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DITCH BRACE

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FIG. 1

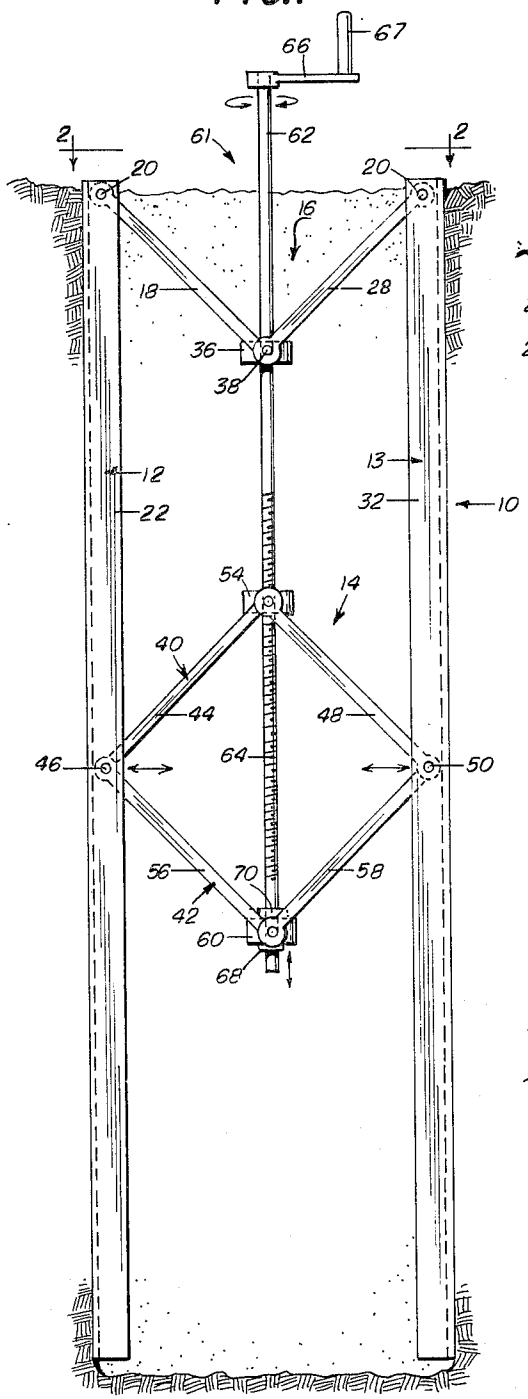
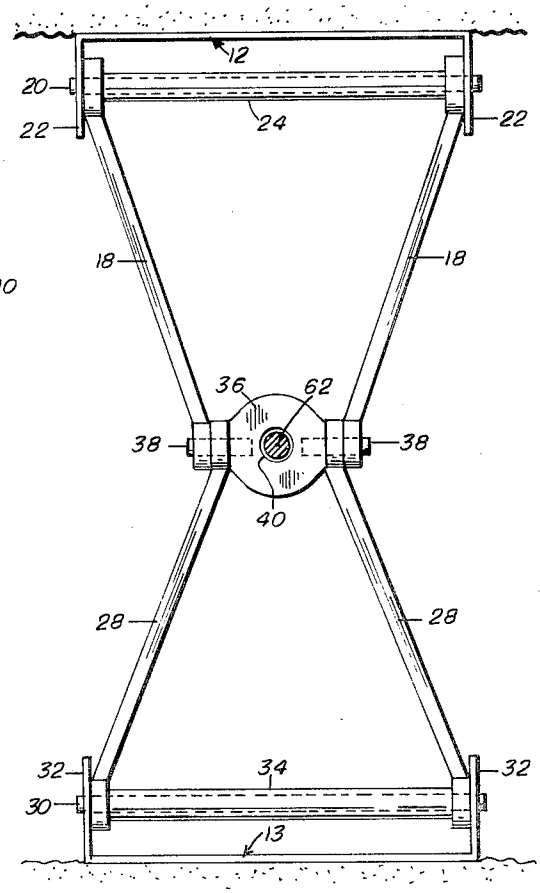


FIG. 2



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DITCH BRACE

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This invention relates to a ditch brace and more particularly to a ditch brace adapted to readily and easily conform to the ditch walls which it is to brace.

The device of this invention is particularly useful in trench work of the type used in installation of sewer pipes, water pipes, gas mains and any other similar type of operation. The trench side walls must in all cases be adequately braced to assure that there will be no caveins as serious injury will certainly be sustained by a worker when such occurs. The cost of safe bracing is a major expense item in this field of work. In the past it has been the practice to use boards somehow interbraced to support the vertical walls of the ditch. In this kind of installation it is necessary that someone enter the trench in the unbraced condition in order to install the planks and braces. The hazards of such procedure are obvious.

The need for inexpensive and safe ditch bracing is well recognized by those in this field.

It is with the many problems encountered in this work in mind that there has been developed the ditch brace of this invention.

In view of the foregoing it is an object of this invention to provide a ditch brace that will be readily adaptable for all types of ditch brace problems and yet simple in construction and operation.

It is another object to provide a ditch brace which is inexpensive yet completely reliable and safe.

It is yet another object to provide a ditch brace which is sufficiently light so that it may be handled by one man and installed properly in the ditch without the operator entering the ditch.

A further object is the provision of a ditch brace that may be reused almost indefinitely with proper maintenance as contrasted to some shoring methods wherein the shoring material is left in the trench and covered up.

A further object is the provision of a ditch brace which when placed in the ditch will readily accommodate itself to sloping ditch walls.

It is yet another object to provide a ditch brace having a pair of shoring members held in spaced relation by a toggle assembly pivoted to each shoring member at a point generally equidistant from the extremities of each shoring member and screw means for operating the toggle links to vary the distance between the shoring members.

The above and other objects of this invention will become apparent when taken in conjunction with the following detailed description and drawing showing by way of example a preferred embodiment of this invention.

In said drawing:

FIGURE 1 is a side elevational view showing the device of the invention installed in a ditch; and

FIGURE 2 is a plan view looking downward along line 2—2.

As illustrated in the two figures of the drawing the ditch brace 10 comprises a pair of channel shaped shoring members 12, 13 of generally rectangular shape. In actual practice these shoring members are approximately eight feet high. These shoring members are held in spaced relation by means of a toggle assembly 14, pivotally secured to the shoring members 12 and 13 generally equidistant from the extremities of the shoring members.

In addition a stabilizer toggle unit 16 is mounted near the upper ends of the shoring members 12 to assist in limiting and controlling relative movement of the two

shoring members 12. The stabilizer toggle assembly 16 comprises a pair of toggle links 18 pivotally mounted on shoring member 12 by means of shaft 20 fitted and carried by opposite flanges 22 of the channel shaped shoring member 12. The links 18 are further held in spaced position by means of cylindrical bushing 24 fitted over shaft 20 between the links 18—18. Likewise a pair of toggle links 28 are pivotally mounted on shoring members 13 by means of shaft 30 fitted and carried between opposite flanges 32 of the channel shaped shoring member 13. The links 28 are further held in spaced relation by means of cylindrical bushing 34 fitted over shaft 30 between the links 28—28. It will be noted that the pairs of toggle links 18—18 and 28—28 are pivotally mounted near and equidistant from the upper end of the shoring members 12 and 13, respectively.

These two pairs of toggle links 18—18 and 28—28 extend downwardly and inwardly from the shoring member where they pivot and meet at a generally common horizontal axis. A guide block 36 pivotally mounts these inward ends of links 18—18 and 28—28 by means of pins 38—38. The guide block 36 is provided with a centrally situated vertical hole 40 for purposes to be discussed later.

The toggle assembly 14 comprises upper and lower toggle units 40 and 42, respectively. The upper toggle unit 40 includes a pair of toggle links 44 pivotally secured to shoring member 12 by means of shaft 46 in the same manner as toggle members 18—18 illustrated in FIGURE 2. A pair of toggle links 48 is pivotally secured to shoring member 13 by means of shaft 50 in the same manner as links 28—28 of FIGURE 2. The shafts 46 and 50 are mounted generally equidistant from the extremities of the shoring members. Link pairs 44 and 48 extend inwardly and upwardly from their mounting shafts and meet at a common horizontal axis. A head plate 54 pivotally mounts the inward ends of link pairs 44 and 48 in the same manner that guide block 36 in FIGURE 2 mounts links 18—18 and 28—28. Upper head plate 54 has a centrally located vertical hole threaded for purposes to be discussed later. The lower toggle unit 42 is mounted in the same general manner as the upper toggle unit 40 in that toggle link pair 56 is pivotally mounted by shaft 46 and toggle link pair 58 is pivotally mounted by shaft 50. In this instance the link pairs 56 and 58 extend inwardly and downwardly from the point where they pivot on the shoring members 12 and 13, respectively, and converge at a common horizontal axis. A lower head plate 60 pivotally mounts the ends of link pairs 56 and 58 in the same manner as before described for link pairs 44 and 48. The lower head plate has a centrally positioned vertical hole for purposes to be discussed later.

An adjusting screw assembly 61 is employed to expand and contract the toggle assembly 14 to vary the distance between shoring members 12 and 13. This adjusting screw assembly includes vertical rod 62 the lower half of which is a threaded portion 64. A crank 66 is secured to the upper end of the rod and a handle 67 is mounted on the crank for ease of operation. The adjusting screw assembly is assembled for use by passing the rod 62 downwardly through hole 40 in guide block 36, then threading portion 64 downwardly through the threaded hole in upper head plate 54 and continuing to pass the rod 62 downwardly until the lower end portion passes through the vertical hole in the lower head plate 60. The lower end of the rod 62 is freely rotatable in the lower head plate 60 and is held in position with respect to this head plate by means of collars 68 and 70 positioned on the rod 62 immediately above and below the lower head plate and suitably secured to the rod 62. With the adjusting

screw assembly **61** so assembled rotation of rod **62** will cause the toggle assembly **14** to expand or contract and thereby move the shoring members toward or away from each other.

The mode of operation of this ditch brace is undoubtedly obvious in view of the above description, however, a brief résumé follows:

First of all, this ditch brace is light enough so that one man may handle same without difficulty. After a ditch has been dug and it is desired to shore the walls thereof, the toggle assembly **14** is contracted by rotation of rod **62** so that the shoring members **12** and **13** will be apart a distance less than the width of the ditch. With the brace in such adjustment it is gently lowered into the ditch so that the flat faces of the shoring members **12** and **13** will face the walls of the ditch. With the brace so positioned the rod **62** is rotated to expand the toggle assembly **14** thereby spreading the shoring members **12** and **13** apart so that they will firmly engage the ditch walls. It should be noted that all of this is accomplished without anyone entering the ditch. This is a very important safety feature of this device.

The function of the stabilizer toggle assembly **16** is twofold. First of all, the guide block **36** is used to provide a guiding means for the rod **62**, secondly the entire toggle assembly is useful in preventing undue movement of the upper ends of the shoring members **12** and **13**. This is particularly advantageous when it is observed that the shoring members are free to pivot about shafts **46** and **50** to accommodate ditch walls which may vary in slope. For example, one ditch wall may be vertical while the opposite wall has substantial slope. This pivot arrangement makes it possible for the shoring members to accommodate such wall disposition.

The advantages of this ditch brace are evident from the foregoing description and drawing. The scope of the invention is to be limited only by the claims which follow.

I claim:

1. A ditch brace adapted to be placed in a ditch having somewhat parallel vertical walls so that it will engage and support these walls to prevent collapse or cave-in, said ditch brace comprising a pair of elongated shoring channel members, an adjustable toggle assembly pivotally connected to said shoring members intermediate their

ends to maintain same in spaced relation and allow said shoring members to be disposed at an angle to one another so as to bear against ditch walls which are not parallel to each other, said adjustable toggle assembly comprising upper and lower toggle units, the upper toggle comprising a pair of toggle links pivotally secured to each respective shoring member, said toggle link pairs converging upwardly, a head plate pivotally mounting the inward ends of the toggle link pairs, the lower toggle unit comprising a pair of toggle links pivotally secured to each respective shoring member at the same point as the upper toggle link pairs, said lower toggle link pairs converging downwardly, and a lower head plate pivotally mounting the lower toggle link pairs, the upper head plate having a threaded vertical hole, a rotatable screw threadedly carried in the threaded hole in the upper head plate and rotatably secured to the lower head plate whereby rotation of the screw will vary the distance between the head plates and thereby vary the distance between the shoring members.

2. The invention as set forth in claim **1** and wherein a stabilizer toggle unit is mounted near one end of the brace, said stabilizer toggle comprising a pair of toggle links pivotally secured to one shoring member, a second pair of toggle links pivotally secured to the other shoring member, both toggle link pairs being pivoted near the extremities of the shoring members and equidistant therefrom, said toggle link pairs extending inwardly and meeting at a common horizontal axis, a guide block pivotally mounting the ends of the inwardly extending toggle links, and said guide block having a vertical hole through which the rotatable screw passes.

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