No. 860,750. PATENTED JULY 23, 1907.

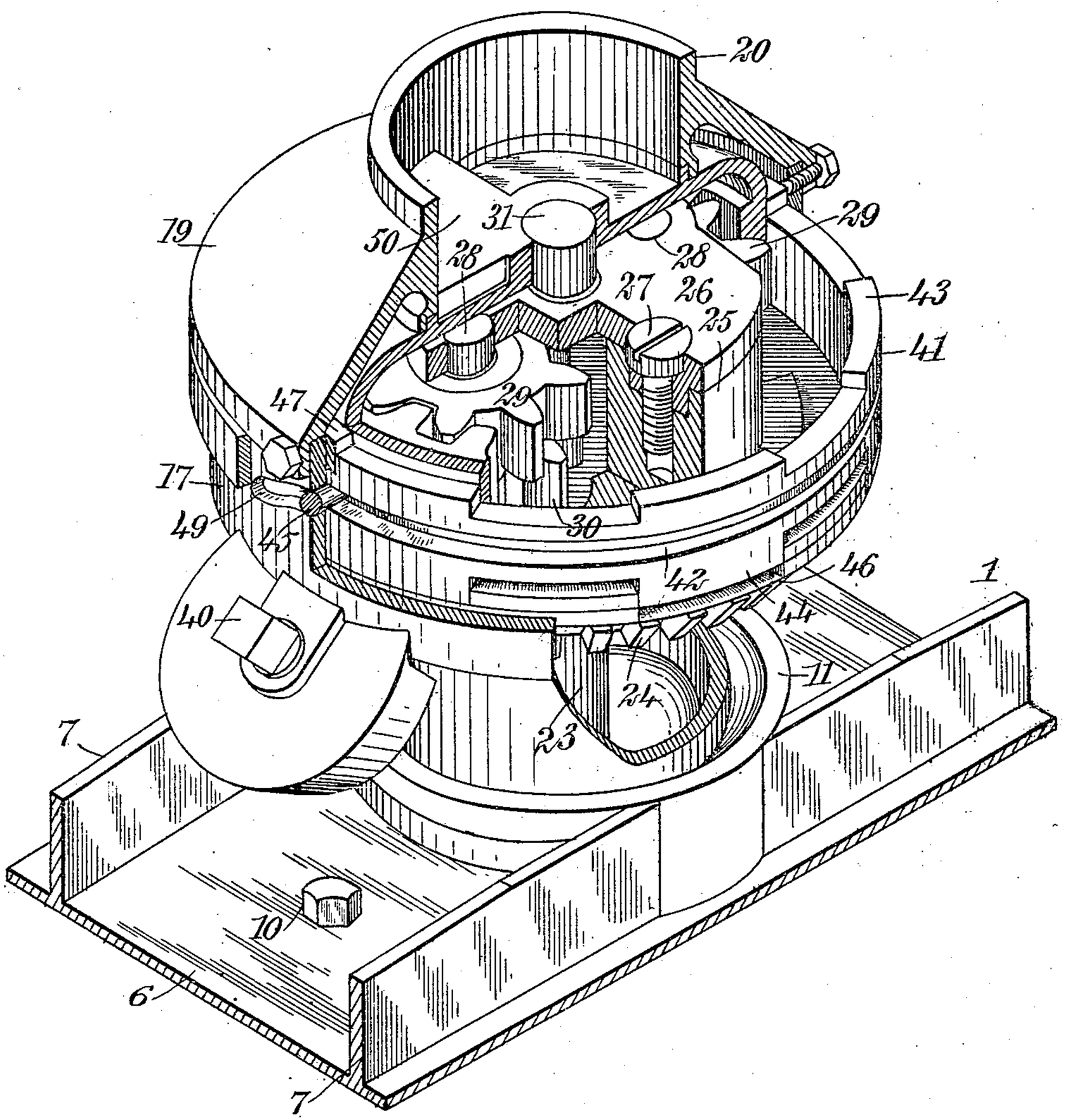
J. W. KITTREDGE.

MINING COLUMN.

APPLICATION FILED OCT. 9, 1906.

3 SHEETS—SHEET 1.

Fig. 1



WITNESSES

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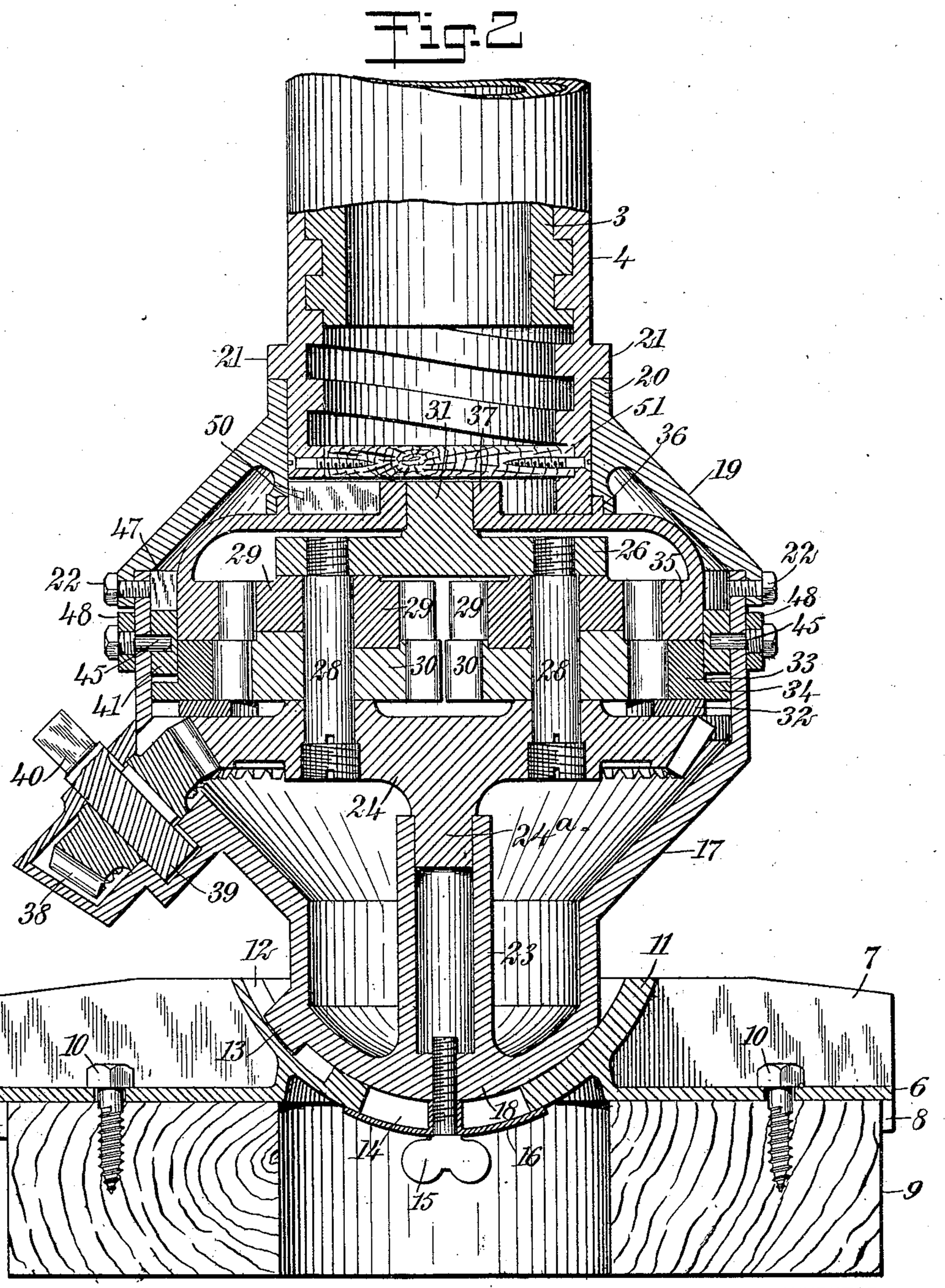
3 SHEETS—SHEET 2.

Fig. 2



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3 SHEETS—SHEET 3.

Fig. 3

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JOHN W. KITTREDGE, OF BOULDER, COLORADO.

MINING-COLUMN.

No. 860,750. Specification of Letters Patent. Patented July 23, 1907.

Application filed October 9, 1906. Serial No. 338,129.

To all whom it may concern:

Be it known that I, JOHN W. KITTREDGE, a citizen of the United States, and a resident of Boulder, in the county of Boulder and State of Colorado, have invented a new and Improved Mining-Column, of which the following is a full, clear, and exact description.

This invention relates to a new and improved column for use in mining operations and elsewhere, where great pressures are required. In mining it is adapted to be held in place by extending the column so that it presses tightly against the floor and roof, or against opposite side walls, of the tunnel or drift in which the column is being used, and which is adapted to support pneumatic drills or other heavy tools used in mining purposes.

More in detail my improvements relate to the means for extending the column so that it will bind tightly against the roof and floor, and also relate to the particular means for fastening the wooden shoes to the end of the column.

In the improved mechanism which I employ for extending the column, it is possible to extend it at a very rapid rate until the column is of substantially the length desired and then by a slight movement of the locking mechanism, it is possible to extend the column at about one-twentieth the previous rate and thereby with about twenty times the power, so that the soft wooden shoes may be pressed against the rocky bearing surfaces with sufficient force to slightly embed the projections of the rock into the wooden shoes and prevent any possible slipping of the column.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures, in which

Figure 1 is a perspective view of the mechanism employed for rotating a portion of the column, a portion of said mechanism being broken away to more clearly disclose the nature of the remaining parts; Fig. 2 is a vertical section through the operating mechanism; and Fig. 3 is a side elevation of the complete column, a portion thereof being broken away.

The main or prominent parts of my improved column comprise a base-plate 1, a similar plate 2 at the upper end of the column, two telescoping members 3 and 4, and operating mechanism inclosed within the casing 5. The base-plate 1, as well as the upper or roof plate 2, is preferably made of cast iron or cast steel and comprises a main or body portion 6, having strengthening flanges 7 extending along its upper surface and having downwardly-extending lugs 8 around its edges and inclosing between them a wooden block 9. This block is held to the plate 6 in any suitable manner, as for instance, by screw bolts 10, and is preferably of soft wood, so that the sharp projections on the rocky floor may easily become indented into the block and prevent the latter from slipping.

Between the strengthening flanges 7 on the upper surface of the plate, there is formed a cup or socket 11 within which the lower end of the column proper is supported, and on one side of this cup or socket is preferably provided a groove 12 adapted to receive a lug or projection 13 on the end of the column, thus allowing the plate to adjust itself to any angle of floor or roof but effectually preventing the column from turning in the socket when once in place. The bottom of the socket is cut away to provide a passage through which extends a screw bolt 15 carried by the end of the column. Around this screw bolt and supported thereon is a plate 16 spaced from the end of the column a distance equal to the thickness of the wall of the socket 11 and of greater size than the passage 14. This plate 16 and screw bolt 15 prevent the removal of the column from the socket while the column may be freely moved in relation thereto, the edge of the socket around the pasage 14 moving between the plate 16 and the end of the column.

In the drawings the detailed structure of the upper or roof plate and shoe is not shown, but it is to be understood that the parts are all substantially as illustrated in Fig. 2, namely, similar to the base-plate and shoe.

It is evident that by unscrewing the bolt 15 the shoes may be readily removed from the column when it is desired to move the device considerable distances, or to place new wooden shoes upon the base and roof plates.

The column proper comprises two telescoping parts 3 and 4, as heretofore stated, the inner column 3 being secured to the upper or roof plate and having screw threads on its outer surface, adjacent its lower end adapted to engage with threads on the inner surface of the outer column 4, the latter threads extending throughout the entire length of the outer member 4. It is evident that the screw threads may be of any character and arranged in any manner desired, it only being requisite that they be of sufficient strength and so arranged that the length of the column may be increased by rotating one of the members.

The lower end of the member 4 of the column fits into a recess on the upper surface of the operating mechanism and is adapted to be rotated thereby. This operating mechanism is supported within a two-part casing having the lower part 17 supported by and integral with the ball or curved surface 18, fitting into the socket 11, while the upper portion 19 of the casing has an upwardly-extending flange 20 surrounding the lower end of the column proper and abutting against an annular flange or collar 21 located thereon. These two parts of the casing, 17 and 19, are rigidly secured

together in any suitable manner, as for instance, by screw bolts 22.

Extending upward from the lower wall of the lower half 17 of the casing, is a bearing 23 supporting a bevel gear wheel 24, adapted to rotate within the casing upon said bearing 23 and journal 31, hereinafter described. Integral with bevel gear 24 and extending upward from opposite sides thereof are projections 25 supporting a plate 26 parallel to the bevel gear wheel 24. The plate 26 is rigidly secured to the projections 25 and bevel gear wheel 24 by screw bolts 27, or in any other suitable manner, and the bevel gear wheel and plate support two vertical shafts 28 extending parallel to the two projections 25 and spaced on opposite sides of the center of the bevel gear wheel intermediate the said projections. Journaled on each of these two vertical shafts 28 and between the plate 26 and the bevel gear wheel 24 are two pinions 29 and 30, the two pinions on each shaft being located together to rotate at all times simultaneously. The plate 26 is provided with an upwardly-extending journal 31 in alinement with the journal 24^a on the lower side of the bevel gear wheel 24, and upon these two journals the bevel gear wheel 24, plate 26, and the four pinions mounted between the two, may be caused to rotate.

Within the casing and supported upon the bevel gear wheel by spacing blocks 32 is an internal gear wheel 33, having a flange 34 in engagement with the casing and having the teeth in engagement with the two lower pinions 30, while resting upon this internal gear wheel is a second or slightly smaller internal gear wheel 35 in engagement with the teeth of the upper pinions 29 and having a frame-work or casing extending above the plate 26. The gear wheel 35 carries an annular flange 36, fitting into a recess in the upper section 19 of the casing and having an annular flange 37 constituting a journal box for the journal 31 of the plate 26.

Journaled in suitable bearings supported upon the lower portion 17 of the casing is a second bevel gear wheel 38, adapted to mesh with the bevel gear wheel 24 and having the end 40 of the supporting shaft 39 thereof adapted to receive a crank, wrench or other suitable tool.

Within the casing and surrounding the two internal gear wheels 33 and 35, there is provided a loose collar 41, having an annular groove 42 extending entirely around its circumference and having teeth or lugs 43 extending upward alongside the internal gear wheel 35, and lugs or teeth 44 extending in the opposite direction from the lower side. The groove 42 in this collar is adapted to receive pins 45 extending inwardly from the casing 17, and by means of these pins the collar may be moved longitudinally through a limited distance. The flange 34 of the internal gear wheel 33 is cut away at points around its circumference to receive the lugs or teeth 44 and these teeth are at all times in engagement with the flange 34, so that the collar and internal gear wheel rotate together. When the collar is moved toward the base-plate, the teeth 44 are brought into engagement with recesses 46 on the upper surface of the bevel gear wheel 24, so that by lowering the ring or collar 41 to its lowermost position, the bevel gear wheel 24 and the internal gear wheel 33 are rigidly locked together and caused to rotate simultaneously.

The vertical wall of the casing 17 is provided with lugs or teeth 47, extending inwardly therefrom and so located that they are out of engagement with the lugs or teeth 43 on the collar when the latter is in its lowermost position and locking the internal gear wheel 33 and the bevel gear wheel 24 together; but when the collar is raised to its uppermost position these lugs or teeth 47 engage with the lugs or teeth 43 and lock the collar 41 to the casing and prevent the rotation of the former. Any suitable means may be provided for raising and lowering the collar 41, but I prefer to employ a band 48, surrounding the outer side of the casing 17 and carrying the pins 45, which extend through diagonal slots 49 in the said casing. By rotating the band 48 a short distance, the pin 45 may be moved from one side of the diagonal slot 49 and the height of the pin above the lower edge of the casing may thus be varied and the interior collar moved simultaneously therewith.

The upper surface of the web or frame of the internal gear wheel 35, which carries the bearing flanges 36 and 37, is provided with a large lug 50 adapted to fit into a cut-away portion of the lower end of the telescoping member 4 of the column, so that when the internal gear wheel 35 is rotated the member 4 of the column is rotated therewith and the length of the column thus increased. If desired, a wooden block 51 may be secured within the lower end of the member 4 to prevent the entrance of any foregin matter within the column when the parts are separated.

In the operation of my improved column, the parts are assembled in the relationship shown in Fig. 3 and the band 48 is rotated, so that the collar 41 is moved to its lowest position and the internal gear wheel 33 locked in the bevel gear wheel 24 as hereinbefore described. When the tool is applied to the end 40 of the shaft 39, the bevel gear wheel 38 rotates the bevel gear wheel 24 and this carries the internal gear wheel 33. As the two pinions 29 and 30 are always locked together and the internal gear wheel 33 is now prevented from turning in relation to the shaft 28, it is evident that the internal gear wheel 35 must rotate simultaneously with the bevel gear wheel 24 and the internal gear wheel 33, and for every rotation of the bevel gear wheel 24 there is a simultaneous and equal rotation of the member 4 of the column. If there are three times as many teeth on the bevel gear wheel 24 as there are on the small bevel gear wheel 38, and the pitch of the thread in the column is one inch, which proportions and dimensions are thus preferably used, it will be seen that by rotating the small bevel gear wheel 38 through three revolutions, the length of the column will be increased by one inch. The parts are maintained in this relation, and the small bevel gear wheel 38 rotated until the upper plate 2 and its soft wooden shoe are brought into engagement with the roof of the tunnel or drift. The band 48 is then turned to raise the collar 41 to its highest position and lock the internal gear wheel 33 and flange 34 to the casing and prevent its rotation, as hereinbefore described. Now, when the bevel gear wheel 38 is rotated, the bevel gear wheel 24 and plate 26 rotate as before, but due to the fact that the internal gear wheel 33 is prevented from turning, the pinions 30 rotate upon their shafts 28 and carry the pinions 29 therewith. Were there the same number of teeth on each pinion, and were there the same number of teeth

on the internal gear wheel 35, that there are on the internal gear wheel 33, there would be no movement whatever of the former, and the two pinions 29 and 30 would rotate around their inner surfaces; but as I provide a larger number of teeth on the internal gear wheel 35 than I do upon the internal gear wheel 33, and as the pinions 29 and 30 are locked together, it is evident that the internal gear wheel 35 will be rotated as many revolutions as there are less teeth in the internal gear wheel 33 than in the internal gear wheel 35, while the bevel gear wheel 24 is rotated a number of revolutions equal to the number of teeth on the internal gear wheel 35. In other words, if there are nineteen teeth on the internal gear wheel 33 and twenty teeth on the internal gear wheel 35, the latter will be rotated one revolution while the bevel gear wheel 24 is rotated twenty revolutions, and if this number of teeth are employed and the bevel gear wheels have the relationship above referred to, it will be seen that the bevel gear wheel 38 must be rotated sixty times to produce an elongation of one inch in the length of the column. As soon as the upper shoe comes in contact with the roof the collar is shifted as above stated, and the operator continues to rotate the small bevel gear wheel 38. As twenty times the force can now be applied, it is evident that the upper shoe may be pressed against the roof as hard as it is desired and the small rocky projections on the roof may be embedded in the soft wooden shoe to any desired extent.

It is thus seen that powerful mechanism may be brought to bear to force the wood and the rock together, so that it is practically impossible for the shoes to slip or the column to become accidentally dislocated. The fast motion is provided for turning the screw to adjust the length of the column, and the slower motion tightens it in place with enormous pressure.

When the column is rigidly secured in place it may be employed for supporting any suitable form of pneumatic, electric, or other machine-drill. As the inner member 3 is of smaller diameter than the outer member 4, I may provide a split sleeve, not shown, of any suitable length to inclose the member 3 above the top of the member 4 and permit of the drill being secured to either, or at the point where the outer member terminates.

It is evident that in smaller sized columns one set of pinions 29 and 30 may be entirely omitted, as their object in the construction shown is to strengthen and to give increased bearing surface. The difference in the number of teeth in the internal gear wheels 33 and 35 may be varied at will and thus the relative speed of the fast and slow motions may be as great or as little as desired. In large sized columns it will usually be found convenient to separate the column into four parts, namely, the two plates and their shoes, the column proper, and the operating mechanism, but upon smaller columns these may be secured together and moved from place to place without being separated. The soft wooden blocks or shoes may be readily removed and replaced by new ones whenever desired, as they are held in place merely by two screw bolts 10. Handles may be provided on the various parts to facilitate the moving of them from one place to another, and any suitable locking means may be employed for holding the parts in their adjusted position and to prevent the rotation of the bevel gear wheel 38 and the collar 48.

Various other changes may be made in the column shown in the drawing, as the form illustrated is only one of many falling within the scope of my invention.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A column, comprising a body portion, the end of which is curved spherically, a lug on said spherical surface, a plate having a socket adapted to receive the end of said body portion, an opening therethrough and a groove adapted to receive said lug, a second plate, and means secured to the end of the body and to the last mentioned plate and extending through said opening, whereby the first mentioned plate and the body may be moved in relation to each other but prevented from accidental separation.

2. A column, comprising a body portion, the end of which is provided with a curved surface, a plate having a socket adapted to receive the end of said plate and having an opening therethrough, a second plate located on the opposite side of the first mentioned plate from the body, and means connecting said second plate and the body and extending through said opening, whereby the body and the first mentioned plate may be moved in relation to the second plate but prevented from accidental separation therefrom.

3. A column, comprising two telescoping members, bearing plates on the opposite ends of said members, and means for elongating said column, said means comprising an operating member and means whereby when the operating member is rotated at uniform speed the column may be elongated or shortened at either one of two different speeds.

4. A column, comprising two telescoping members screw-threaded together, and means for rotating one of said members to vary the length of the column, said means including an operating member and means whereby when the operating member is moved at uniform speed the length of the column may be varied at either one of a plurality of different speeds.

5. A column, comprising two telescoping members screw-threaded together, and means for rotating one of said members, said means including a differential gear and means for unlocking said gear, whereby two different rates of rotation may be imparted to one of said column members.

6. A column, comprising two telescoping members screw-threaded together, and means for rotating one of said members, said means including two gear wheels having a different number of teeth and means whereby the two gear wheels may be rotated simultaneously or at different rates of speed.

7. A column, comprising two telescoping members screw-threaded together, and means for rotating one of said members, said means including two internal gear wheels adapted to rotate on a common axis, one of said internal gear wheels being in engagement with the rotating member of the column, and means whereby the other internal gear wheel may be locked to the former or may be locked in a stationary position.

8. A column, comprising two telescoping members screw-threaded together, and means for rotating one of said members, said means including two internal gear wheels adapted to rotate on the same axis, and one of said gear wheels being in engagement with the rotating member of the column, pinions in engagement with both of said internal gear wheels, means for moving said pinions about the axis of said internal gear wheels, and means for locking the internal gear wheels together and for locking one of them in a stationary position, whereby the rotating member of the column may be moved at either one of two different speeds.

9. A column, comprising two telescoping members screw-threaded together, and means for rotating one of them, including two internal gear wheels, one of which is locked to the rotating member of the column, pinions located within said internal gear wheels, means for moving said pinions about the center of said internal gear wheels, and means for locking one of said internal gear wheels in a

stationary position or to the other of said internal gear wheels, said locking means comprising a collar surrounding said internal gear wheels and adapted to be moved in a longitudinal direction.

10. In combination, a stationary casing, a member in engagement therewith and adapted to be rotated, and means within said casing for rotating said member, said means comprising two internal gear wheels, one of which is in engagement with said rotating member, and means for locking the other of said internal gear wheels to the casing or to the first mentioned gear wheel, whereby the rotating member may be moved at either one of two different speeds.

11. A column, having one part thereof adapted to be rotated, a gear wheel adapted to be manually operated, and means connecting said gear wheel with said rotating part, said connecting means including a differential gear.

12. A column, having one part thereof adapted to be rotated, a rotating member adapted to be manually operated, and means connecting said manually operated rotating member with the rotating part of said column, said connecting means including a plurality of gear wheels and means adapted to engage with certain of said gear wheels, whereby the rotating part of the column may be moved at two different speeds in relation to the manually operated rotating member.

13. A column, having two telescoping members, one of which is adapted to be rotated, means for rotating said member at two different relative speeds, and means adapted to be operated to determine the speed, said means including a band, collar, and means for moving said collar in a longitudinal direction.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN W. KITTREDGE.

Witnesses:

MARY RIDGEWAY,

HENRY O. ANDREW.