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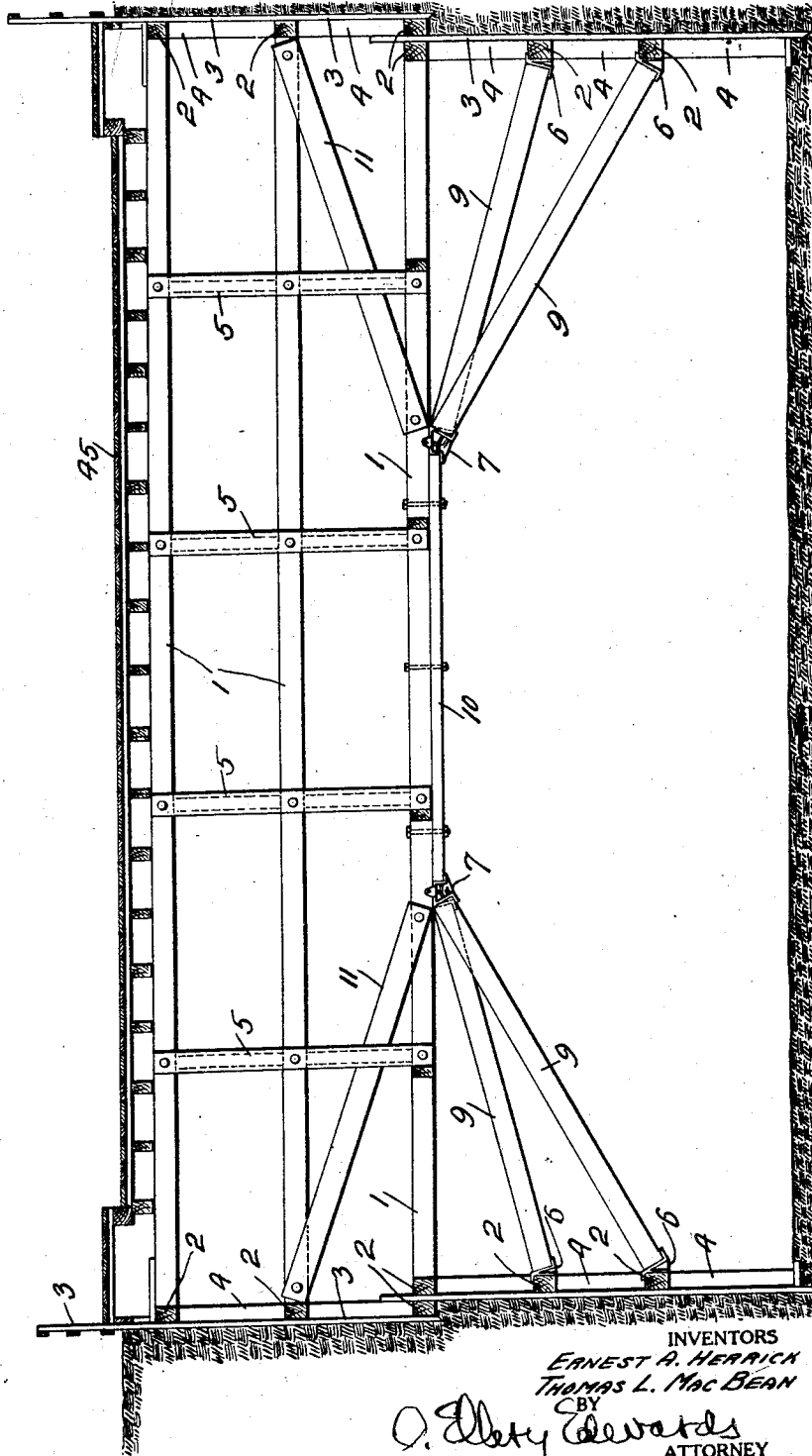
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TIMBERING OR BRACING SYSTEM

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Fig. 1.



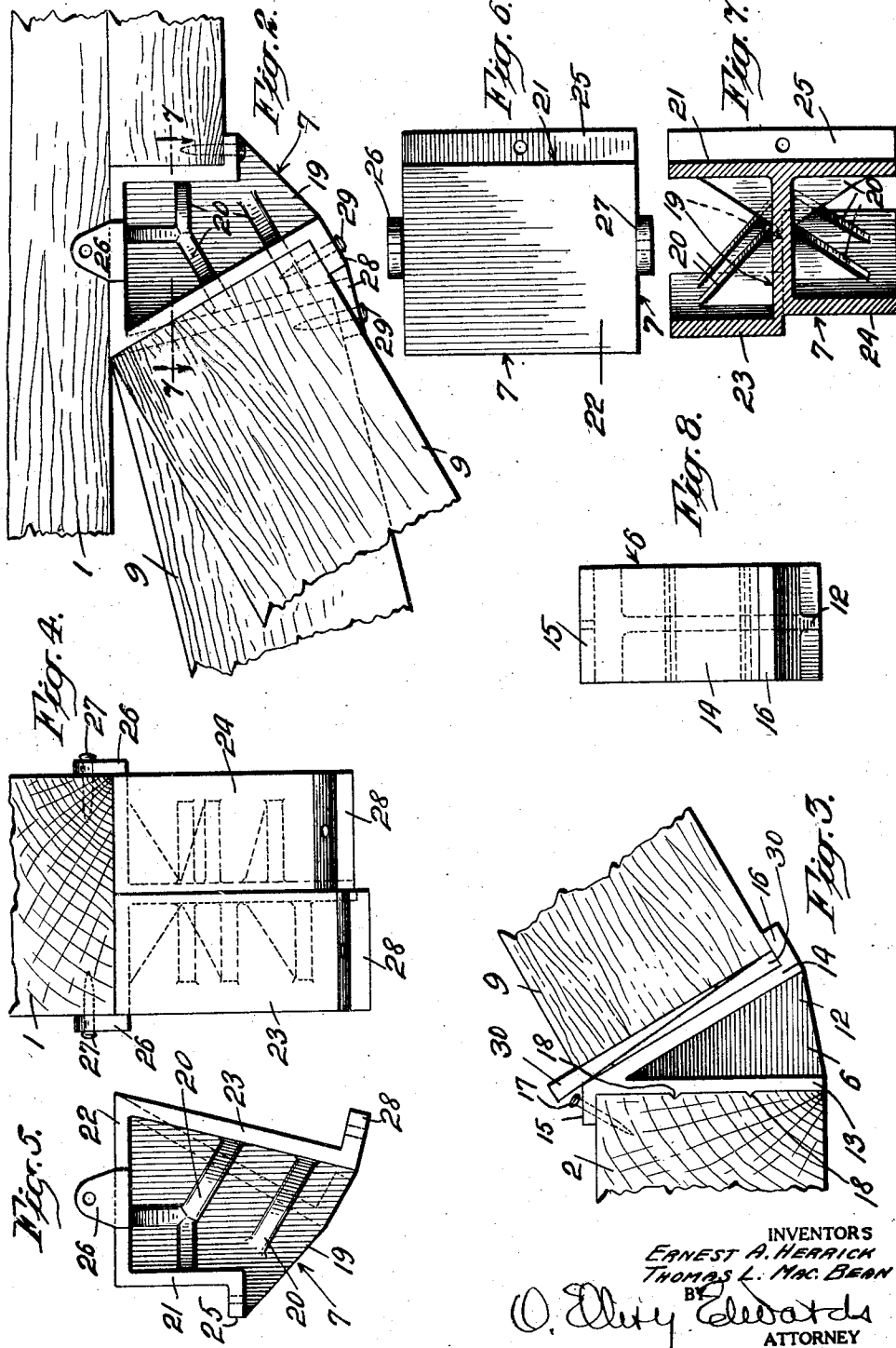
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INVENTORS
ERNEST A. HERRICK
THOMAS L. MAC BEAN
BY
O. W. Edwards
ATTORNEY

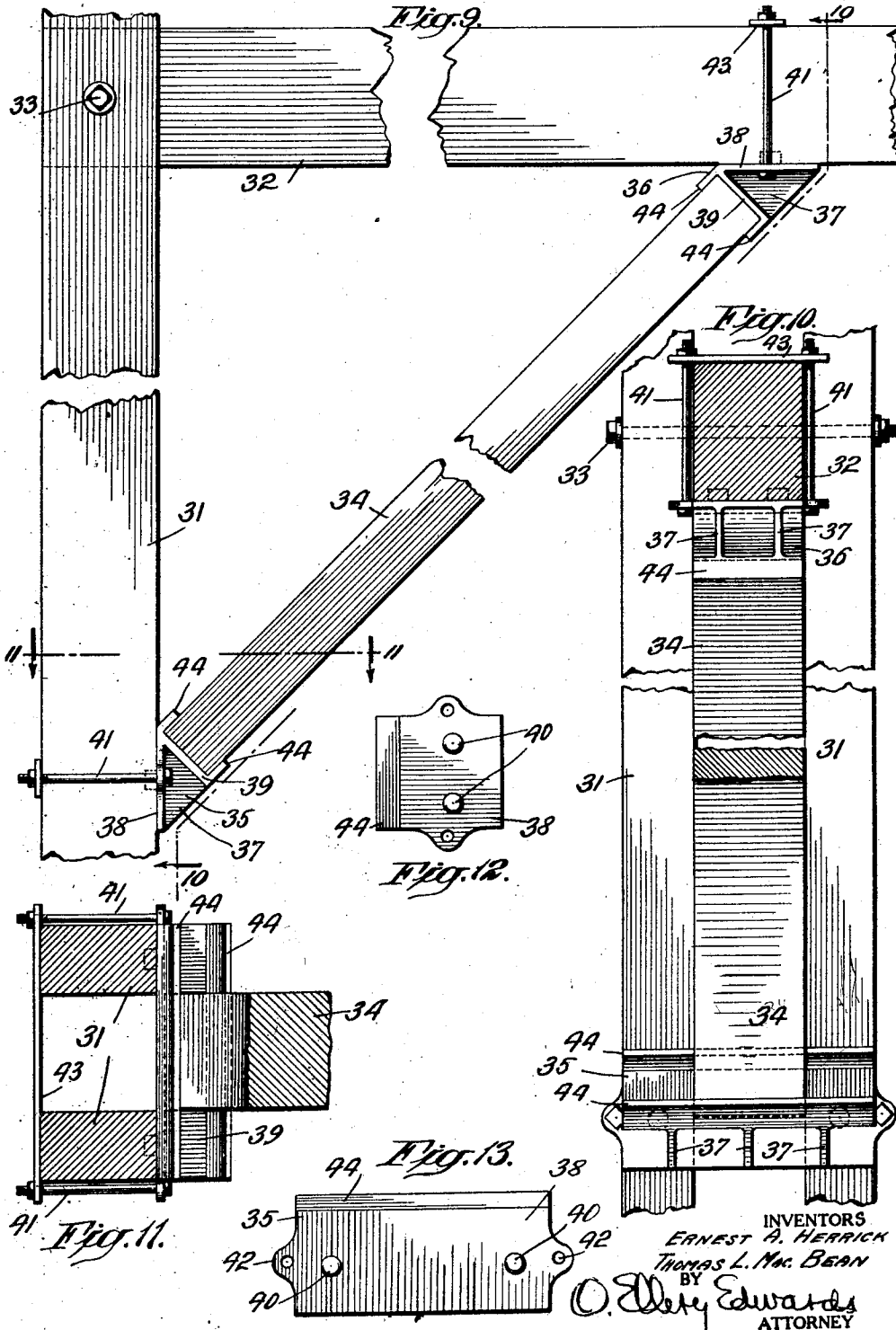
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UNITED STATES PATENT OFFICE.

ERNEST A. HERRICK AND THOMAS LEONARD MacBEAN, OF NEW YORK, N. Y.

TIMBERING OR BRACING SYSTEM.

Application filed March 21, 1925. Serial No. 17,208.

The object of our invention is a new system of timbering or bracing the sides or banks of any excavation in a manner that will protect the ground adjacent to the excavation against settlement and at the same time afford sufficient head room to permit the use of a steam or power shovel, or other mechanical excavators for excavating and disposing of the materials required to be excavated. This and other objects are accomplished by our invention, one embodiment of which is hereinafter more particularly set forth.

For a more detailed description of our invention, reference is to be had to the accompanying drawings, forming a part hereof, in which

Figure 1 is a sectional view showing the timbering of an open cut embodying our invention.

Figure 2 shows a bracing block and adjacent timbers.

Figure 3 shows another form of bracing block and adjacent timbers.

Figure 4 is a front elevation of the bracing block shown in Figure 2, together with a portion of a timber which supports it.

Figure 5 is a side elevation of the bracing block shown in Figure 4, the view being taken at right angles to the view shown in Figure 4.

Figure 6 is a plan view of the bracing block shown in Figure 2, and

Figure 7 is a sectional view thereof, taken on the line 7—7 of Figure 2, looking in the direction of the arrows.

Figure 8 is a front elevation of the diagonally disposed timber seat shown in Figure 3.

Figure 9 shows a modified form of bracing block and the adjacent timbers which support the same.

Figures 10 and 11 are sectional views, taken on the lines 10—10 and 11—11, respectively, of Figure 9, looking in the direction of the arrows.

Figures 12 and 13 are views of the bracing blocks shown in Figure 9, the views being taken next the horizontal and vertical timbers.

Throughout the various views of the drawings, similar reference characters designate similar parts.

Generally speaking, this invention consists of a combination of braces and bracing

blocks which are arranged and disposed in such a way as to form an arch from side to side of the excavation, under which the work can be carried on by the use of mechanical excavating machinery. It is particularly suitable in trench excavations for the construction of pipe lines, sewers or subways in city streets whether the work is carried on in open cut or under decking.

In the herein described embodiment of our invention, the excavation is first carried down to a depth that will permit the placing of one or more sets of through braces 1 which are placed transversely to the line of excavation and butt against the side stringers 2, in the conventional manner, and these stringers 2 support the usual sheeting 3 that protects the sides of the excavation in the usual way. The braces and stringers are kept in position vertically and tied together by posts 4 and straps 5 which are bolted in in the usual way.

When the excavation has reached the level of the lowest through brace 1 and the same is in position, as above described, a second set of sheeting 3 is driven down, in the conventional manner, and a second set of stringers 2 are put in place and carried by posts 4 in the usual manner. The second set of sheeting 3 may be inside the first set, as shown in Figure 1, and their exteriors are against the interior of the lowest stringers 2 of the top set. To permit the second set of stringers 2 to be inserted, it is necessary to shorten the lowest through braces 1 so as to permit the insertion of the lower stringers and this is done in the usual manner. The lower stringers 2 are provided at suitable intervals with bracing blocks 6 which are shown in detail in Figures 3 and 8 and the lower surfaces of the lowest through braces 1 are provided with corresponding bracing blocks 7 shown in detail in Figures 2, 4, 5, 6 and 7 and these bracing blocks 6 and 7 are connected by raker braces 9 and the bracing blocks 7 are kept properly placed by means of spreaders 10 so that the thrusts due to the pressure of the earth on the lower sheetings 3 are transmitted in opposition to each other and if there be any upward thrust of any consequence, it can be taken care of by counteracting braces 11 secured and disposed substantially as shown in Figure 1. These counterbraces 11 may be secured in any suitable way as by bolts, as in

licated, or they may be provided with bracing blocks which will not be described.

Where bracing is inserted in the usual manner, and without the use of our improved bracing blocks, it is necessary to cut and trim and in other ways mutilate the bracing so that it cannot be used again without reshaping and consequential loss of time, labor and material. Furthermore, it is difficult to get the timbers cut and connected in such a way that the connections will be efficient. These difficulties are overcome by the use of the bracing blocks which will now be described in detail and through the use of which the timbers are practically uninjured and not trimmed and may be used again and again.

The simplest form of bracing block is shown in Figures 3 and 8. This form of block is preferably made of a casting having a connecting web 12 at each side of which are seating webs 13 and 14. The web 13 is provided with an upper flange 15 which rests on a timber 2 and the web 14 has a flange 16 which supports one end of a raker brace 9. To hold the bracing block 6 in place it is preferable to perforate the flange 15 and drive a nail 17 through this perforation and also to provide ridges 18 which will take into the wood of the stringer 2, if desired these ridges may be omitted. It will be noted that the seats of the two webs 13 and 14 are at an angle one to the other, according to the location of the bracing block, the lower ones having the larger angles. Of course, these bracing blocks are designed according to the positions which they occupy, all of which may be standardized according to the design of the timbering.

The other brace blocks 7 are more complicated in that they have to provide for a multitude of raker braces in each instance. Here there is the connecting web 19 corresponding to the web 12 which has been described above, and this web 19 is reinforced by laterally extending reinforcing webs 20. On three sides the web 19 is bound by the seating webs 21, 22, 23 and 24 which will now be described in detail. The web 21 is adapted to rest against the end of the spreader 10 and has a laterally extending perforated flange 25 to enable it to make a good fit. The web 22 sits against the bottom of a through brace 1 and has laterally extending, perforated ears 26 by means of which the bracing block 7 may be held on the bottom of a brace 1 by means of suitable nails 27. The webs 23 are provided with laterally extending perforated flanges 28 which are adapted to support an end of a raker brace 9 and these raker braces may be secured in place by means of nails 29 which pass through the perforations, as shown. The seat 24 is identical with the seat 23 except that it is placed at a different angle with

regard to the web 22 so that a raker brace 9 will seat firmly and securely against this web and another brace will seat against the web 23 and these braces will go to different levels to the corresponding bracing blocks 6, as above described.

From time to time it is desirable that all slackness may be taken up in the bracing and the conventional way of doing this is to place wedges 30 which are driven in tight so as to take up any looseness.

The use of bracing blocks, as above described, makes it possible to use the same timbers over and over again without mutilation and without injury so that they will last indefinitely and they also permit the repeated use of a standardized construction.

A different form of brace, but embodying the same general idea is shown in Figures 9 to 13 inclusive. Here the vertical timbers 31 and the horizontal timbers 32 are bolted together at their intersections by suitable bolts 33, or held in any other desired way, and they are also united by means of braces. 34 connected to brace blocks 35 and 36, respectively. The brace blocks 35, in the construction shown, have connecting webs 37 with two seating webs 38 and 39, one at each side. The web 38 in the embodiment shown has two projecting lugs or dowels 40 adapted to take into the respective upright timbers 31 against which the web rests, suitable holes being made for this purpose, whereby the bracing block is kept from slipping and it is held against the uprights 31 by means of bolts 41 that pass through projecting ears 42 that extend from the web 38 and also pass through a perforated bar 43 on the rear of the posts 31, as shown. The seat 38 has two laterally extending flanges 44 which are adapted to embrace the end of the timber 34 and hold the lower end of the same in place.

The upper brace block 36 is the same as the lower except that it is shorter and has only two webs 37 instead of three. Its lugs 40 are closer together, but as the parts correspond exactly, except for this difference in length, a further description is unnecessary.

The advantages of our improved construction can be readily comprehended from the foregoing. It provides a firm support for the sides or banks of an excavation and at the same time affords ample head room for the use of power excavating machinery and it also provides room for construction work of any kind. It also provides a construction which can be used in covered or open work, as desired. In Figure 1 is shown a construction used in covered work where the planking 45 for a street is shown in place.

It will be understood that the structures herein described may be varied without in

any way departing from the scope of this invention, as defined in the following claims.

Having thus described our invention,
what we claim is:

1. A bracing means for the sides or banks of an excavation comprising transverse timbering disposed between said sides, longitudinally disposed timbering and bracing members for said transverse timbering and longitudinal timbering inclined inwardly and upwardly from the points of contact with said sides, whereby the pressure of the sides upon said bracing members aids in supporting said transverse and longitudinal timbering.

2. A bracing means for the sides or banks of an excavation comprising transverse timbering disposed between said sides, longitudinally disposed timbering, a roadway supported by said timbering and bracing members for said transverse timbering and longitudinal timbering inclined inwardly and upwardly from the points of contact with said sides, whereby the pressure of the sides of the excavation is utilized for supporting said roadway.

Signed at the city of New York, county of New York and State of New York.

E. A. HERRICK.
T. L. MacBEAN.