

July 11, 1933.

J. O'F. CLARK

1,917,431

EXCAVATING TOOTH BASE WITH Laterally INTERLOCKED POINTS

Filed Dec. 22, 1928

2 Sheets-Sheet 1

Fig. 1

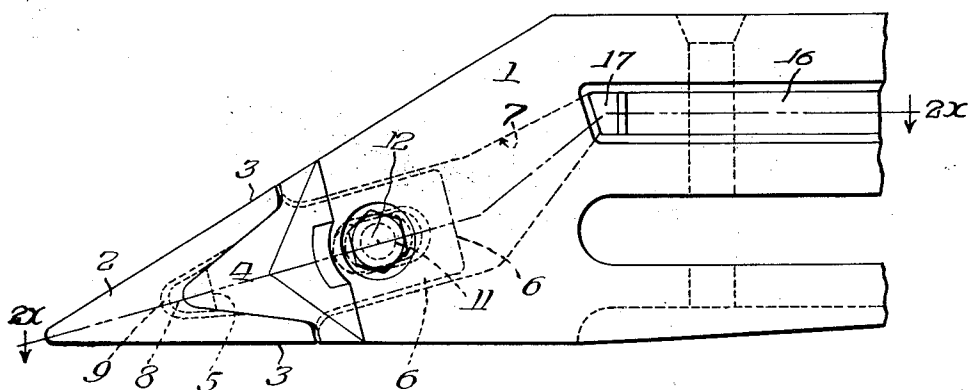
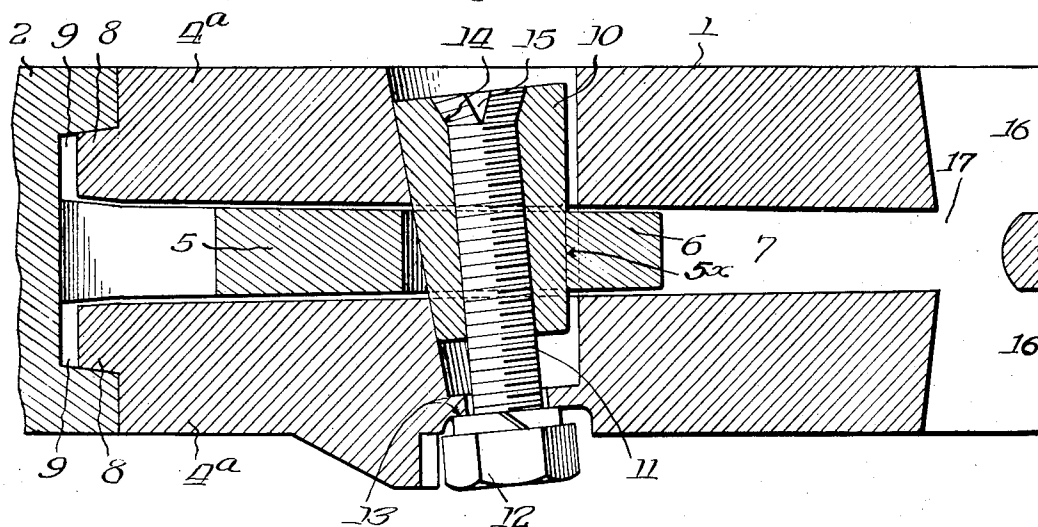


Fig. 2



Witness:

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July 11, 1933.

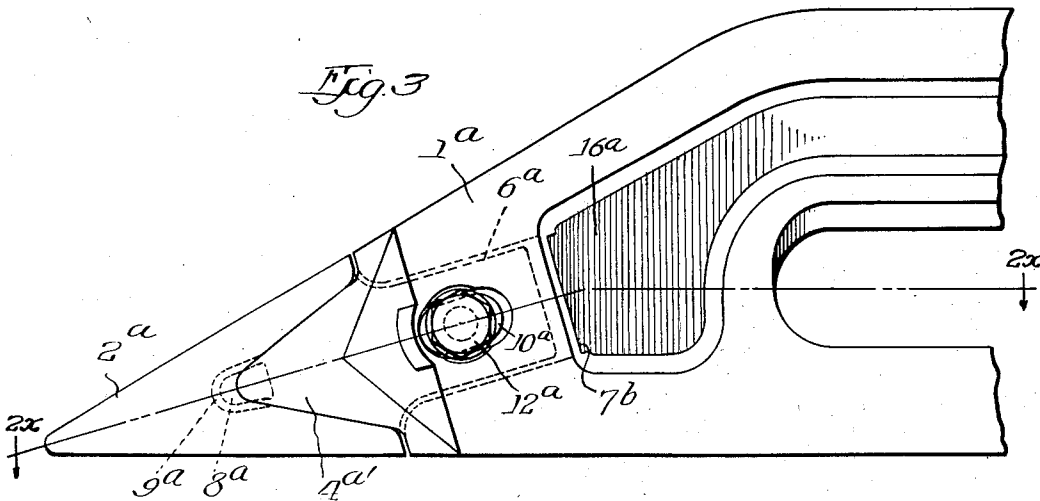
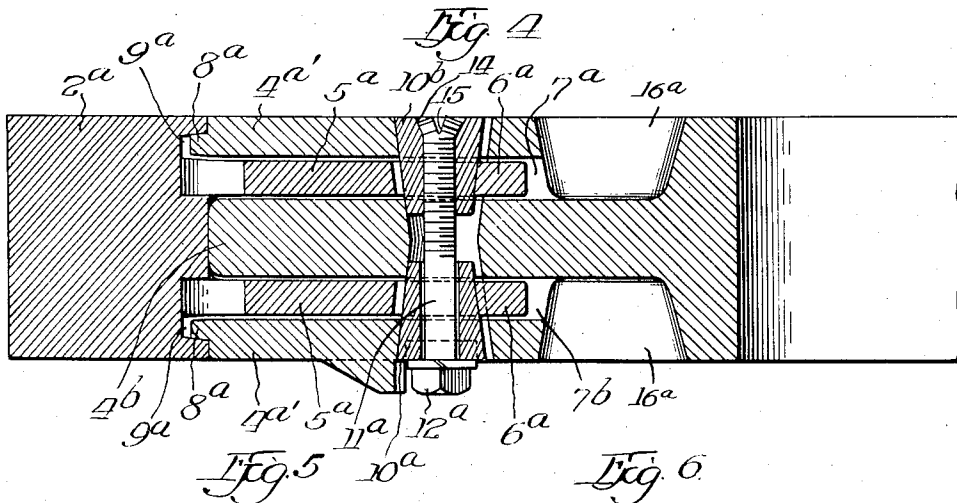
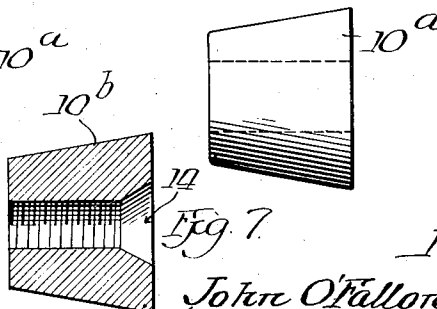
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EXCAVATING TOOTH BASE WITH LATERALLY INTERLOCKED POINTS

Filed Dec. 22, 1928

2 Sheets-Sheet 2



Witness:

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UNITED STATES PATENT OFFICE

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EXCAVATING TOOTH BASE WITH Laterally INTERLOCKED POINTS

Application filed December 22, 1928. Serial No. 327,773.

This invention relates in part to a novel means for securing against lateral spreading the members of a tapered nose on an excavating tooth point, when said nose has been subdivided longitudinally to admit the web means employed for tying together, against vertical spreading, divergent jaws of the replaceable point into which the nose is fitted in mounting the point upon the base.

The invention relates also in part to novel multiple web means through which to tie together the divergent jaws of such a point, as well as to a novel form of slotted nose adapted to receive such point. This slot or these slots in the bifurcated or multiple slotted nose as the case may be, being preferably so merged with recess panels in the sides of the base that the interior of the more massive part of the base will be opened up to heat treatment and quenching to a degree that is very beneficial to the finished piece.

Finally, the invention relates in part to a novel construction of keying means, the principle and general construction of which may be embodied in either of two designs appropriate, respectively, for interlocking the single web means and the multiple web means with the base in securing the point in position. Heretofore, it has been the practice to provide the diverging jaws of the point that received the wedged-shaped nose of the base, with either flanges, or projections, extending vertically upwardly and downwardly from their lateral marginal faces, into correspondingly formed recesses in the lateral faces of the nose or else cut away the forward ends of the nose members in vertical longitudinal planes in a manner to adapt said ends to enter behind webs lying across the crotch of the point, somewhat after the manner of an ordinary rabbeted joint, so that stresses encountered in use which are lateral to the replaceable point of the tooth and which are frequently of a very large order, are prevented, by the resultant lateral interengagement, from spreading apart the walls into which the nose is sub-divided. But these methods of laterally interlocking, as well as certain adopted variations of them,

coming within their principles, while measurably effective for the purposes intended, are not as efficient as they should be, and they involve certain disadvantages from the standpoint of production of the article. Moreover, the use of an ordinary rabbeted joint for lateral confinement in which crotch webs enter lateral recesses in the nose members are objectionable because they reduce the seating area of the tapered nose, and the crotch webs obstruct access to the forward tapered ends of the seats for finishing; besides, the presence of these webs adds appreciably to the mass of the metal that has to be treated, in case the tooth is made of the most desirable material for the purpose, namely, manganese steel. Accordingly, one feature of the present invention embodies the principle of laterally interlocking the point with the extreme forward ends of the nose members, by providing the forward end of the tapered nose beyond its seating ends, at each of its outer walls, with a forwardly presented interlocking projection inset from the outer lateral face of the nose; and providing upon the point, forward of the convergence of the jaws of the point, and set inwardly from the lateral faces of the point, and between but forward of said seats, recesses that receive said projections and afford them such lateral bearing as will cause side-wise stresses upon the point to be imposed upon the walls of the nose in a direction to force said walls together rather than spread them apart, and the security thereby afforded against spreading, being the more effective because the interlock is at the extreme forward end of the nose, and therefore, at the farthest point removed from the points at which the walls seek to bend under lateral stresses.

The result of this relation between the parts is that the lugs which extend forwardly from the apex of the nose are of greater vertical dimension than the nose immediately adjacent the said apex, and the merger of the lugs with the nose is in rear of the apex so that the lugs have laterally presented interlocking faces which extend from points

in rear of the apex to the ends of the lugs which are forwardly beyond the apex; and the recess which receives said lugs, being made to substantially conform to them, develops a sufficient range of lateral interlock combined with a seating of the point upon the nose through means of faces which diverge from two laterally spaced crotches that conform to the apex.

The nose of the base which enters between the jaws of the point may have one slot in a single medial vertical plane bifurcating the nose leaving the two members with forwardly seating ends and laterally interlocking extensions beyond the seating portions of said ends; or there may be two slots in parallel vertical longitudinal planes dividing the nose into an intermediate forwardly seating wall and two outer forwardly seating walls; the point being provided in the former instance with a single web which enters the single slot in the nose; and in the latter instance with two spaced webs entering the two slots in the nose. The slot or slots formed in the nose communicate rearwardly with a channel or channels that receive anchoring shanks integral with the web or webs, and these sockets extend rearwardly until they merge with side panel recesses, so that the interior mass of the base is thoroughly opened up to heat treatment, to the material advantage of the finished piece. In carrying out that part of the invention which relates to the improved form of keying means, the invention provides a key bolt with wedging sleeve means, which, while serving the purpose long recognized as desirable, of drawing the point firmly upon the tapered nose, will do so without requiring an exposed nut on the inserted end of the bolt, and without rotating the wedging member in the parts of the wall and web (or webs) in which it bears; the bolt being threaded into the wedging sleeve member and constituting drawing means which causes the wedging means to seat forwardly against the base, and rearwardly against the overlapping web, thereby anchoring the point to the base. This wedging means may be either single, and comprise a wedge-shaped sleeve entering from one side and threaded to the bolt which enters from and finds seating at the other side, so that the sleeve is drawn into bearing against all the walls of the overlapping parts, or it may be dual and comprise two wedge-shaped sleeves entering from opposite sides, each bearing against portions of the overlapping members, the bolt, in this instance, being headed against the sleeve that enters from one side, and threaded in the sleeve that enters from the other side, and serving to draw both keys to a firm seating. In each form of the invention the bolt may be locked against unscrewing from the sleeve in

which it is threaded, for instance, by spreading the inserted end of the bolt in a flaring cavity found in the outer end of the sleeve. The dual sleeve embodiment of the invention is especially advantageous when used in connection with the plural web form of point assembly, since there are, in this embodiment, two webs with symmetrically beveled apertures assuming identical relation to the respective wedging sleeves, and therefore, the point is reversible in position, to prolong its life. In the single wedge embodiment, in order that the point may be reversed, the wedging sleeve lies with its axis at such an angle to the transverse plane of the tooth, as will bring the rear side of the wedge, and the rear wall of the web aperture, normal to the longitudinal axis of the tooth (or in said transverse plane) so that the aperture coacts with the wedge in either position of the point.

In the accompanying drawings, in which two embodiments of each feature of the invention are shown by way of illustration—

Figure 1 is a side elevation of the single web and single wedge form of the invention.

Figure 2 is a horizontal section, on an enlarged scale, of those portions of the point and base shown in Figure 1, which are immediately concerned with the features of the present invention.

Figures 3 and 4 are views corresponding, respectively, to Figures 1 and 2, but embodying that form of the invention in which two webs are provided between the jaws of the point, and two wedging sleeves to secure them.

Figure 5 is an end view that is typical of all the wedging sleeves.

Figure 6 is a side elevation of that one of the two wedging sleeves shown in Figure 4, which receives the head of the bolt.

Figure 7 is an axial section of that one of the sleeves shown in Figure 4, which receives the threaded end of the bolt.

Referring to Figures 1 and 2, 1 represents the base, and 2 the point of a renewable point tooth for an excavating machine. Point 2 has upper and lower divergent jaws 3 which are preferably of identical construction, in order that the tooth, for the sake of prolonging its service, may be applied with either of its inclined faces downward. Base 1 is provided with a wedge-shaped nose 4 that fits between the jaws 3. In order to resist spreading of the jaws 3 under vertical stresses encountered by the tooth in use, said jaws are integrally united by a web 5. This web extends rearwardly to provide an anchoring shank 6. In order to receive the web 5 and shank 6, nose 4 is provided with a vertical longitudinal slot 7.

Slotting the nose 4 subdivides it into walls 4a, with the result that lateral stresses, encountered by the point 2 in service, load that

wall of the nose toward which the stress is exerted, to a degree which tends to spread the walls apart and seriously attack the integrity of the base. The present invention meets the last-named condition by forming on the forward end of each wall 4a beyond the seating forward end thereof, and offset inwardly from the outer lateral face of the wall, a lug 8, and forming in the point 2 forward of the convergence of its jaws 3, recesses 9 to receive said lugs; said lugs 8 and recesses 9 being so designed that they are in substantial contact or in such relation that they will contact under a lateral stress pressing the point toward the lug as soon as, if not before, the web 5 presses against a wall 4a, or at least the outwardly presented face of a lug 8 will encounter the opposing wall of its recess 9 before a wall 4a can be stressed beyond its elastic limit under loads encountered laterally by the point.

Inasmuch as the bending points of wall 4a are at the inner end of slot 7, and locking lugs 8 are at the extreme distance therefrom, the interlock with the point effected through said lugs, is the most efficient that can be obtained.

In the assembly of the point of the tooth with its base, longitudinal seating of the nose members 4a in the crotch of the point occurs between those portions of said nose-members which lie in planes outside of the lateral interlock portions 8; and to render more effective the seating of the parts against vertical transverse play, their converging faces, and the confronting faces of the crotch that receive them, continue to substantially an apex as shown by full lines in Fig. 1 instead of being abruptly terminated in extended transverse faces as heretofore.

Again, those portions of the said nose-members which provide the lateral interlock between the base and the point overlap longitudinally upon, and thus, in addition to any extension which they may have forwardly beyond said apexes, they extend rearwardly of the said apexes where they are better sustained; and they are of greater vertical transverse dimension than the said longitudinally seating portions as shown by dotted lines in Fig. 1, so that the recess 9 that receives them is undercut above and below the said apex and an altogether novel substantial structure results.

Recess 9, as shown in Figure 2, extends clear from side wall to side wall of the crotch of the point, thereby materially reducing the heaviest section of the point, which is beneficial in heat-treating the manganese or other steel casting, and facilitates finishing. Lugs 8 are so located that they are free of any interference, and easily ground and cleaned in finishing the piece; and the enlarged recess 9 and design of lugs 8, together facilitate assembly.

In order to anchor the point on the base, the shank 6, according to another feature of the present invention, while receiving rearward pressure from a wedging member that is sustained against forward displacement by the walls 4a as has heretofore been the practice, has such wedging force developed, not through wedging faces of a bolt drawn by a nut, but through wedging faces of a sleeve 10 which is tapered (at least in one diametric plane) so that it can enter into wedging bearing as stated, and this wedging element is drawn in the direction of its axis and therefore transversely to the anchoring shank 6, and to the walls 4a, by means of a bolt 11, the head 12 of which seats against the base at 13, while its shank is threaded into the sleeve 10. Sleeve 10, by reason of its non-circular section, for instance, as illustrated in Figure 5, is prevented from rotating with the bolt 11; and in order to prevent the bolt 11 from backing out under vibration, the remote end of the sleeve 10 is recessed, as shown at 14, and the extreme end of the bolt is slotted, as shown at 15, so that the end of the bolt can be spread through means of a cold chisel or equivalent tool to prevent withdrawal until such force is applied to the bolt, in the direction of unscrewing, as will force the split ends together.

In order that the point shown in Figures 1 and 2, may receive the wedging sleeve 10, in either of two positions which it is adapted to assume on the base, sleeve 10, in fitting the opening through the base, assumes an inclined position that brings its rear wedging surface normal to the longitudinal axis of the tooth, so that the rear wall 5X, of the opening in the shank 6, is straight and will, therefore, receive the wedging sleeve in full bearing whichever side of the tooth is downward.

Referring to the form shown in Figures 3 and 4, base 1a is provided with two vertical longitudinal slots 7a and 7b, dividing the nose into outer walls 4a, each of which carries a forwardly presented lug 8a entering a recess 9a in the point, to stay the point laterally as described in connection with Figures 1 and 2, and an intermediate wall 4b. The point 2a has its jaws 3a united by two integral webs 5a extended rearwardly as two anchoring shanks 6a. A bolt 11a has its head 12a seated against a wedging sleeve 10a inserted from one side and bearing forwardly against one outer wall 4a and the intermediate wall 4b and rearwardly against one of the anchoring shanks 6a; and the inserted end of said bolt 11a is threaded into and secured by splitting its end 15 within the flaring bore of another wedging sleeve 10b, inserted from the other side of the base, and bearing forwardly against the other outer wall 4a and intermediate wall 4b; and rear-

wardly against the other anchoring shank 6a. With this construction, the point 2a is sustained by the middle wall 4b and one of the outer walls 4a in each direction.

5 A preferable feature of the present invention resides in the condition that recesses 9a in the point 2a, that receive the stay lugs 8a on the nose, like the lugs 8 and recesses 9 of Figure 2, are so located in the clear that
10 they are more easily cleaned and ground; that is to say, the finishing tools are free from interference in cleaning and grinding their faces. Besides, the recesses can be made larger than the lugs, to reduce the faces that
15 have to be fitted together. Moreover, in enlarging the coring of the point at the meeting of the converging jaws, as explained, a better casting can be made for the reason that metal is being excluded from the heaviest
20 portion of the mass, which is exceedingly difficult to solidify in the pouring of the point member. Finally, the stay lugs and recesses are located where they can be very much better protected than can the oppositely projecting flanges, or variations thereof,
25 heretofore used on the margins of the diverging jaws.

With a wedging anchoring device as herein described, one of the vulnerable and most
30 seriously attacked elements heretofore employed, namely, the nut on the inserted end of the bolt, is completely done away with; the threaded connection is wholly internal and free from attack; the wedging means,
35 whether used singly or in a pair, make a superior anchoring instrumentality as compared to a bolt; and the tightening operation is very much more conveniently performed because the wedging sleeve locks itself
40 against rotation.

In order to turn the slotting feature of the base to advantage, in the sense of improving the quality of metal in the base, the slot 7 (Figures 1 and 2) and the two slots
45 7a (Figures 3 and 4) are continued rearwardly until they meet the paneling recesses 16 (Figures 1 and 2) or 16a (Figures 3 and 4), recess 7, which is in the medial plane of the base, being brought into communication with
50 the recesses 16 through means of the transverse cored opening 17. In this manner, the areas of major mass of the base are opened up to the influence of the heating and quenching media of the heat treatment, without
55 weakening the base structure to any material degree.

I claim:

1. A replaceable point excavator tooth, comprising a base bifurcated to form two
60 point-engaging furcations, said base having upon each of its members vertically presented point-seating faces converging forwardly to substantially an apex; and a point having
65 jaws diverging rearwardly from laterally spaced crotches and substantially conform-

ing to said apexes and to said seating faces; said base having at its apex, in vertical longitudinal planes spaced inwardly from its outer lateral faces, lugs for laterally interlocking it with the point; and said point having, intermediate of its laterally spaced
70 crotches, a recess providing faces which receive the lateral faces of said lugs; the vertical transverse dimensions of the lugs and the recess being sufficient to provide laterally
75 presented interlocking faces a material distance in rear of the apex of the base as well as forward thereof.

2. As a new article of manufacture, an excavator tooth base constructed as described in claim 1, and adapted to receive and interlock laterally as well as vertically with a point constructed as described in said claim.

3. As a new article of manufacture, an excavator tooth point constructed as described in claim 1, and adapted to conform to and interlock laterally as well as vertically with a tooth base constructed as described in said claim.

4. A replaceable point excavator tooth, comprising a base bifurcated to form two point-engaging furcations, said base having upon each of its members vertically presented point-seating faces converging forwardly to substantially an apex; and a point having
95 jaws diverging rearwardly from laterally spaced crotches and substantially conforming to said apexes and to said seating faces; said base having at its apex, in vertical longitudinal planes spaced inwardly from its outer
100 lateral faces, lugs extending beyond the point-seating faces for laterally interlocking it with the point; and said point having intermediate of its laterally spaced crotches, a recess providing faces which receive the lateral
105 faces of said lugs; the vertical transverse dimensions of the lugs and the recess being sufficient to provide laterally presented interlocking faces a material distance in rear of the apex of the base as well as forward
110 thereof.

5. In a replaceable point tooth, a point member having diverging jaws and web means connecting said jaws, and a base member having a wedge-shaped nose adapted to fit between the jaws of the point member and slotted to permit the point member to be placed in position upon the base; said point member having rearwardly presented recesses; said nose having upon its forward
120 end, lugs adapted to enter said recesses, said web means comprising two vertical longitudinal webs; and said nose comprising two outer walls and an intermediate wall.

6. A tooth for excavating implements, comprising a point member having two rearwardly extending anchoring shanks, a base slotted to receive said shanks and having two outer walls and an intermediate wall, wedging sleeves inserted from opposite sides of
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the base, each of said sleeves bearing forwardly against an outer wall of the base and rearwardly against one of the shanks of the point member, and a bolt seated in one wedging sleeve and threaded into the other wedging sleeve.

7. A tooth for excavating implements, comprising a point member having two rearwardly extending anchoring shanks, a base slotted to receive said shanks and having two outer walls and an intermediate wall, wedging sleeves inserted from opposite sides of the base, each of said sleeves bearing forwardly against an outer wall of the base, and rearwardly against one of the shanks of the point member, and a bolt seated in one wedging sleeve and threaded into the other wedging sleeve, the sleeve into which the bolt is threaded being of non-circular section, and thereby held against rotation.

8. In a replaceable point tooth for excavating implements, a base member, a point member reversibly fitted to said base member, said base and point members having portions through which they overlap each other, a wedging sleeve inserted in one direction

through overlapping portions of said members, a bolt inserted in the opposite direction and threaded into said sleeve, and a second sleeve inserted in the direction of entry of the bolt, limited in longitudinal movement in the direction of its entry; said bolt passing through and being rotatably seated in said second sleeve.

9. In a replaceable point excavator tooth, the combination of base and point members fitted together and having portions through which they overlap each other, and means for holding said members in assembly comprising a wedging sleeve inserted in one direction through overlapping portions of said members, a bolt inserted in the opposite direction through overlapping portions of said members, and a second wedging sleeve inserted through overlapping portions of said members in said opposite direction; said bolt being seated in said second sleeve and threaded into the sleeve first named.

Signed at St. Louis, Missouri, this 14th day of Dec. 1928.

JOHN O'FALLON CLARK.