

Feb. 9, 1937.

C. A. HIRSCHBERG

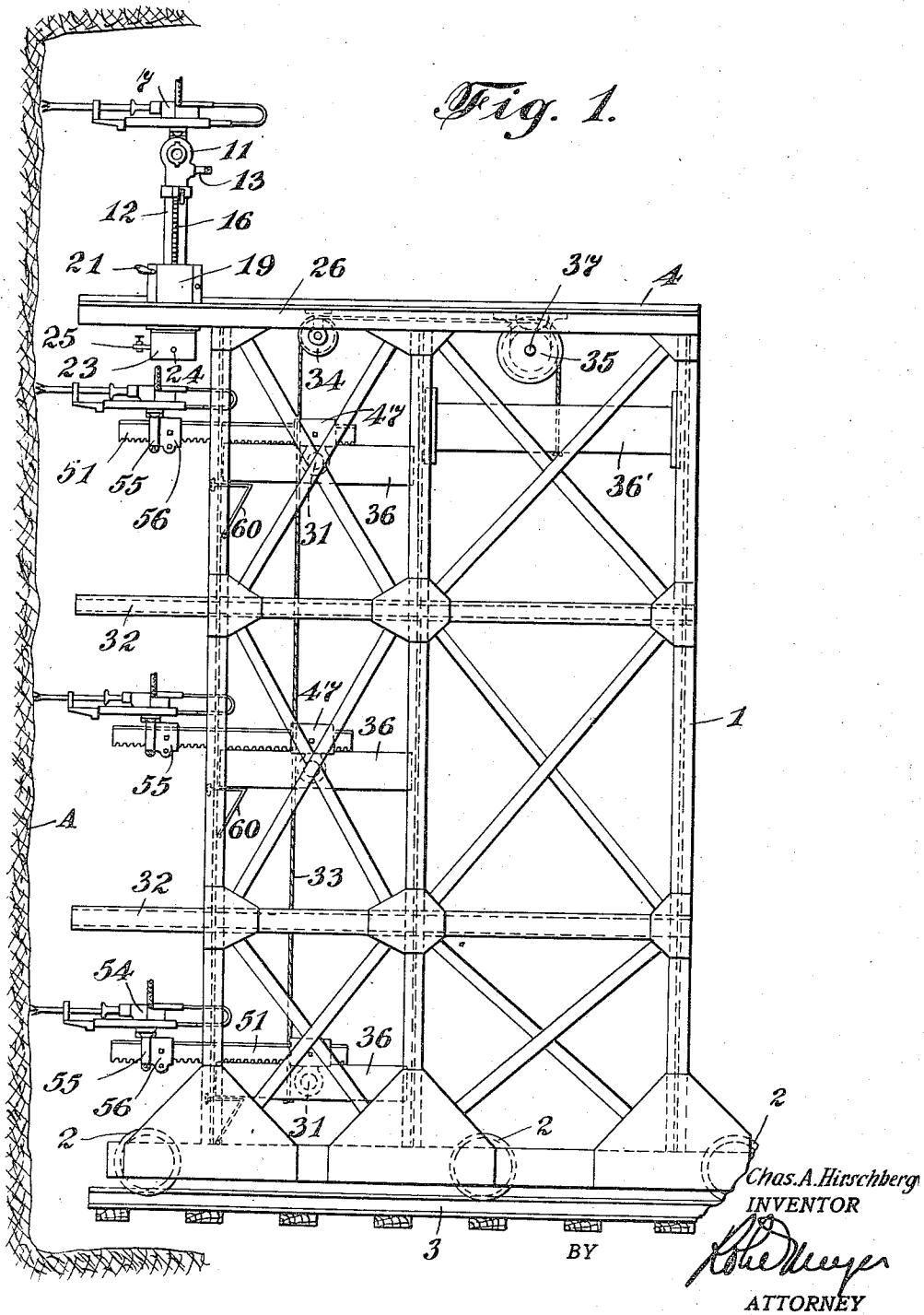
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TRAVELING GANTRY

Filed March 1, 1934

5 Sheets-Sheet 1

Fig. 1.



Feb. 9, 1937.

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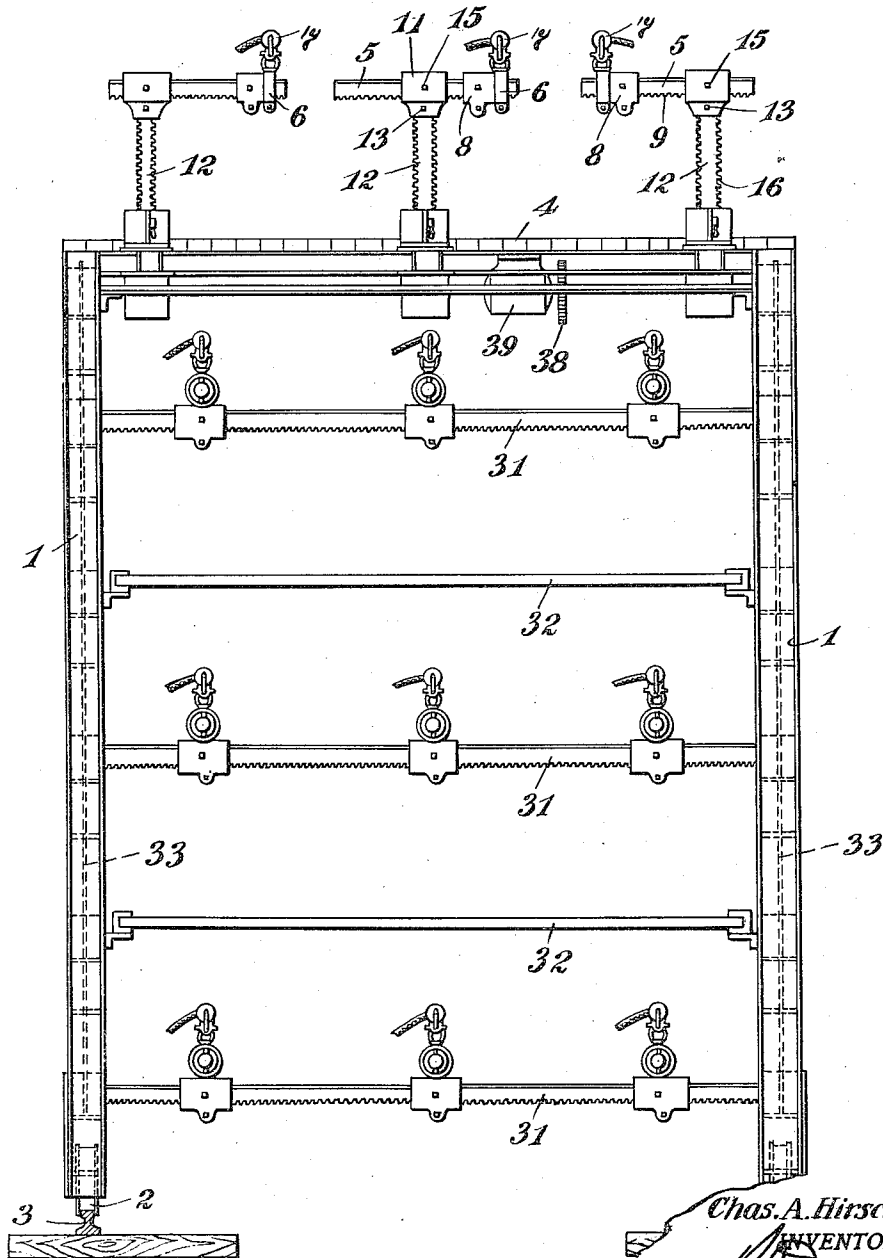
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TRAVELING GANTRY

Filed March 1, 1934.

5 Sheets-Sheet 2

Fig. 2.



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2,069,830

5 Sheets-Sheet 3



Feb. 9, 1937.

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2,069,830

TRAVELING GANTRY

Filed March 1, 1934

5 Sheets-Sheet 4

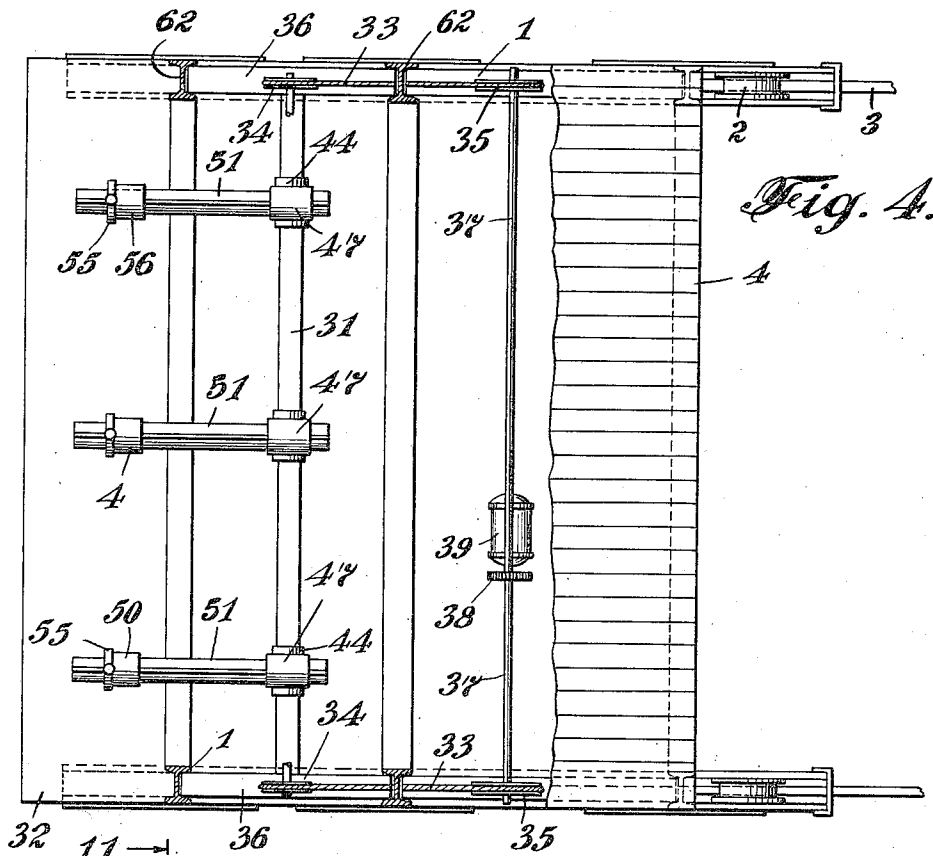


Fig. 4.

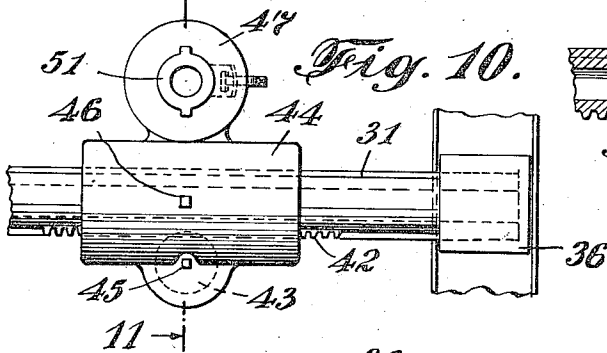


Fig. 10.

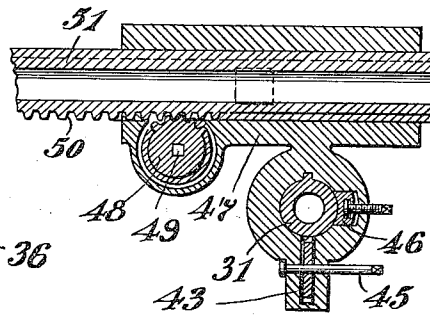


Fig. 11.

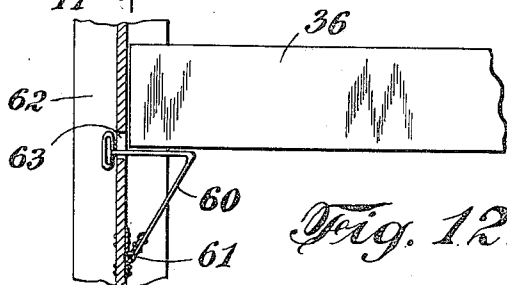


Fig. 12.

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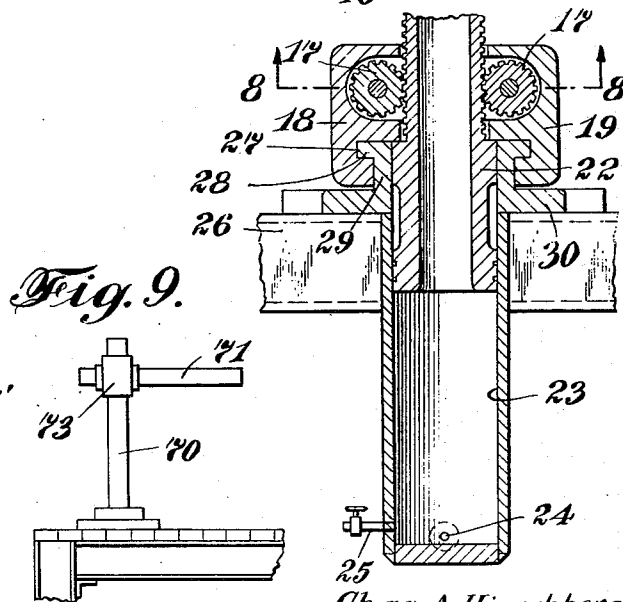
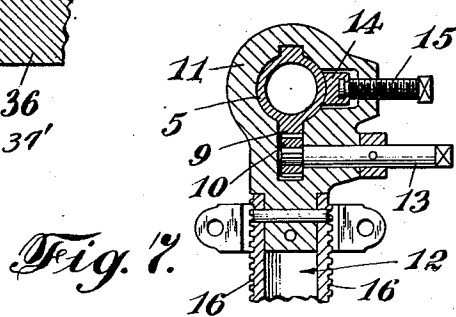
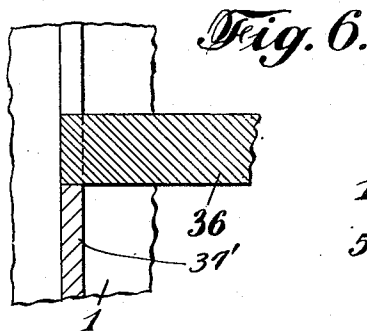
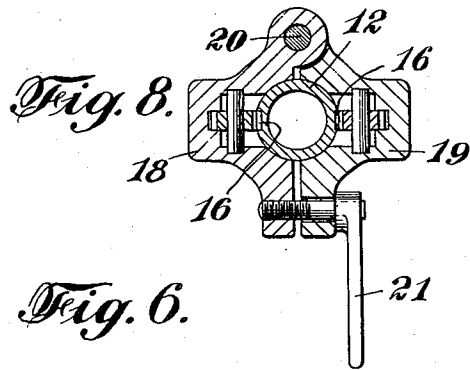
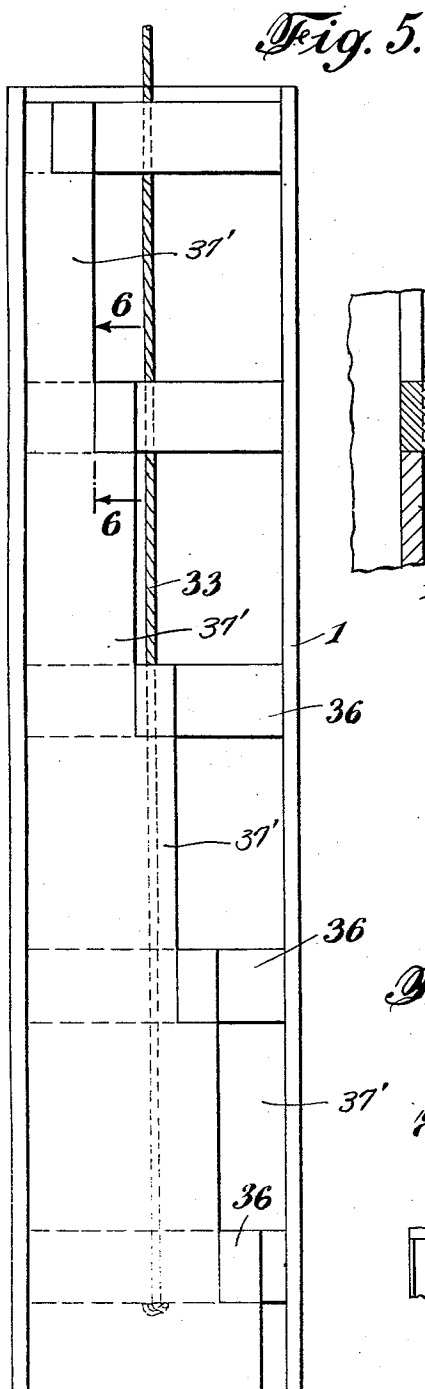
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TRAVELING GANTRY

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Application March 1, 1934, Serial No. 713,447

11 Claims. (Cl. 255—51)

This invention relates to portable drilling rigs and more particularly to a traveling gantry or drilling rig designed for tunneling.

An object of the invention is to provide a traveling gantry for use in tunneling which carries a plurality of percussive rock drills or other tools and which is primarily designed so as to permit a relatively large number of tools to be carried thereby for drilling the face of a tunnel, which tools may be moved out of drilling position and into an upper position to permit a mucker to operate through the gantry beneath the tools for removing the rock, muck or the like, removed by the drilling operation and without requiring the necessity of extra trackage to move the gantry out of the way.

Another object of the invention is to provide in a traveling gantry as specified a plurality of platforms and of percussive drill carrying members, all of which may be readily moved into an upper non-drilling position, and to provide means whereby each of the platforms and drill supports will assume their proper drilling position upon movement of them into drilling position.

A further object of the invention is to provide drill supports which are adjustable so as to permit adjustment of the drills to various angles and various positions for drilling the desired number of holes on the face of a tunnel.

With these and other objects in view, as may appear from the accompanying specification, the invention consists of various features of construction and combination of parts, which will be first described in connection with the accompanying drawings, showing a traveling gantry of the preferred form embodying the invention, and the features forming the invention will be specifically pointed out in the claims.

In the drawings:

Fig. 1 is a side elevation of the improved traveling gantry.

Fig. 2 is a front elevation of the traveling gantry showing the various drills in drilling position.

Fig. 3 is a view similar to Fig. 2 showing the drills in a raised or undrilling position.

Fig. 4 is a top plan of the traveling gantry with parts broken away.

Fig. 5 is an edge elevation of the gantry frame.

Fig. 6 is a detailed section on the line 6—6 of Fig. 5.

Fig. 7 is a vertical section through one of the rock drill supporting and adjusting structures.

Fig. 8 is a cross section on the line 8—8 of Fig. 7.

Fig. 9 is a fragmentary view of a modified form of mounting for the rock drill or percussive tool.

Fig. 10 is an enlarged detail of the mounting for certain of the percussive tools.

Fig. 11 is a longitudinal section through the mounting shown in Fig. 10.

Fig. 12 is a detailed section of a modified form of the platform supporting mechanism.

Referring more particularly to the drawings, the improved traveling gantry comprises the substantially U-shaped frame 1 which has supporting wheels 2 carried thereby. The supporting wheels 2 are provided for rolling upon the track 3.

Various types of portable drilling supports or drilling rigs have been provided heretofore but they are all of such nature that after a set of holes has been drilled in the tunnel face, the drilling rig must be removed or side-tracked before the mucking operations can begin. In the present invention the substantially inverted U-shaped frame 1 is designed to permit the mucker and cars to pass therethrough so that after the various holes have been drilled and the drilling rig moved away from the face the drills and their supports may be moved into an upper non-drilling position such as shown in Fig. 3 of the drawings to permit the mucker to pass therebeneath.

The substantially U-shaped frame or carrying body of the traveling gantry has a platform 4 mounted upon its top on which extra drill bars, tools and the like, may be placed and on which the operators may stand during drilling operations.

Any number of drills desired may be provided for operation from the platform 4 and a special type of mounting is illustrated in the drawings for the purpose of permitting adjustment of the drills to desired locations for drilling the proper number of holes.

The mountings for the uppermost drills or those carried adjacent to the platforms 4, comprise cross-bars or racks 5 which have drill carrying collars 6 adjustably carried thereby on which any approved type of rock drill or percussive tool as indicated at 7 may be mounted. The collars 6 and the carrying members 8 therefore are similar to the companion mechanisms 40 and 43 shown in my companion application, Serial No. 680,194, and they will not be specifically described in the present application.

The supporting bars 5 have rack teeth 9 formed thereon which rack teeth mesh with a pinion 10 carried by the head 11 of the standard 12. A suitable rotating shaft 13 is connected to the pinion 10 for rotating it and moving the rack 5 horizontally and transversely of the axis of the standard 12. A suitable locking mechanism is provided for locking the bar 5 in adjusted po-

sitions and comprises a clamp shoe 14 carried by the head 11 and moved into or out of clamping locking positions by means of an adjusting screw 15.

5 The standard 12 has rack teeth 16 formed on opposite sides thereof, as clearly shown in Figs. 7 and 8 of the drawings. Pinions 17 mesh with the teeth 16 and form braking pinions to brake
10 or retard the vertical movement of the standard 12. The braking pinions 17 are rotatably carried by clamping shoes 18 and 19 which are pivotally connected as shown in 20 and are clamped against the standard 12 by means of the locking or clamping lever 21. The clamping
15 shoes 18 and 19 may be clamped tightly against the standard 12 for locking the standard in vertically adjusted positions.

The lower end of the standard 12 has a piston 22 thereon which reciprocates or moves in a cylinder 23. An inlet 24 for pressure fluid of any suitable type, preferably the air under pressure employed for operating the drills, is provided at the bottom of the cylinder 23. It is understood that any suitable type of valve may be provided
25 for controlling the inlet of the pressure fluid into the cylinder 23. When it is desired to move the standard 12 upwardly pressure fluid is admitted to the cylinder 23 beneath the piston 22 and the locking member 21 is released. The pressure air
30 will then move the standard 11 upwardly into the desired position where it is locked and at which time admission of pressure fluid to the cylinder is cut off. The pressure fluid which has been admitted to the cylinder for the purpose of rais-
35 ing it may be confined in the cylinder and gradually bled therefrom through an outlet 25 to permit the lowering of the piston 22 in the cylinder and consequently the lowering of the standard 12. The gradual bleeding of the pressure
40 fluid from the cylinder will prevent rapid dropping or falling of the standard 12.

The clamping shoes 18 and 19 are rotatably connected to the horizontal supports or top bars 26 of the U-shaped frame 1 to permit rotation
45 of the standard 12 about a vertical axis. The clamping shoes 18 and 19 are channeled as shown at 27 and receive therein the top annular flange 28 formed on the member 29. The member 29 is attached in any suitable manner to the top
50 bar 26 by means of the flange 30.

The percussive tools 7 carried by the standard 12, at the top of the frame 1 of the traveling gantry are adjustable vertically, only by adjustment of the standards 12, and they will be adjustable horizontally through the medium of the
55 bars 5 rotatably about vertical axis by means of the connection between the clamping shoes 18 and 19 and the member 29, while they are adjustable in a rotating manner about horizontal axis
60 by adjustment of the collars 6 on the bars 5.

A plurality of percussive tool or drill carrying bars 31 and supporting platforms 32 are carried by the frame 1 of the traveling gantry so as to permit the supporting of any desired number of
65 rock drills in various positions to permit multiple drilling of the holes necessary for cutting away the face of the tunnel.

The bars 31 and the platforms 32 are adjustably carried by the frame 1 of the traveling
70 gantry and the lowermost bar 31 has cables 33 connected thereto at each end, which extend through suitable openings in the bars and platforms thereabove. The cables 33 extend upwardly through the frame 1, pass about suitable guid-
75 ing sheaves 34, are preferably wound about

sheaves 35 and are connected to counterweights 36'. The sheaves 35 are mounted upon a suitable operating shaft 37 which is connected by any suitable type of gear indicated at 28 to a motor 39 so that when it is desired to raise the
5 various platforms 32 and bars 31 into an upper position as shown in Fig. 3, the motor 39 is operated, which rotates the shaft 37 and sheaves 35 and raises the platforms and bars 32 and 31. The raising operations of the various platforms 10 and bars is facilitated by means of counterweights 36'.

As the lowermost bar 31 moves upwardly and comes in contact with the platform 32 next there-
15 above, it will engage the platform and carry it along upwardly continuing this operation until all of the platforms are raised to their uppermost positions. In the drawings, the various platforms and bars are shown as having suitable
20 cross-heads 36 connected to their ends, which cross-heads travel in the I-beams which form the uprights for the frame 1. Suitable spacing means as indicated at 37a may be formed on the cross-heads 36 if desired or if necessary. The
25 supports 37' for the cross-heads 36 and the cross-heads are cut away as clearly shown by the solid and dotted lines in Fig. 5 of the drawings so that when the various platforms and bars
30 are lowered by reverse rotation of the motor 39, they will be stopped in their proper positions, that is, the uppermost platform is cut to match the cutting of the supports and when it reaches
35 its desired position it is stopped from further downward movement by the step-like cutting in the guiding structure, while the other bars and platforms move downwardly until they reach
40 their respective positions where each is stopped by the step-like cutting arrangement of the supports and cross-heads.

The drill carrying bars 31 have racks 42 formed thereon, the teeth of which mesh with the pinions 43 carried by the collars 44. The pinions 43 are rotated by means of suitable rotating
45 shafts 45 for moving the collars 44 along the bars 31. The collars 44 are located in adjusting positions by means of a suitable locking mechanism similar to the locking shoe 14, such locking mechanism being indicated at 46. The collars
50 44 have transversely extending collars 47 connected thereto, which transversely extending collars carry pinions 48 rotated by means of shafts 49 for engagement with the teeth 50 formed on the adjustable carrying bars 51, so that by rota-
55 tion of the pinions 48 the bars 51 may be moved longitudinally to move a percussive tool or rock drill as indicated at 54 to or from the face of a tunnel as indicated at "A". The percussive tools or rock drills 54 are carried by collars 55 which are in turn connected to sleeves 56. The collars 55 and sleeves 56 correspond to the collars 6 and
60 8 respectively.

In Fig. 12 of the drawings adjustable means for supporting the cross-heads 36 are shown which comprise angle bars 60 hingedly connected as shown at 61 to the I-beams 62 and
65 movable, through the slots 63 for movement into or out of cross-head supporting positions.

In Fig. 9 of the drawings a modified form of support for the rock drills or percussive tools is shown, which comprises stationary vertical stand-
70 ards 70 having horizontally extending drill supporting bars 71 connected thereto by any suitable type of clamping means 73.

In operation, when drilling the face of a tunnel the traveling gantry is moved into position 75

in front of the tunnel face to be drilled, as shown in Fig. 1 of the drawings. The various platforms and supporting bars are then lowered into their proper positions and the drill supports adjusted to bring the drill bars into engagement with the face to be drilled. After the desired number of holes has been drilled in the tunnel face "A", the various platforms and supports 31 and 32 are raised into non-drilling position and the gantry is moved away from the face "A", if the face is blasted. After the face "A" has crumbled or broken up, the mucker for removing the broken-down face may be run with its scoop extended through the U-shaped frame 1 of the traveling gantry and the mucking operations carried on without interference by the gantry and without requiring the gantry to be removed from the portion of the tunnel which has been previously cut, leaving the gantry in position to be quickly moved into drilling position.

It will be understood that the invention is not to be limited to the specific construction or arrangement of parts shown but that they may be widely modified within the invention defined by the claims.

What is claimed is:

1. In a traveling gantry, a frame of inverted U-shape in transverse cross section, a plurality of supports carried by said frame and disposed in vertically spaced relation when in working position, means for moving said supports into collapsed non-working position, means on said frame for stopping said supports and holding them in proper position upon their movement into working position, and platforms carried by said frame and movable with said supports.

2. In a traveling gantry, a frame of inverted U-shape in transverse cross section, a plurality of supports carried by said frame, a plurality of working tools adjustably carried by each of said supports, means for moving said supports into tool working position and into tool non-working position, said supports being moved in close proximity to each other near the top of said frame when in non-working position, counterweights connected to said supports for facilitating their movement into non-working position, means on said frame for stopping the movement of said supports when each reaches its respective working position, a platform carried by the top of said frame and a plurality of tool supports adjustably carried by said platform.

3. In a traveling gantry, a frame of inverted U-shape in transverse cross section, a plurality of supports carried by said frame, a plurality of working tools adjustably carried by each of said supports, means for moving said supports into tool working position and into tool non-working position, said supports being moved in close proximity to each other near the top of said frame when in non-working position, counterweights connected to said supports for facilitating their movement into non-working position, and means on said frame for stopping the movement of said supports when each reaches its respective working position, means for adjusting the positions of said tools comprising collars adjustable longitudinally on said support, supporting bars adjustably carried by said collars for movement transversely of the supports, and means connecting tools to said supporting bars for permitting adjustment of the tools longitudinally of the supporting bars and at angles

with respect to the axis of the supporting bar, a platform carried by the top of said frame and a plurality of tool supports adjustably carried by said platform.

4. In a traveling gantry, a frame of inverted U-shape in transverse cross section, a plurality of supports slidably carried by said frame, flexible members connected to certain of said supports, and a motor for moving said flexible members to move said supports into collapsed non-working position, and a counter-weight connected to said flexible members for counterbalancing the weight of said supports.

5. In a traveling gantry, a frame of inverted U-shape in transverse cross section, a plurality of alternately arranged supports and platforms movably carried by said frame, means for moving said supports and platforms into collapsed non-working position or moving them into spaced working position, a plurality of tool-carrying members adjustably carried by said supports, and a stationary platform on the top of said frame, a plurality of tool supports adjustably carried by said stationary platform.

6. In a traveling gantry, a frame of inverted U-shape in transverse cross section, a plurality of supports movably carried by said frame and arranged one above the other, flexible means connected to the lowermost of said supports for moving it into upper non-working position, means for moving said flexible means, said supports constructed and arranged whereby as said lowermost support moves upwardly, it will successively pick up the other supports and move them into non-working position, said means acting to permit said supports to move downwardly into working position, and means on said frame for engaging and arresting further downward movement of the supports as each reaches its respective working position.

7. In a traveling gantry, a frame of inverted U-shape in transverse cross section, a plurality of supports movably carried by said frame and arranged one above the other, flexible means connected to the lowermost of said supports for moving it into upper non-working position, means for moving said flexible means, said supports constructed and arranged whereby as said lowermost support moves upwardly it will successively pick up the other supports and move them into non-working position, said means acting to permit said supports to move downwardly into working position, means on said frame for engaging and arresting further downward movement of the supports as each reaches its respective working position, and a plurality of tool supports adjustably carried by said supports.

8. In a traveling gantry, a frame of inverted U-shape in cross section, a plurality of supports carried by said frame and disposed in vertically spaced relation when in working position, means for moving said supports into collapsed non-working position, means on said frame for stopping said supports and holding them in their proper position upon their movement into working position, a platform on the top of said frame, vertically adjustable supports carried by said platform, horizontally adjustable supports carried by said vertically adjustable supports, and tool carrying means adjustable on said horizontal supports.

9. In a traveling gantry, a frame of inverted U-shape in cross section, a plurality of supports carried by said frame and disposed in vertically spaced relation when in working position, means

for moving said supports into collapsed non-working position, means on said frame for stopping said supports and holding them in their proper position upon their movement into working position, a platform on the top of said frame, vertically adjustable supports carried by said platform, horizontally adjustable supports carried by said vertically adjustable supports, tool carrying means adjustable on said horizontal supports, tool carrying members carried by said supports, racks on said supports, and means on said tool carrying members for engagement with said racks for moving the tool carrying members along the supports.

15 10. In a traveling gantry, a frame of inverted U-shape in transverse section, a plurality of alternately arranged supports and platforms movably carried by said frame, means connecting said supports and platforms, a motor connected

20 to said means for moving said supports and platforms into collapsed non-working position, a plurality of tool carrying members adjustable along said supports, racks on said supports, and means on said tool carrying members for engage-

ment with said racks for moving the tool carrying members along the supports, a platform on the top of said frame, vertically adjustable supports carried by said platform, horizontally adjustable supports carried by said vertically adjustable supports, and tool carrying members adjustable on said horizontal supports.

11. In a traveling gantry, a frame of inverted U-shape in transverse cross section, a plurality of supports movably carried by said frame and arranged one above the other, flexible means connected to the lowermost of said supports for moving it into upper non-working position, a motor for moving said flexible means, said motor acting to permit said supports to move downwardly into working position, and means on said frame for engaging and arresting further downward movement of the supports as each reaches its respective working position, said last-named means arranged to permit unimpeded movement of the supports other than the individual support with which each means cooperates to their respective working positions.

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