

927,939.

C. A. BRAY.
APPARATUS AND METHOD FOR MINING.
APPLICATION FILED JUNE 16, 1908.

Patented July 13, 1909.

4 SHEETS—SHEET 1.

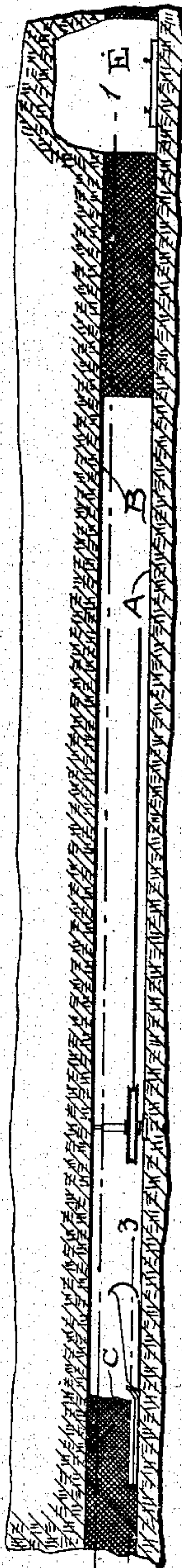


Fig. 2

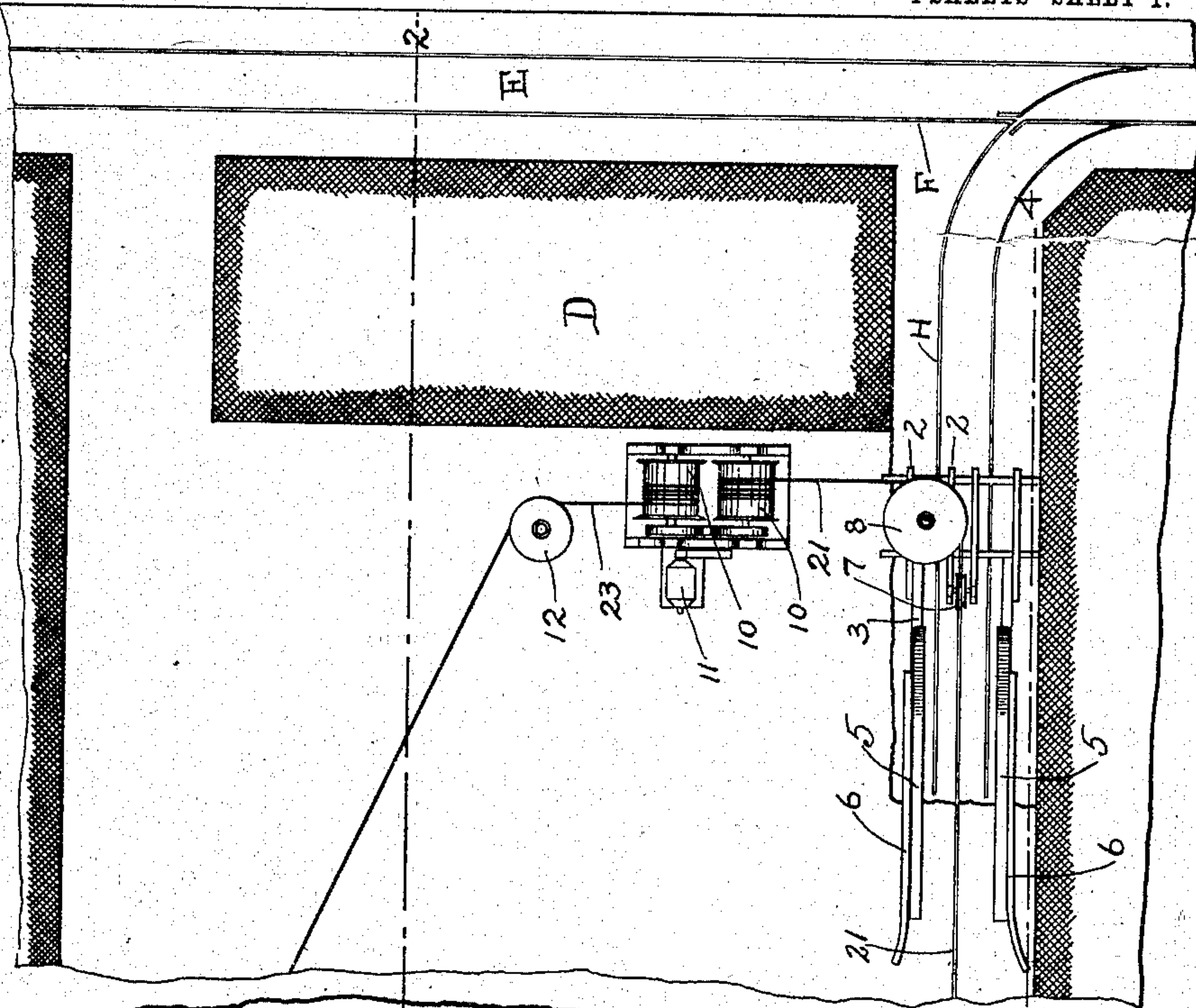


Fig. 1

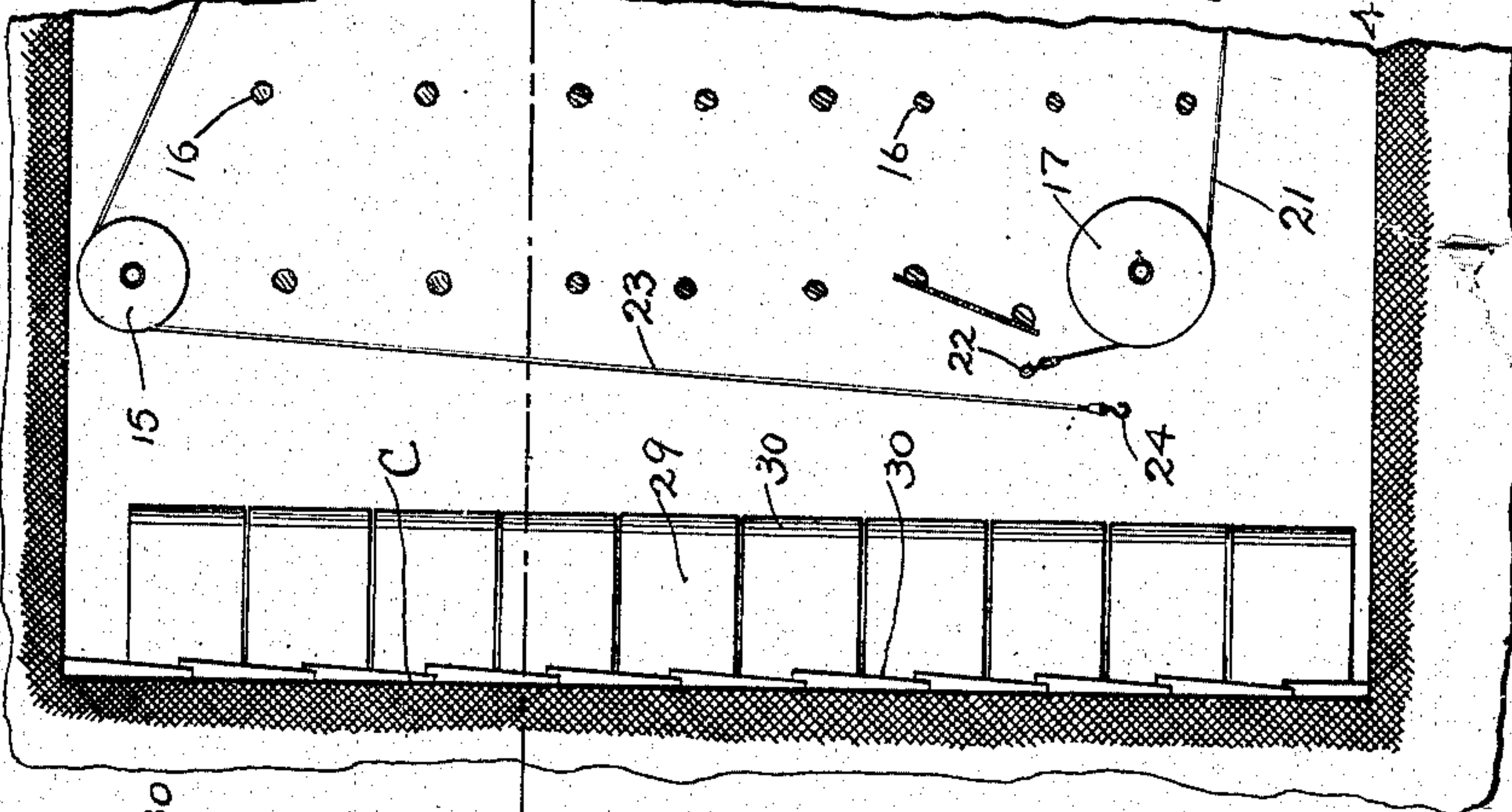
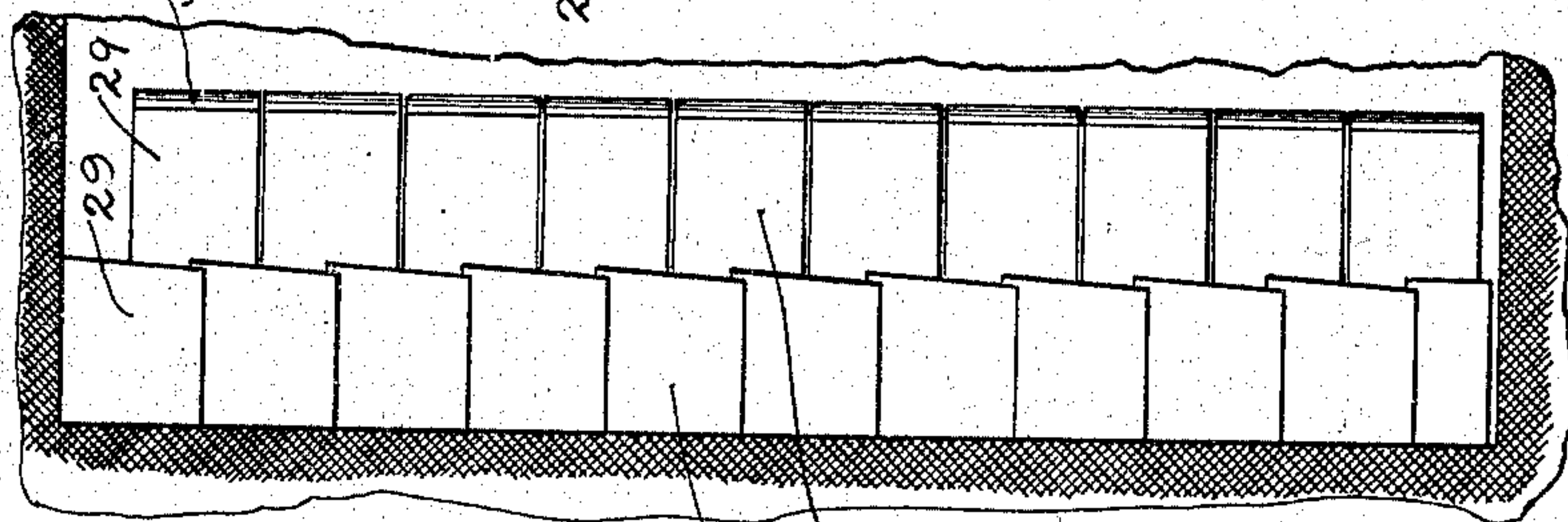


Fig. 3



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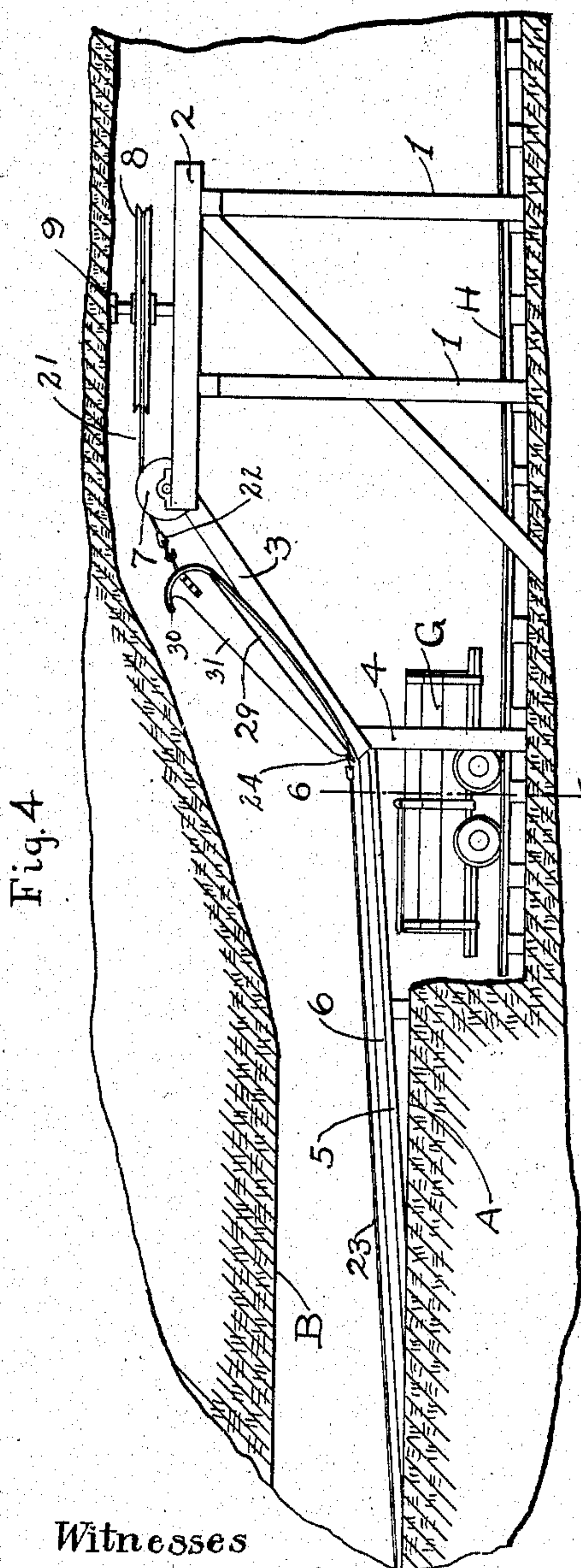
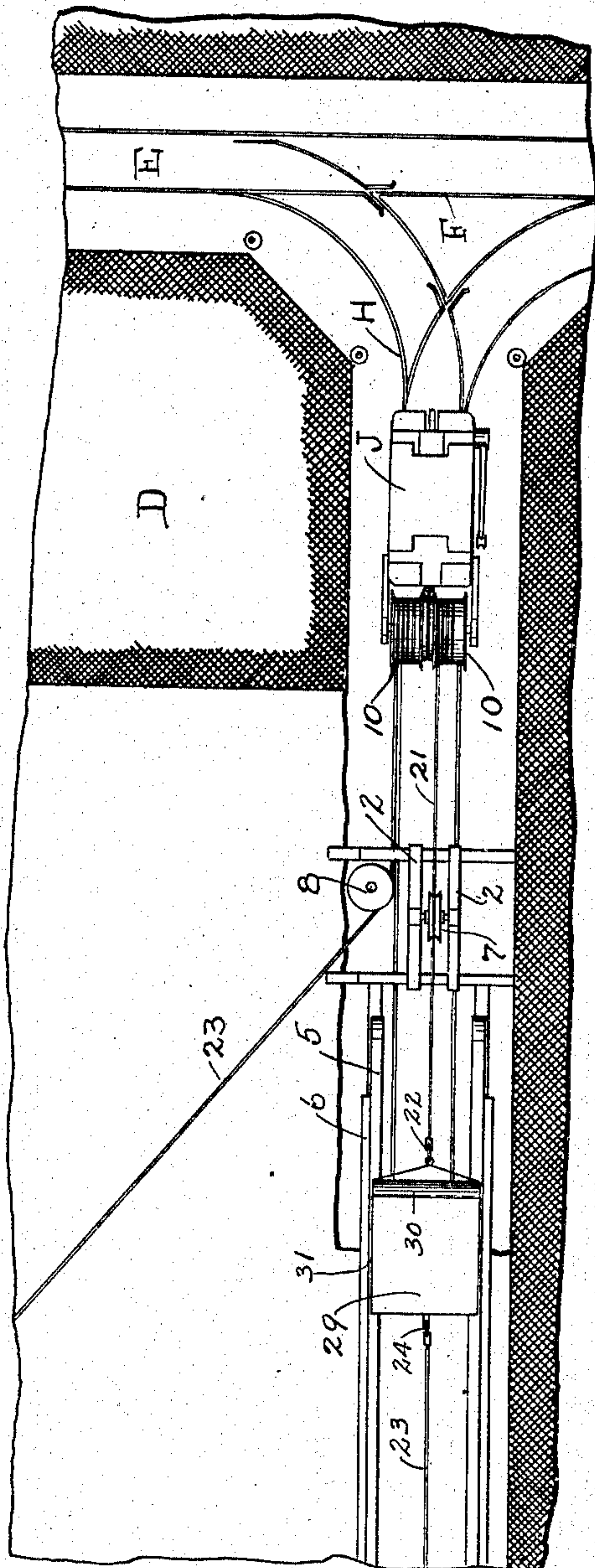


Fig. 4

Fig. 5



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Fig. 6.

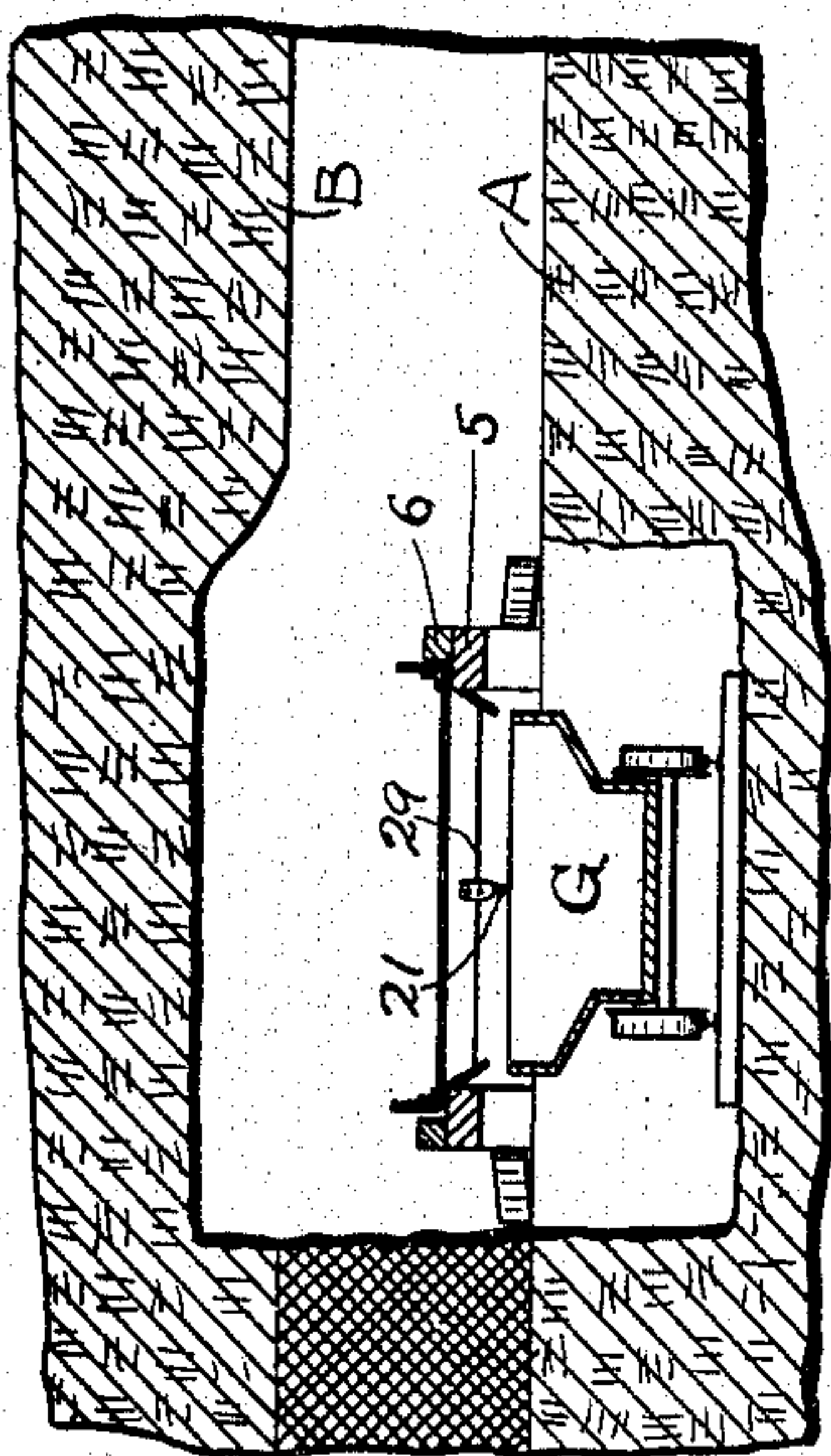


Fig. 7.

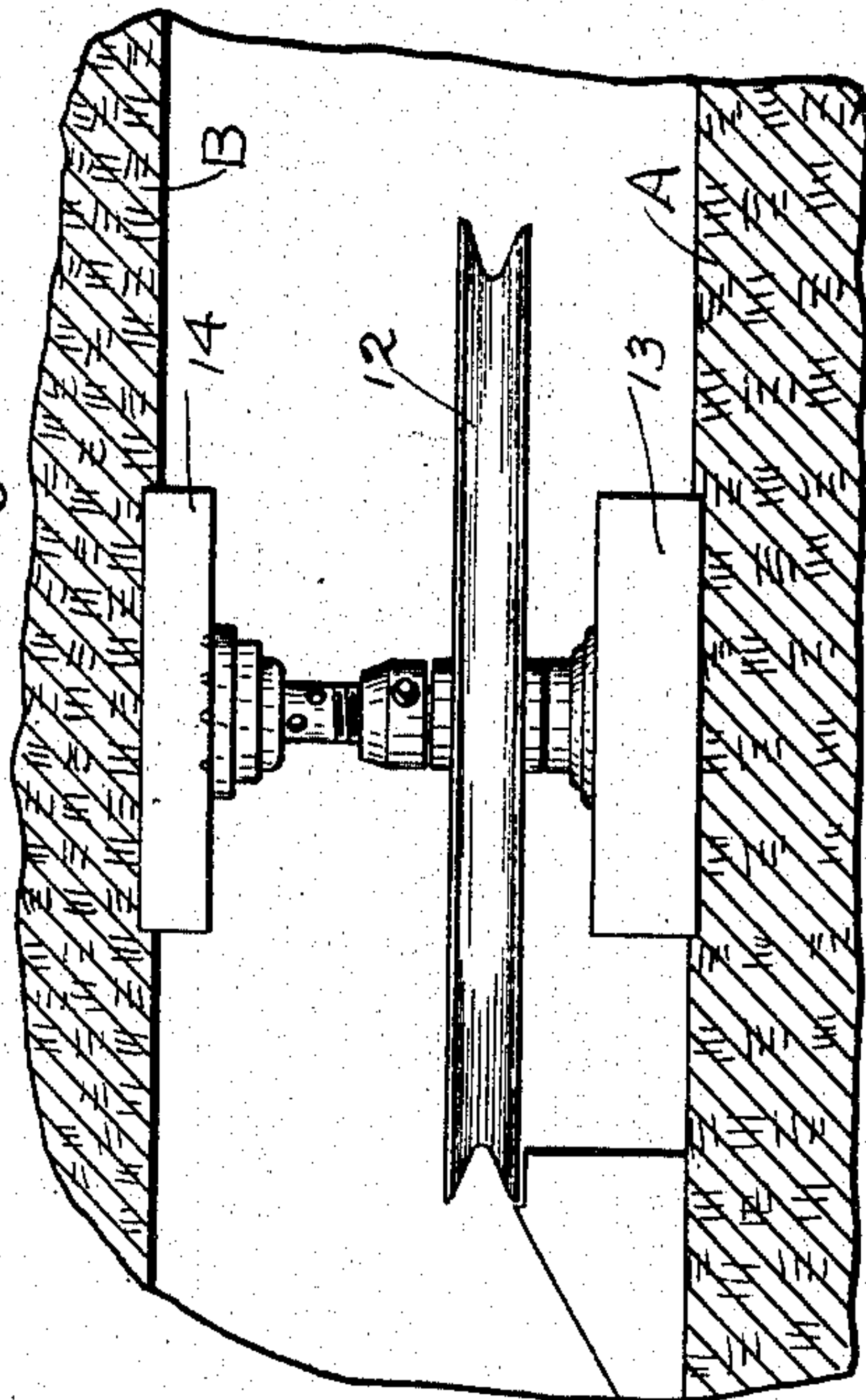
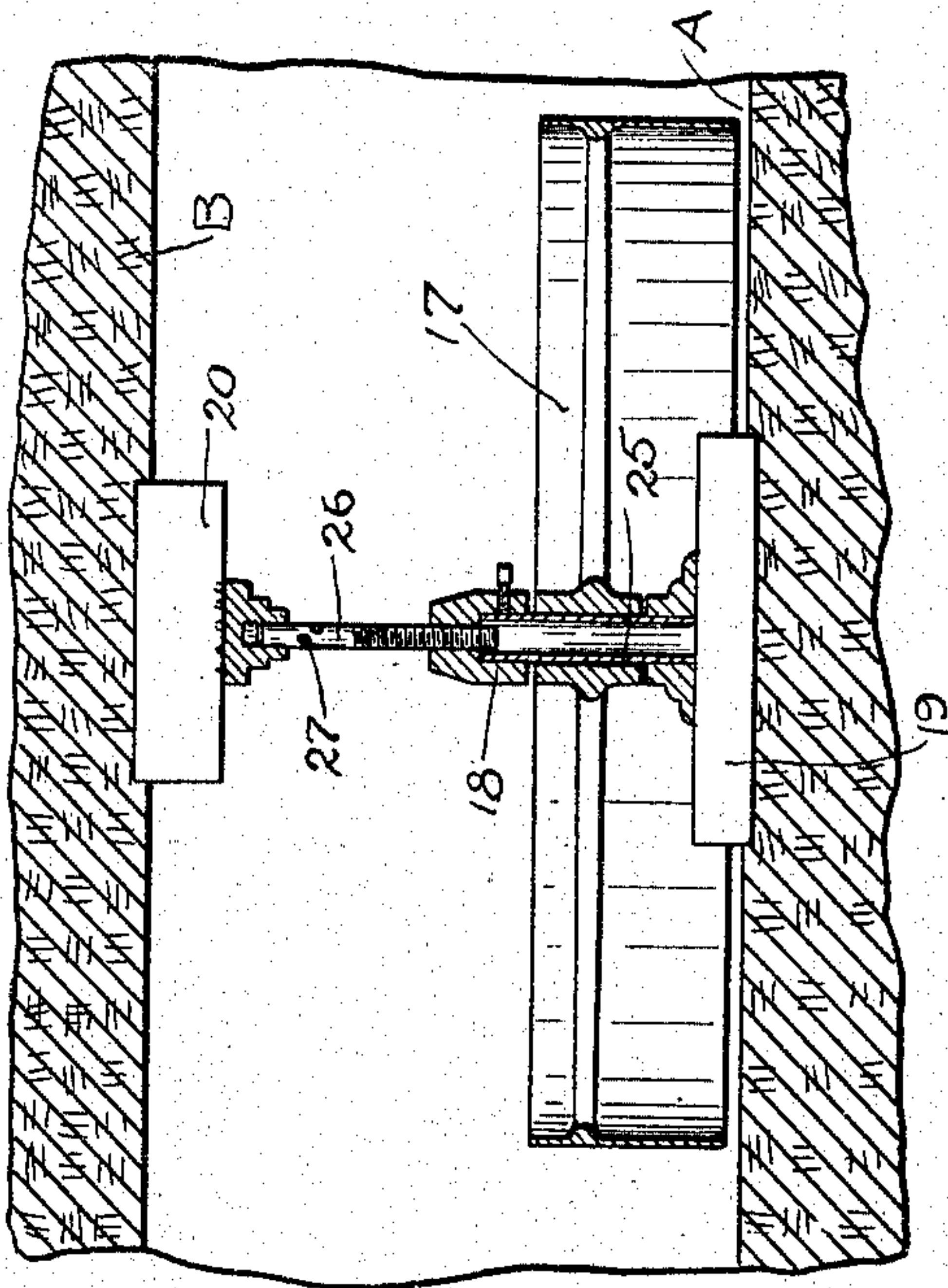


Fig. 8.



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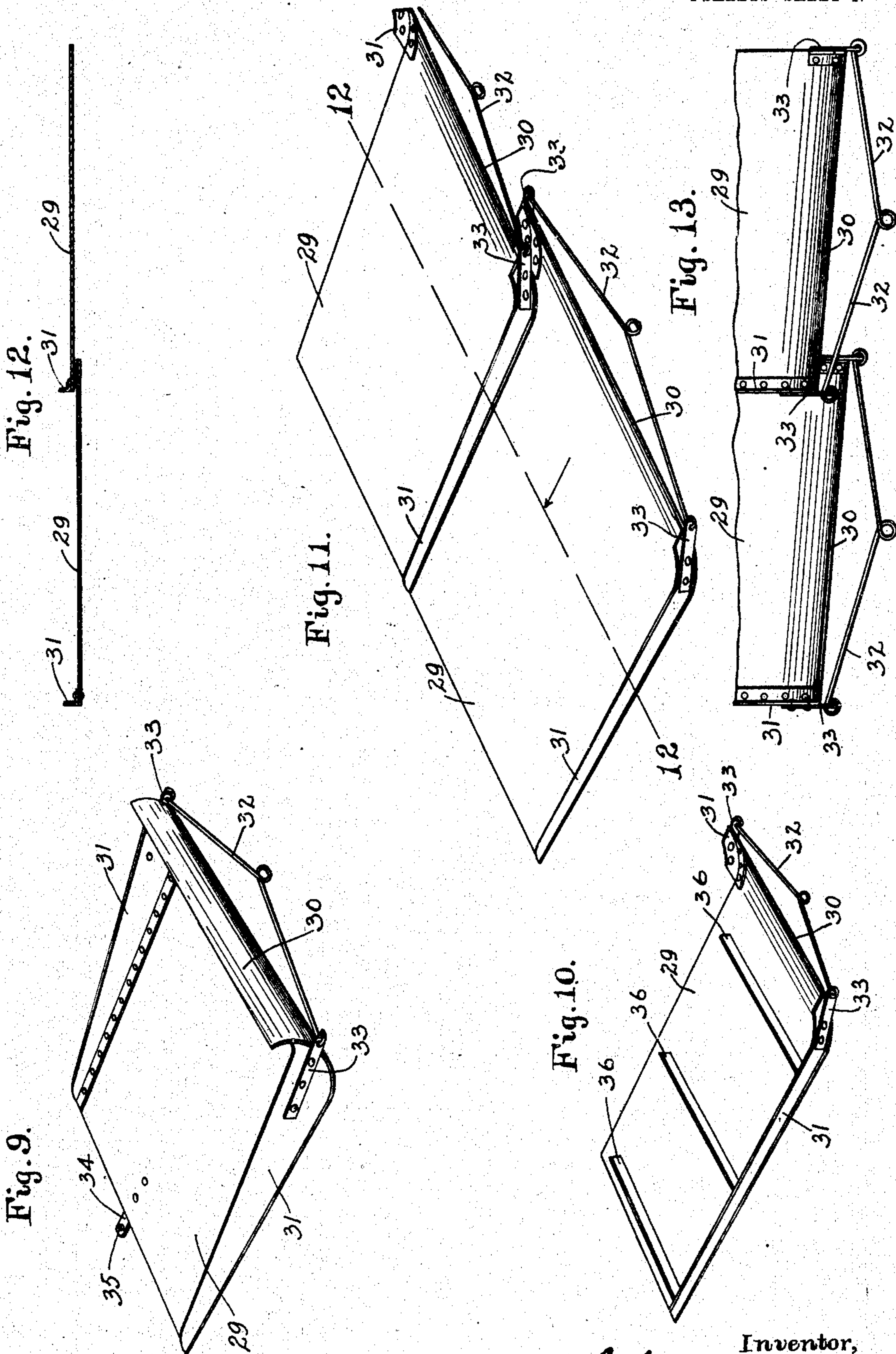
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

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APPARATUS AND METHOD FOR MINING.

No. 927,939.

Specification of Letters Patent.

Patented July 13, 1909.

Application filed June 16, 1908. Serial No. 438,770.

To all whom it may concern:

Be it known that I, CHARLES A. BRAY, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and useful Improvement in Apparatus and Methods for Mining, of which the following is a specification, reference being had to the accompanying drawing.

My improvement relates particularly to apparatus and methods for mining coal and similar material, the object of the invention being to facilitate the delivery of the loosened coal or other material into cars or other means of transportation.

The invention is specially adapted to coal workings where the seams of coal are so thin as to make shoveling difficult on account of lack of head-room.

My invention involves the use of tray-form receptacles or vehicles so located preparatory to loading as to receive the coal when it is picked down or "shot" down. The work can be done most advantageously by under-cutting the coal and then placing said receptacles or vehicles under and adjacent the under-cut portion, and then picking or "shooting" the under-cut coal and allowing it to fall into the receptacles or vehicles. Then the vehicles are drawn one after another to ordinary mine cars or to any other cars or vehicles or apparatus suited for the transportation of the coal out of or away from the mine. The discharge from the tray-form receptacles or vehicles is preferably accomplished automatically.

In the accompanying drawings, Figure 1 is a sectional plan of a mine room in which my apparatus is installed, said figure being a section on the line 1—1 of Fig. 2; Fig. 2 is an upright section on the line 2—2 of Fig. 1; Fig. 3 is a horizontal section on the line 3—3 of Fig. 2; Fig. 4 is an enlarged upright section on the line 4—4 of Fig. 1, a tray and a car having been added; Fig. 5 is a detail plan of a modification of the apparatus illustrated in Figs. 1 and 4; Fig. 6 is a section on the line 6—6 of Fig. 4; Fig. 7 is a sectional elevation of one of the cable-guiding sheaves; Fig. 8 is a sectional elevation of a drum for guiding the cables and the trays; Fig. 9 illustrates one of the trays or tray-form vehicles; Fig. 10 illustrates another form of such a tray; Fig. 11 illustrates two such trays of still another form, the one

overlapping the other; Fig. 12 is a section on the line 12—12 of Fig. 11; Fig. 13 is a plan of the front portion of the two trays shown in Fig. 11.

Referring first to Figs. 1, 2 and 3 of the drawings, A is a floor; B is a roof; and C is a facing in a coal mine, and coal is to be removed from such facing. D is a pillar. E is an entry having greater head-room than the head-room afforded between the floor, A, and roof, B. F is a track for ordinary mine cars, G, by which such cars are brought into said entry. A branch track, H, extends into the opening opposite one end of the pillar D. Said branch track is depressed as shown in Figs. 4 and 6, so that the tops of the cars, when standing upon the extreme end of said branch track are approximately at the level of the floor, A. And above said branch track, the roof, B, is made higher than elsewhere over the floor, A, as shown in Fig. 4. At each side of said branch track are upright, wooden supports or columns, 1, 1, across the top of which is a horizontal framing, 2, and from each side of said framing a rail, 3, extends obliquely downward to a lower column, 4, standing at each side of said branch track. From said supports, 4, two rails, 5, 5, extend toward the facing and rest upon the floor, A. Said rails, 3 and 5, form a track for the trays, I, as will be hereinafter described. At each side of the rail, 5, is a guard rail, 6, which serves to prevent the tray from moving sidewise. In the left hand portion of the framing, 2, (the portion directed toward the track, 3—5,) is mounted an idle guide pulley, 7, the axis of which is horizontal and transverse to said track. On said framing and rearward of the pulley, 7, and having its forward portion meeting the plane of the pulley, 7, is a larger pulley or sheave, 8, set on an upright axle supported by its lower end upon said framing and having its upper end secured in a block, 9, which rests against the adjacent portion of the roof (see Figs. 1 and 4). Back of said sheave are a pair of drums, 10, which are geared and clutched to an electric motor, 11, the axes of said drums being parallel to the branch track, H. A little way rearward of said drums is a sheave, 12. This rotates loosely upon an upright axle, the lower end of which bears upon a block, 13, resting upon a block, 14, which bears against the roof.

Rearward and to the right of the sheave, 12, is another sheave, 15, which is like the sheave, 12. This may be set in line with a line of roof-supporting posts, 16, which line is approximately parallel to the facing, C. At the front of said line of posts is a drum, 17, arranged on an upright axle, 18, which is held at its lower end by a block, 19, supported by the floor and which axle is held at its upper end by a block, 20, bearing against the roof. A cable, 21, is attached by one end to the forward drum, 10, and extends thence over one side of the sheaves, 8 and 7, and the drum, 17. The end adjacent said drum is provided with a hook, 22, adapted to engage the trays. Another cable, 23, is attached to the rear drum, 10, and extends thence over one side of the sheaves, 12 and 15, and thence forward parallel to the facing and toward the drum, 17. The end of said cable adjacent the latter drum has a hook, 24, adapted to engage the trays. Each of the two drums, 10, is adapted to pay out its cable while the other is winding its cable. The shafts or axles on which the sheaves, 12 and 15, and the drum, 17, rotate may be made longitudinally extensible, in order to facilitate securing them in position by means of the floor and roof blocks. Such a shaft is illustrated in detail in Fig. 8. It consists of a lower, tubular, interiorly screw-threaded section, 25, and an upper section, 26, the lower portion of which is exteriorly screw-threaded and extended into the lower section, 25, and has transverse holes, 27, for the insertion of a lever for rotating said shaft to screw the latter up or down. A bushing, 28, may surround the lower section, 25, of the shaft.

Fig. 9 is a perspective of one of the trays, I. The form shown in this figure consists of a sheet metal body portion, 29, having an up-turned front portion, 30, and two low upright side pieces, 31, and a bail, 32, secured in ears, 33, which project forward from the side pieces, 31. At the middle of the rear edge is a tail piece, 34, having an aperture, 35.

Fig. 10 is a perspective view of a tray which has also a flat body portion, 29, and a front up-turned portion, 30, and one full-length upright side piece, 31, and three transverse ribs, 36, which serve to strengthen the body portion, 29, and to prevent the coal from slipping off from the tray when the latter is pulled forward. At the side of the tray opposite the upright portion, 31, is a short upright portion, 31. And said tray also has a bail, 32, and ears, 33.

The two trays illustrated by Figs. 11, 12 and 13 are like that illustrated by Fig. 10, excepting that the ribs, 36, are omitted.

The operation is as follows: The facing, C, is under-cut, by any desired means or mechanism, as shown in Fig. 2. Then, be-

ginning preferably at the front, trays, I, are pushed backward into the under-cut, the up-turned front ends of the trays projecting, and the trays preferably overlapping each other by their adjacent edges. Thus the entire under-cut from one end of the facing to the other is filled with these trays. The trays may be long enough to project forward away from the facing any desired distance. The drawings show two rows of trays, one row extending almost entirely into the under-cut and the second row standing in front of the first row, the trays of the second row having their rear edges projecting partially beneath the trays of the rear row. In shooting or picking, after the under-cut has been made, a considerable portion of the coal falls forward. Hence the trays, either the single row or the two rows, should extend far enough forward to catch substantially all of the coal that is thus thrown forward. The coal is now shot down or picked down. Then the trays are drawn away one after another by means of the cable, 21, the forward tray of the right hand or outer row of trays being first taken. For this purpose, the hook, 22, of the cable, 21, is hooked into the bail of said forward tray. The forward drum, 10, is then set into action, whereby the cable, 21, is wound upon said drum and the tray is drawn toward the right and upon the slanting track, 3—5, into the inclined position shown in Fig. 4, whereupon the coal in said tray slides rearward out of the latter and down into the car, G, located beneath said inclined track. For the return of the tray, the hook, 24, of the cable, 23, is engaged in the tail piece, 34, at the rear of the tray and the action of the drums, 10, is reversed, whereby the cable, 23, is made to draw the tray in the reverse direction. But the tray may be returned by any other means. If it is not too heavy, it may be returned by the workmen. In such case, the tail piece, 34, may be omitted. And the tray may also be returned by turning the tray around and hooking the cable, 23, to the bail. The drum, 17, serves as a guide for the trays as well as for the cables.

In Fig. 5 the two drums, 10, 10, are mounted on the locomotive, J, which is also used for moving the mine cars. It will be observed that with this construction, the cables may be drawn by the rotation of said drums or by the moving of the locomotive away from the room.

The trays may be made of any desired material, and they may be made to slide on the floor of the mine or on low rollers. The trays may also be used where there is no under-cut but where the facing is solid and the mineral shot off or pick mined from the solid.

When the ribs, 36, are used, they are preferably not extended quite to the edge oppo-

site the long upright portion, 31, in order that said clear edge may extend beneath the next tray.

It is to be observed that it is not contemplated that all of the mineral will fall upon and remain upon these trays. On the contrary it is anticipated that some mineral will fall off or over the trays. But this can readily be hand-shoveled upon empty trays and hauled thereon to the main carrying line. Or a tray may be drawn over the floor with a flat or clear edge forward like a scraper to gather the loose mineral.

For discharging the load in the trays into the cars or other carrying apparatus, instead of running the trays up an inclined track, 3—5, the trays may have hinged bottom sections which will fall downward when the tray is on such track. Or the tray may be drawn parallel to the cars, at a suitable elevation above the latter, and there tilted sideways. Or a raking or scraping device may be let down upon the tray when the latter is drawn over the car, whereby the mineral is raked or scraped off from the tray and allowed to fall into the car.

The mine car track, F, and its branch track, H, if it have such a branch, and the equipment of cars may be regarded as a carrying line for carrying or transporting the mineral delivered from the working room. Such carrying line may be an inclined way or an endless belt or chain conveyer.

The trays might be drawn upon the cars by the cables and carried on the cars to a discharging place.

I claim as my invention:

1. The herein described method of mining, which method consists in placing a plurality of tray-form receptacles flatwise upon the floor beside a face of mineral, then breaking down the mineral into said receptacles, and then transporting said receptacles with the mineral thereon and dumping the mineral therefrom, substantially as described.

2. The herein described method of mining, which method consists in placing a plurality of tray-form receptacles flatwise upon the floor beside a face of mineral, then breaking down the mineral into said receptacles, and then transporting said receptacles with said mineral thereon to other transportation apparatus and dumping said mineral into said apparatus, substantially as described.

3. The herein described method of mining, which method consists in under-cutting the mineral along the floor, then placing receptacles into the under-cut, then breaking the mineral down upon said receptacles, and then transporting said receptacles with the mineral thereon and dumping the mineral therefrom, substantially as described.

4. The herein described method of mining, which method consists in under-cutting the mineral, then placing receptacles into the

under-cut, then breaking the mineral along the floor down upon said receptacles, and then transporting said receptacles with said mineral thereon to other transportation apparatus and dumping said mineral into said apparatus, substantially as described.

5. In a mining system, a carrying or transporting line adjacent the mineral to be removed, trays adapted to be placed simultaneously at a face of solid mineral, and means for drawing said trays successively to said carrying line, substantially as described.

6. In a mining system, a carrying or transporting line adjacent the mineral to be removed, trays adapted to be placed simultaneously at a face of solid mineral, and means for guiding and drawing said trays successively to said carrying line, substantially as described.

7. In a mining system, a carrying or transporting line adjacent the mineral to be removed, trays adapted to be placed simultaneously at a face of solid mineral, and means for drawing said trays successively to and discharging the mineral upon said carrying line, substantially as described.

8. In a mining system, a carrying or transporting line adjacent the mineral to be removed, trays having clear lateral edges adapted to extend beneath the lateral edges of adjacent trays, and means for drawing said trays successively to said carrying line, substantially as described.

9. In a mining system, a carrying or transporting line adjacent the mineral to be removed, a tray track extending above said carrying line, trays adapted to be placed simultaneously at a face of solid mineral, and means for drawing said trays successively to and upon said tray track, substantially as described.

10. In a mining system, a carrying or transporting line adjacent the mineral to be removed, an inclined tray track extending above said carrying line, trays adapted to be placed simultaneously at the face of solid mineral, and means for drawing said trays successively to and upon said tray track, substantially as described.

11. In a mining system, a carrying or transporting line adjacent the mineral to be removed, a tray track extending above said carrying line, trays adapted to be placed simultaneously at a face of solid mineral, and drum and cable mechanism for drawing said trays successively to and upon said tray track, substantially as described.

In testimony whereof I have signed my name, in presence of two witnesses, this 8th day of June, in the year one thousand nine hundred and eight.

CHARLES A. BRAY.

Witnesses:

CYRUS KEHR,
C. A. MORSE.