

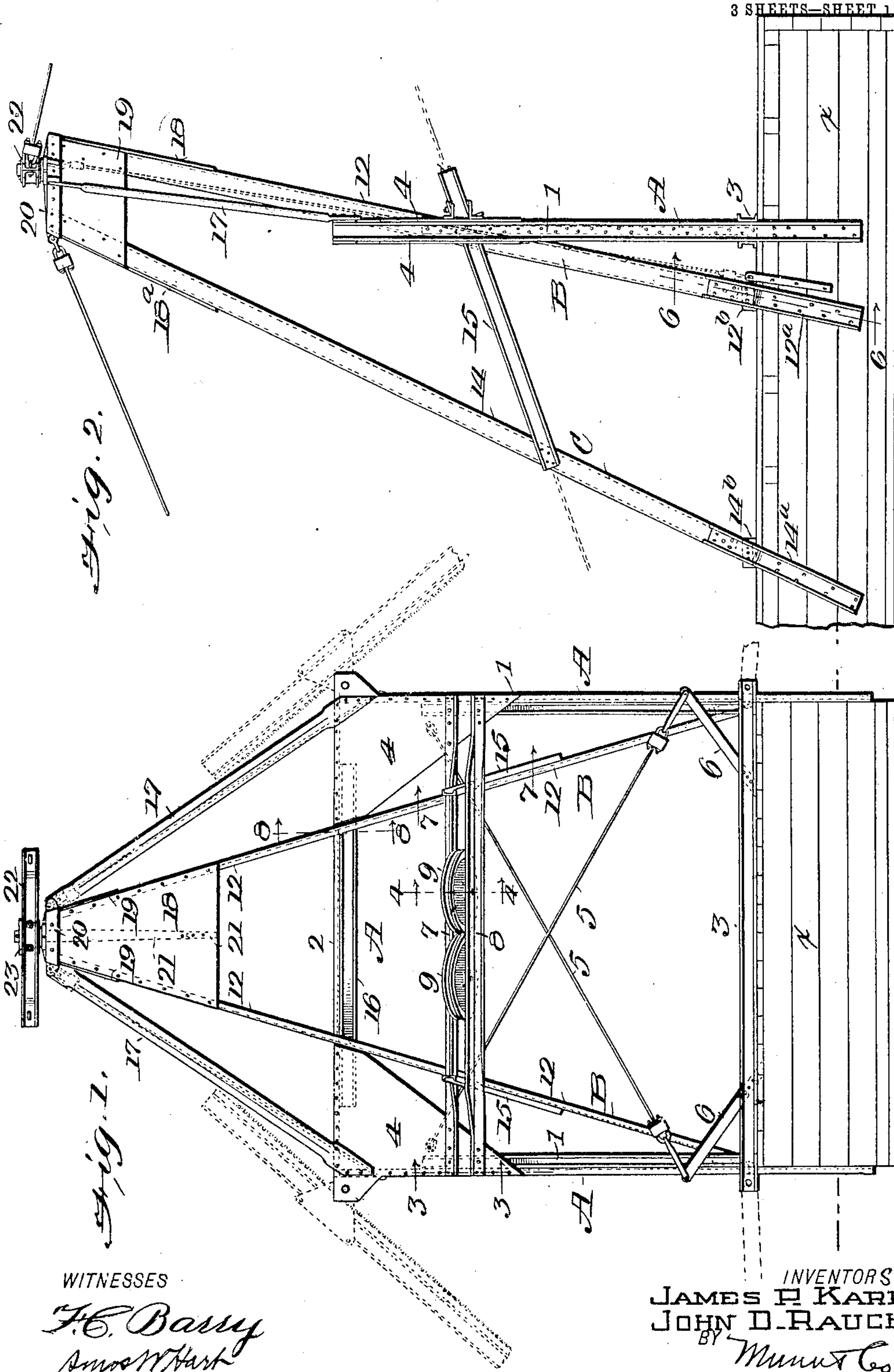
No. 869,438.

PATENTED OCT. 29, 1907.

J. P. KARR & J. D. RAUCH.  
SPUD AND HOISTING FRAME FOR EXCAVATORS.

APPLICATION FILED FEB. 12, 1907.

3 SHEETS—SHEET 1



WITNESSES

*J. E. Barry*  
*Amos W. Hart*

INVENTORS  
JAMES P. KARR  
JOHN D. RAUCH

BY *Munn & Co.*

ATTORNEYS

No. 869,438.

PATENTED OCT. 29, 1907.

J. P. KARR & J. D. RAUCH.  
SPUD AND HOISTING FRAME FOR EXCAVATORS.

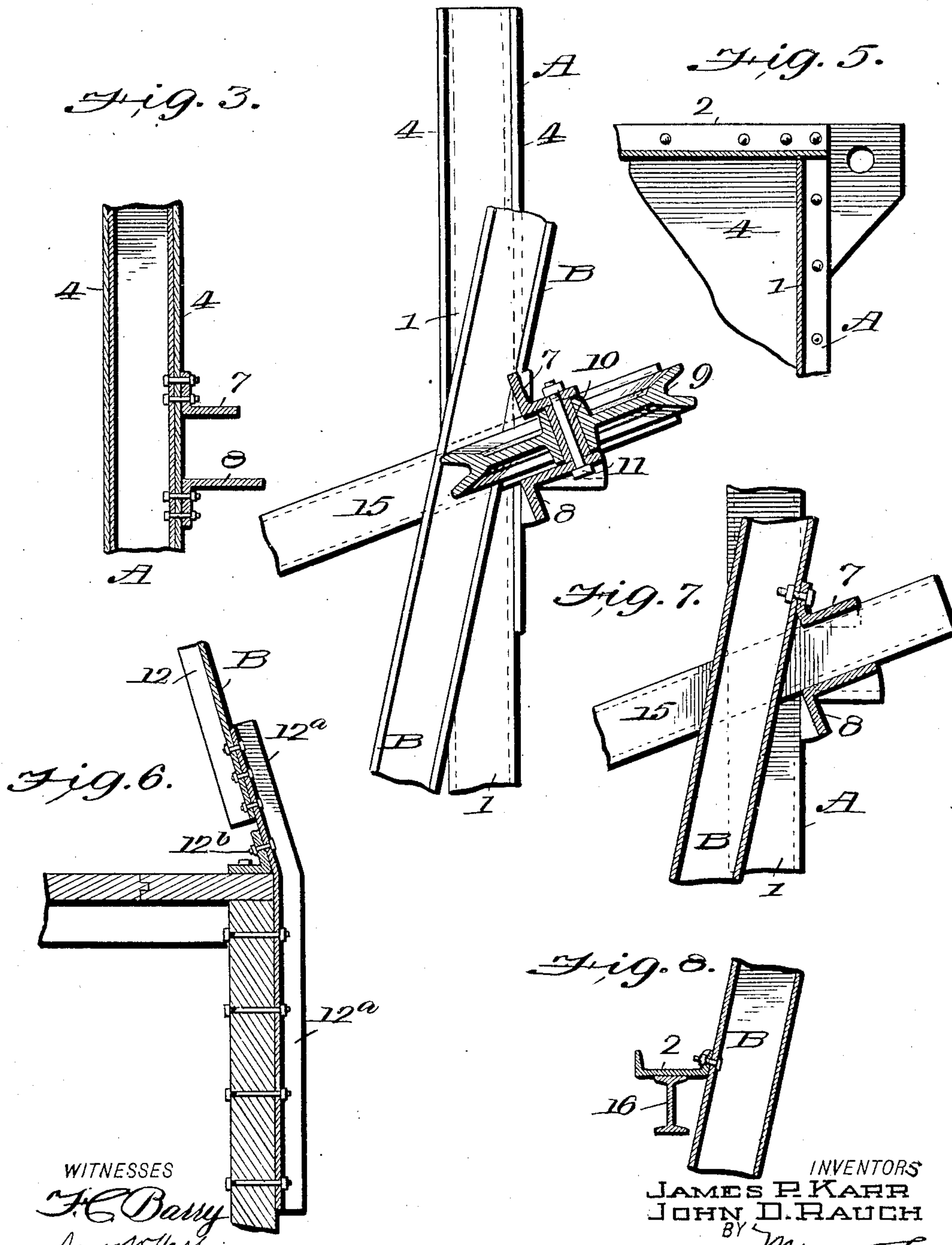
APPLICATION FILED FEB. 12, 1907.

3 SHEETS—SHEET 2.

*Fig. 4.*

*Fig. 3.*

*Fig. 5.*



WITNESSES

*J. E. Barry*  
*Amos W. Hart*

INVENTORS

JAMES P. KARR  
JOHN D. RAUCH

BY

*Munn & Co.*

ATTORNEYS

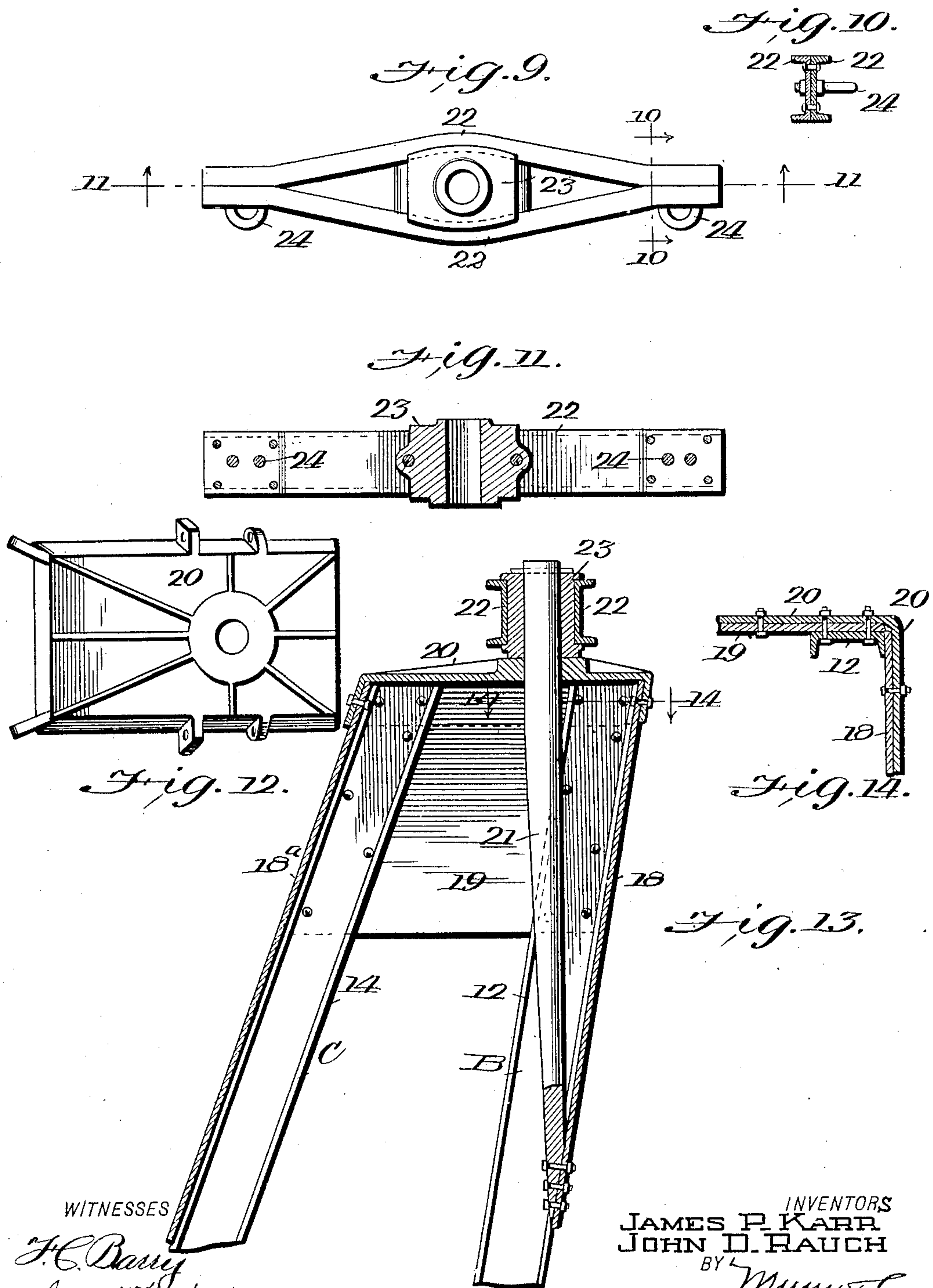
No. 869,438.

PATENTED OCT. 29, 1907.

J. P. KARR & J. D. RAUCH.  
SPUD AND HOISTING FRAME FOR EXCAVATORS.

APPLICATION FILED FEB. 12, 1907.

3 SHEETS—SHEET 3.



WITNESSES

*J. C. Barry*  
*Amos M. Hart*

INVENTORS  
JAMES P. KARR  
JOHN D. RAUCH

BY *Mum & Co.*  
ATTORNEYS



# UNITED STATES PATENT OFFICE.

JAMES P. KARR AND JOHN D. RAUCH, OF LOGANSPORT, INDIANA.

## SPUD AND HOISTING FRAME FOR EXCAVATORS.

No. 869,438.

Specification of Letters Patent.

Patented Oct. 29, 1907.

Application filed February 12, 1907. Serial No. 357,016.

*To all whom it may concern:*

Be it known that we, JAMES P. KARR and JOHN D. RAUCH, citizens of the United States, and residents of Logansport, in the county of Cass and State of Indiana, have invented an Improved Spud and Hoisting Frame for Excavators, of which the following is a specification.

Land and marine excavators are provided with a vertical frame erected at the front end of the wheeled platform or floating barge, as the case may be, for support of beams or booms and other parts connected therewith and required for hoisting, and otherwise operating the digger, shovel, or scoop by which material is dug and raised from a ditch or other excavation. It is a problem to so construct said frames that they shall have due strength and stability without excessive weight and without being too expensive in construction, besides adapting them for operation of the boom and digger-hoisting devices with convenience and little friction and wear.

As the result of long experience in use of excavators of the type indicated, we have devised and put in successful use a new and improved construction of said frames whereby defects incident to the usual construction are avoided and new advantages attained.

The details of construction, arrangement, and operation of parts are as hereinafter described and illustrated in the accompanying drawings, in which

Figure 1 is a front elevation of a barge and our improved frame erected thereon. Fig. 2 is a side view of the same. Fig. 3 is a detail vertical section on the line 3—3 of Fig. 1. Fig. 4 is a vertical section on the line 4—4 of Fig. 1. Fig. 5 is a vertical section of the corner portion of the main frame. Fig. 6 is a vertical section substantially indicated by line 6—6 of Fig. 2. Fig. 7 is an enlarged section on the line 7—7 of Fig. 1. Fig. 8 is a vertical section on the line 8—8 of Fig. 1. Fig. 9 is a plan view of the swivel yoke applied to the top of the hoisting frame for attachment of ropes or cables supporting the boom. Fig. 10 is a transverse section on the line 10—10 of Fig. 9. Fig. 11 is a longitudinal section on the line 11—11 of Fig. 9. Fig. 12 is a plan view of the cap applied to the A-frame and its braces. Fig. 13 is a vertical section of the cap applied to the A-frame and its braces. Fig. 14 is a horizontal section on the line 14—14 of Fig. 13.

The composite frame about to be described is made up of a vertical main, or "spud," frame, a so-called A-frame and the braces therefor, together with various attachments of these individual frames, as will be particularly set forth.

As shown in Fig. 1, the vertical spud frame A is set up at the head or bow of the barge or boat X, and the same is mainly composed of side posts 1, and top and bottom connecting bars 2 and 3, all securely fastened together by rivets or bolts and constructed of channel iron for the sake of maximum strength and rigidity as well as

lightness. The side posts 1 extend down on the sides of the barge X and are bolted thereto, as shown in Fig. 2. The upper corners of the frame A are braced by triangular metal plates 4, see Figs. 1 and 5, the same being securely riveted as shown. The outer upper corners of the plate serve for attachment and support for pivoted keepers or guides, through which bars or so called "spuds" (indicated in part by dotted lines, Fig. 1) are adapted to slide. In practice, such bars have broad feet, or bearing plates, for resting on the banks or sides of the ditch being excavated, and thus constitute side braces and supports for the barge or other base structure X. The frame A is braced laterally by means of guys or tie rods 5 which are attached to the triangular corner plates 4 and to diagonal bars 6 which are in turn rigidly attached to the lower cross-bars 3. This forms an effective means for bracing the frame laterally, in which direction it is subjected to great strain incident to use of the spuds indicated by dotted lines in Fig. 1, and to use of a boom as it swings laterally.

Two angle bars 7 and 8 are arranged transversely above the middle of the side posts 1 and attached thereto as well as to the lower portions of the triangular plates 4. These bars are spaced apart far enough to receive the pulleys 9 between which runs the hoisting rope indicated by dotted lines Fig. 2, which in practice extends from the winding drum of the hoisting mechanism to the top of the boom, not shown, from which the digger is suspended. The middle portions of the bars 7, 8, are turned to bring their inner opposite flanges parallel to the general direction of the hoisting rope, and by this means we also provide for supporting and journaling the pulleys 9.

As indicated in Fig. 4, each pulley is to be mounted on a sleeve 10 applied to a pivoted bolt 11, so as to revolve loosely thereon and between the bars 7, 8. Thus the latter not only provide support for the guide pulleys of the hoisting rope but connect and strongly brace the sides of the frame A.

The A-frame indicated by B is composed as to its main parts of two channel irons 12 which are, as shown in Fig. 1, set inclining outward at as great an angle as the width of the barge permits, their feet or lower ends being attached to obtuse-angled extensions 12<sup>a</sup>, see Fig. 2, which are secured to the sides of the barge X; see Figs. 1, 2, and 6. These extensions 12<sup>a</sup> formed of channel iron are secured to the deck of the barge by angle pieces 12<sup>b</sup>. Thus the A-frame is adapted to sustain great weight and is braced securely as is practicable. As shown in Figs. 1 and 2, it will be seen that the parts 12 composing the main portion of the frame are inclined sufficiently to pass between the upper cross-bar 2 and the lower cross-bars 7, 8, of the main or spud frame A. Directly in rear of the parts 12 comprising the A-frame are arranged two braces 14 which are likewise constructed of channel iron and connected with exten-



sions 14<sup>a</sup> attached to the sides of the barge X, and they are connected to the deck by the angle pieces 14<sup>b</sup>, and the braces 14 are inclined forward at a slightly greater angle than the A-frame B, the two being rigidly connected near their middle by means of inclined channel bars 15, see Figs. 2, 4 and 7. The said bars 15 are likewise bolted to the upper cross-bar 7 beneath which guide pulleys 9 are journaled. The main components 12 of the A-frame are connected transversely at the point where they cross the upper bar 2 of the spud frame, by a channel bar 16, the ends of the same extending, as shown by dotted lines Fig. 1, between the triangular corner plates 4 of the spud frame A. For further strengthening and supporting the A-frame laterally we connect the head of the same with the upper corners of the spud frame A by diagonal braces 17; see Figs. 1, 2.

It is highly important and even essential that the upper end or portion of the A-frame and the braces arranged in rear of it and constituting virtually a part of it, should be constructed in the strongest and most rigid manner, and to this end we apply thereto a plate metal cap whose construction is as follows. As shown in Figs. 1 and 13, a plate 18 is riveted to the members 12 of the A-frame, its sides being inclined correspondingly and its upper end cut away, or truncated. A similar plate 18<sup>a</sup> is riveted to the rear side of the braces 14 and shorter plates 19 are similarly riveted to and connect the sides of the A-frame and braces 14. The plates 19 are made thus shorter than the plates 18 and 18<sup>a</sup> in order that they may not interfere with the movement of the spuds when hoisted or raised to the highest point. The parts 12—12 and 14—14 are thus very rigidly connected and braced in all directions. To reinforce or strengthen them still further and also provide a bearing to be presently described, we construct and apply a flanged metal cap 20; see Figs. 1, 2, 12 and 13. The same consists, as shown, of a plate having a series of ribs for the sake of combining lightness and strength and a pendent flange which are flared, or otherwise formed at an angle, to adapt them to fit upon the head formed by the parts 12, 14, 18, 18<sup>a</sup>, and 19. As shown in Fig. 13, the flanges of the cap are riveted to the several plates and the horizontal portion of the cap rests directly upon the heads of the A-frame and its braces 14. The cap is provided with a vertical hole eccentrically located to receive a vertical post 21, whose lower end is extended and bolted to the lower portion of the plate 18; see Figs. 1 and 13. Upon the portion of the post 21 projecting above the cap 20, we apply a yoke 22, see Figs. 9 and 11, the same being constructed of two pieces or bars of channel iron arranged back to back and bolted together, their middle portions being separated sufficiently to receive a channel block or bearing 23. The ends of this yoke are provided with eyes or clevises 24 for attachment of guy ropes that extend to the head of the boom or dipper-beam (not shown) and serve to support the latter while allowing it to swing freely from side to side in a manner which is well understood.

We have found by actual practice that, by the construction and arrangement of parts described, we produce a frame which is exceedingly strong yet light, and in which the strains are so distributed that it remains rigid while hoisting the heaviest loads. In other words, by the combination and arrangement of parts described and composing the main or spud frame A, the A-frame

composed of four principal members, and two shorter members, all of which are firmly connected, we produce practically a single structure combining maximum lightness, strength, and rigidity. While the parts 12 have been described as the A-frame proper, the A-frame may be considered as including the braces 14 thereby constituting practically what may be termed a double A-frame, of which the diagonal side braces 17 extending to the corners of the spud frame A are adjuncts. The arrangement of these parts and the application of the housing and cap provide a strong support for the pivot post of the rotatable yoke, which, as is well understood, sustains a great strain in the operation of the machine. The arrangement of the A-frame proper, B, so that the legs 12 pass between the upper cross-bar 2 and the lower cross-bar 7 of the spud frame A and their attachment to said bars 2, 7, connects such parts in the strongest manner and thus avoids the use of supplemental braces and attachments which would be otherwise necessary. Further, by the provision of the extensions 12<sup>a</sup> and 14<sup>a</sup> for the legs 12 and 14, we avoid expense and difficulty in manufacturing and handling the A-frame as well as greatly facilitate its attachment to or connection with the barge. It will be further understood that while some of the parts have been referred to as constructed of channel iron they may and probably will be in practice constructed of channel steel.

It may be noted that the bottom bars 3 of the spud frame A extends beyond the side posts 1 and thus serve for attachment of other bars shown in part by dotted lines which are in practice pivoted to the lower ends of the spuds and thus always hold the latter a suitable distance from the sides of the barge X.

We claim—

1. In an excavator of the type indicated, the combination, with a base support, of a vertical main or spud frame comprising parallel side posts, a connecting top bar and other horizontal connecting bars arranged below the top one, of an A-frame comprising front legs which pass between the upper and adjacent bars of the spud frame and are secured thereto and other legs serving as braces and arranged in rear of the first-named ones, lateral legs or braces arranged diagonally and connected with the upper corners of the spud frame and the upper ends of the A-frame, a housing and cap for said A-frame, a pivot post secured in the cap and housing, and a rotatable yoke journaled on said post, as and for the purpose specified.

2. In an excavator of the type indicated, the combination, with the base support, and a main or spud frame comprising side posts and top and bottom bars arranged horizontally, of the A-frame proper comprising legs passing in front of and secured to the top bar of the spud frame, a support in rear of the spud frame to which said A-frame is also secured and devices connecting the upper ends of the legs, as described.

3. In an excavator of the type indicated, the combination, with the base support and a vertical or main frame secured thereto and including a horizontal top bar and other horizontal bars arranged below the same, of an A-frame comprising two front legs that pass between the upper bar and the next lower bars of the spud frame and are attached to both, rear legs or braces 14, and extension pieces 12<sup>a</sup> and 14<sup>a</sup> secured to the base and to the four legs of the A-frame, as described.

4. The combination, with a base support and a vertical spud frame including a horizontal top bar and other horizontal bars arranged below the same, of an A-frame comprising two front and two rear legs duly spaced apart and secured to the support, and inclined braces 15 con-



necting the rear legs of the A-frame with the lower horizontal bars of the spud frame, as described.

5 The combination, with a base support, of a vertical spud frame comprising side posts attached to the support, and a horizontal top bar and two other horizontal angle bars arranged below the same, the angle bars being spaced apart and their opposite adjacent flanges turned upward at an angle, and guide pulleys for the hoisting rope journaled between said bars and at an angle corresponding to the general direction of the hoisting rope, as described.

10 6. The combination, with the base support, of a spud frame comprising vertical side posts and top and bottom transverse connecting bars, and corner braces 4 comprising triangular plates riveted to the side posts and the upper cross-bar, and serving as pivot supports for spuds, and an A-frame which is rigidly connected with the spud frame, substantially as described.

15 7. The combination, with the A-frame composed of front legs 12 and rear legs or braces 14, of a housing comprising plates attached to the sides of the several legs and a flanged metal cap fitting over and resting upon the ends of the legs and the housing, and a post extending through

the cap and secured in vertical position, and a device applied to its upwardly projecting end to serve for attachment of means for supporting a boom, substantially as described. 25

8. The combination, with an A-frame, a housing and a cap therefor, and a pivot post arranged in and projecting from the cap, of a yoke pivoted on the post and comprising two channel bars arranged back to back and separated in their middle portions, and a bearing block arranged between them and receiving the pivot post, as described. 30

9. The combination, with a base support, of a spud frame comprising side posts, top and bottom bars and triangular corner plates secured to the posts and said top bar, and diagonal ties and braces 5 attached to the corner plates and connected with the bottom bars, substantially as described. 35

JAMES P. KARR.  
JOHN D. RAUCH.

Witnesses:

FRANK P. WILKINSON,  
HARRY C. KESLING.