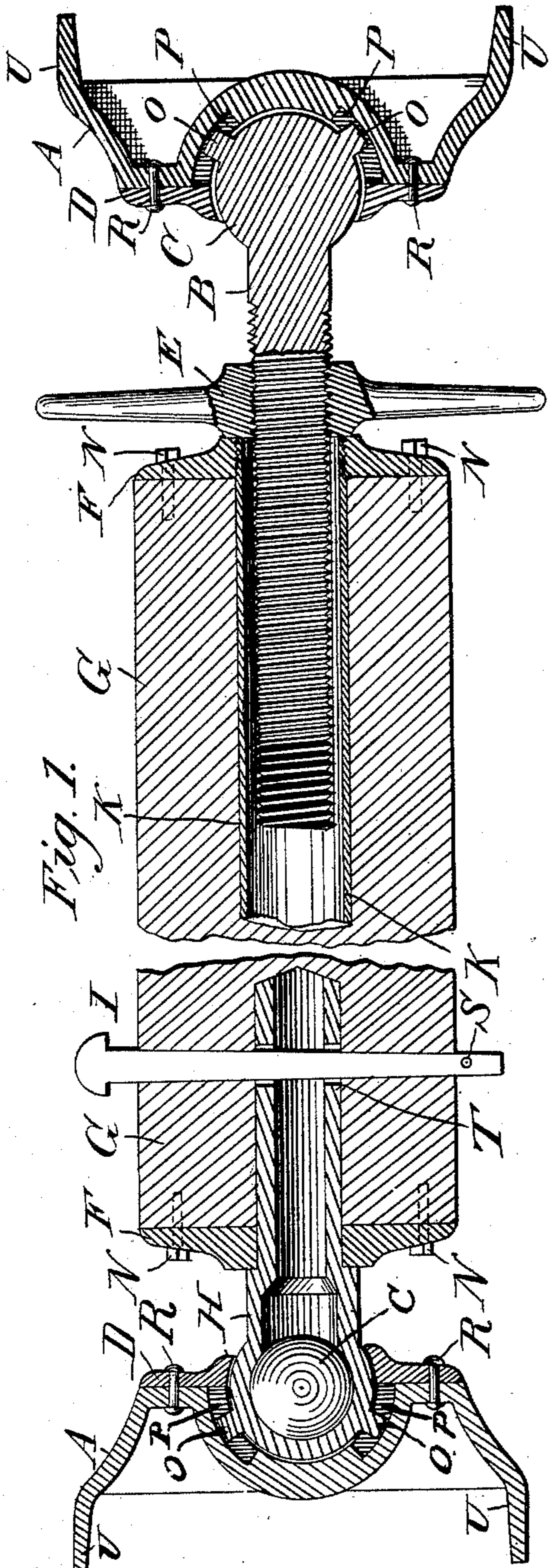


(No Model.)

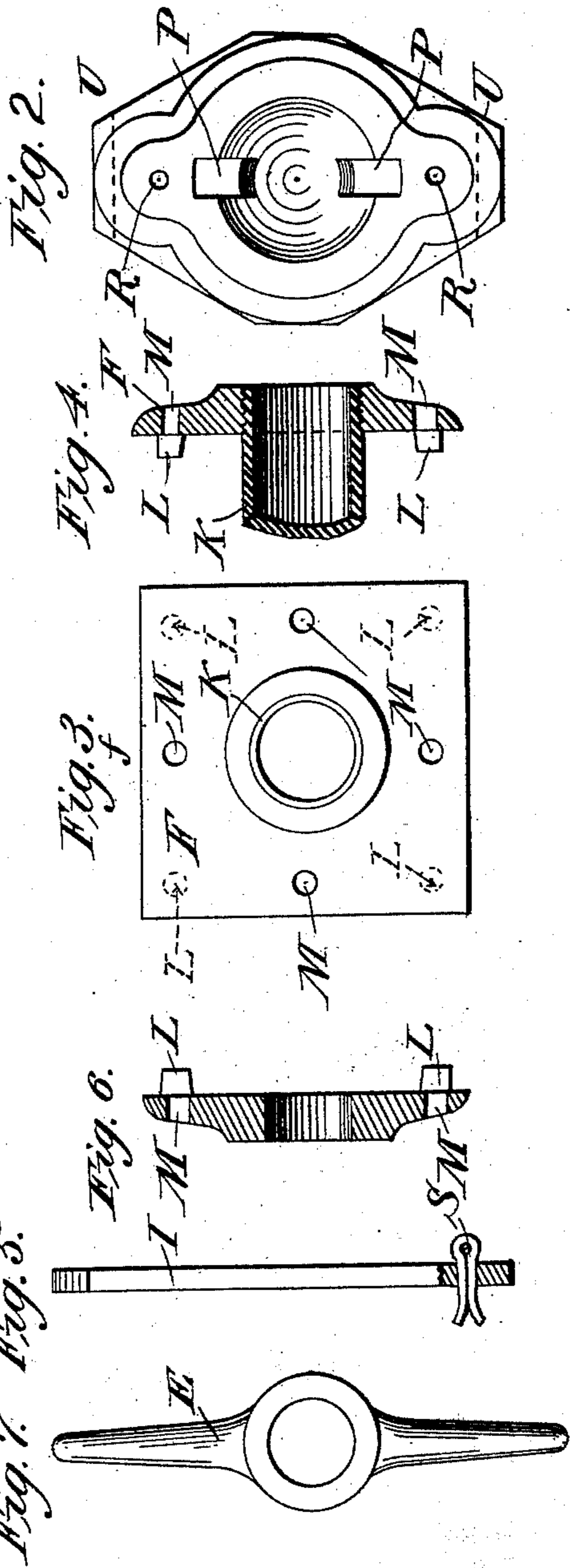
W. J. DUNN.
EXTENSIBLE BRACE.

No. 485,342.

Patented Nov. 1, 1892.



Witnesses:
Geo. Geyser
W. L. Armour.



Inventor:
William J. Dunn.
by his Atty.
John R. Seyser.

UNITED STATES PATENT OFFICE.

WILLIAM J. DUNN, OF BEN AVON, PENNSYLVANIA.

EXTENSIBLE BRACE.

SPECIFICATION forming part of Letters Patent No. 485,342, dated November 1, 1892.

Application filed November 17, 1891. Serial No. 412,217. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM J. DUNN, a citizen of the United States, residing at Mentone, (now Ben Avon,) in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Extensible Braces for Earth Excavations; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification, like letters referring to like parts.

My invention relates to improvements in extensible braces for holding the side walls of earth excavations in which the extension is secured by a screw working in a sleeve and operated by a handled nut; and the object of my improvements are to make the heavy timber braces required for large and deep works adjustable radially from the point of contact with the side timbers and also to act as supports for said side timbers in case of the earth or sand shifting, so that the casing of the ditch shall always remain in position. I attain these objects by the mechanism illustrated in the drawings, in which—

Figure 1 is a longitudinal section of the brace complete. Fig. 2 is a face view of one of the shoes with the retaining-cap removed. Fig. 3 is a face view of one of the end plates on the timber, and Fig. 4 is a section thereof. Fig. 5 is a side view of the retaining-key. Fig. 6 is a section of other end plate of the timber, and Fig. 7 a face view of the handled nut.

The mechanisms for radial adjustment in the shoes and screw-stem and end stem with the handled nut are substantially the same as those contained in the patent granted to me July 8, 1890, No. 431,689, being larger in dimensions only.

A A are the shoes, socketed to freely receive the balls C C of the stems B H, said balls having two lugs O O to move freely in the recesses P P, and the whole secured together by the caps D D, riveted to the bodies of the shoes by rivets R R. In this case the shoes are further provided with the flanges U U, the object of which will be described

farther on. E is the handled nut working on the screw-stem B, and by which the extension and compression are obtained.

G is the timber body of the brace, of any desired length and cross-section.

F F are the metal plates with which the ends of body G are faced. The end through which the screw-stem B passes has the tubular lining K threaded into its center to act as a casing for the screw and strengthen the timber. The dead end H fits neatly into the other plate's center and is shouldered against it and held in place by the tapered key I, which passes through the timber G and the keyhole T in H. Key I is then secured by the split cotter S passing through a hole in the small end of key I.

The end plates F F are secured to the timber G by the lugs L L L L, (see Figs. 3, 4, and 6,) which are sunk into the ends of the timber to prevent any movement of the plates, and they are further held by the lag-bolts N N N N, which pass through the holes M M M M in the plates.

In very large and deep excavations it has been found difficult to retain the casing in position, especially so in sand or gravel or when a quicksand is encountered, the usual practice being to line with planking arranged vertically on the sides of the cut, these being held by stringers of timber placed lengthwise. Upon these stringers the ends of the bracing-timbers are placed and wedged tight; but it often happens that loose stuff will run from under the plank-lining, rendering work dangerous. Attempting to remedy the trouble by sledging the lining down frequently results in disarranging the stringers and dropping the braces out of place, so that the work has eventually to be done over. By the form of the bottom of the shoe on my improved brace this difficulty is overcome. The flange-wings U U, Figs. 1 and 2, are made to fit over and under the string-timber, and as that is usually a long piece there can be from four to eight or more of my braces adjusted upon it, the large screw giving so powerful a compression on the sides that if at any point the loosening of the dirt should require the side planking to be driven down the same may be done without danger of displacing either braces or stringer, the most that can happen

being the loosening of the brace next to the point of sledging. The other braces will hold the stringer and the loose brace in position, and when the work is done it can be again
 5 tightened up by the screw. The sleeve K, covering the screw in the timber G, will prevent the screw from coming in contact with the wood and at the same time strengthen it at that point. Although I have here shown
 10 it as a separate piece threaded into the end plate, it can and may be formed as an integral part of said plate.

The key I is formed so as to draw the dead end H tightly to its place and assist in hold-
 15 ing the end plate.

All the parts are made so as to be easily removable from the main timber G, that the contractor may be able at small cost to increase or diminish the length of the timber,
 20 as his work may require. The form of end plate shown is square; but I do not wish to be confined to that form alone, as it can be made round or oblong or to suit any shape of the end of the main timber G. It may also,
 25 if necessary, be provided with a raised collar to act in the form of a ferrule on the end of the timber, or a separate ferrule can be provided and driven over the timber beyond it.

The radial adjustment attained by the ball-
 30 bearing in the shoes is of great value in preventing the main timber from slipping out of place and reducing the danger of buckling or breaking it, and there is no limit to the size of the bracing-timbers to which my im-
 35 provements can be applied.

The recesses for the reception of the dead end H and the sleeve of the screw-stem B are bored into the timber part of the brace, and the passage for the key I is also bored at

right angles to that of dead-end H, so as to in- 40
 tersect it at the proper place.

Having thus described my invention, I desire to secure by Letters Patent the following claims:

1. In a brace of the character described, 45
 the combination of the main timbers, the stems, the end plates provided with central openings for the passage of the stems and secured to the ends of the main timber by
 50 lag-screws and lugs, and a sleeve attached to one of said plates to receive the screw-stem, said stems having balls and lugs, and the shoes socketed to receive the balls and se-
 cured to them, substantially as shown and described. 55

2. In a brace of the character described, the combination of the dead end provided with a ball, socketed shoe, and stem sunk into the main timber and shoulder upon the
 60 end plate and the taper key and split cotter by which it is held in place with the main timber, screw-stem, handled nut, and ball and shoe, substantially as herein shown and described.

3. In a brace of the character described, 65
 the combination of the wings or flanges U U on the socketed shoes with the dead end and screw-stems provided with balls and lugs to fit the shoes, the end plates, and main timber,
 70 all substantially as shown and described, and for the purpose specified.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM J. DUNN.

Witnesses:

EDW. A. HESS,
 J. B. GEYSER.