for pivotal movement, bearings secured to said frame and means forming a part of said lifts and forming guide rails for said bearings, and means operatively connecting said lifts and said frame so as to raise and lower said frame and said platform as a unit.

9. In a mechanical loader, a vehicle, a chassis having a motor mounted thereon, said vehicle having wheels and means drivingly connecting at least one of said wheels and said motor, a pair of rails with means pivotally mounting said rails at one end of said chassis, a second pair of rails with means pivotally mounting said second pair of rails on said chassis at a spaced position with respect to the first mentioned set of rails, a frame disposed between said sets of rails with bearings on said frame slidably disposed on said rails, means secured to said rails and said frame for selectively raising the front and rear ends of said frame, an upper series of rollers carried by said frame, a lower series of rollers cooperating with said upper series of rollers and forming a rod feed, and means for raising said lower series of rollers to decrease the space between said rollers.

10. In a mechanical loader, a vehicle, a chassis having a motor mounted thereon, said vehicle having wheels and means drivingly connecting at least one of said wheels and said motor, a pair of rails with means pivotally mounting said rails on said chassis, a second pair of rails with means pivotally mounting said second pair of rails on said chassis at a spaced position with respect to the first mentioned set of rails, a frame disposed between said sets of rails with bearings on said frame slidably disposed on said rails, means secured to said rails and said frame for selectively raising the front and rear ends of said frame, an upper series of rollers carried by said frame, a lower series of rollers cooperating with said upper series of rollers and forming a rod feed, and means for raising said lower series of rollers to decrease the space between said rollers including a platform disposed in said frame for vertical adjustment together with a lift reacting on said platform and said frame.

11. In a mechanical loader, a vehicle, a chassis having a motor mounted thereon, said vehicle having wheels and means drivingly connecting at least one of said wheels and said motor, a pair of rails with means pivotally mounting said rails on said chassis, a second pair of rails with means pivotally mounting said second pair of rails on said chassis at a spaced position with respect to the first mentioned set of rails, a frame disposed between said sets of rails with bearings on said frame slidably disposed on said rails, means secured to said rails and said frame for selectively raising the front and rear ends of said frame, an upper series of rollers carried by said frame, a lower series of rollers cooperating with said upper series of rollers and forming a rod feed, and means for raising said lower series of rollers to decrease the space between said rollers including a platform disposed in said frame for vertical adjustment together with a lift reacting on said platform and said frame, at least one of said rollers having an outer surface with a groove to enhance the gripping action between the one of said rollers and the rod.

12. A mechanical loader comprising a vehicle chassis, a frame disposed on said chassis, said frame having vertical members forming guides, a pair of plates fixed to said chassis, a second pair of plates fixed to said chassis spaced from said first mentioned pair of plates, a shaft disposed in each pair of plates, vertical rails mounted for pivotal movement on each of said shafts, said frame having bearings at one end slidably disposed on one of said pairs of rails, and said frame having bearings disposed at the opposite end and slidably arranged on the other pair of rails whereby said frame is vertically movable and whereby said frame is pivotally movable about both ends as a pivot axis, means operatively connected with said rails and said frame for raising and lowering said frame as a unit and for pivotally operating said frame, a platform disposed between said guides and means operatively connected with said platform and said frame for raising said platform, a plurality of rollers forming a first series secured to said frame, a plurality of rollers forming a second series secured to said platform and vertically movable therewith, all of

said rollers being movable with said frame, the first and second series of rollers having their peripheries spaced from each other to form a rod feeding passage, and means operatively connected with said rollers for rotating said rollers.

13. A mechanical loader comprising a vehicle chassis, a frame disposed on said chassis, said frame having vertical members forming guides, a pair of plates fixed to said chassis, a second pair of plates fixed to said chassis spaced from said first mentioned pair of plates, a shaft disposed in each pair of plates, vertical rails mounted for pivotal movement on each of said shafts, said frame having bearings at one end slidably disposed on one of said pairs of rails, and said frame having bearings disposed at the opposite end and slidably arranged on the other pair of rails whereby said frame is vertically movable and whereby said frame is pivotally movable about both ends as a pivot axis, means operatively connected with said rails and said frame for raising and lowering said frame as a unit and for pivotally operating said frame, a platform disposed between said guides and means operatively connected with said platform and said frame for raising said platform, a plurality of rollers forming a first series secured to said frame, a plurality of rollers forming a second series secured to said platform and vertically movable therewith, all of said rollers being movable with said frame, the first and second series of rollers having their peripheries spaced from each other to form a rod feeding passage, and means operatively connected with said rollers for rotating said rollers including a motor and members drivingly connecting said motor and said rollers, said chassis having wheels to support the chassis for mobility, and means operatively connected with said motor and a pair of said wheels for operating the pair of wheels.

14. The combination of claim 13 together with resilient members constituting the peripheries of said rollers to engage the rod and enhance the gripping between the rollers and the rod.

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