

W. HENDERSON.

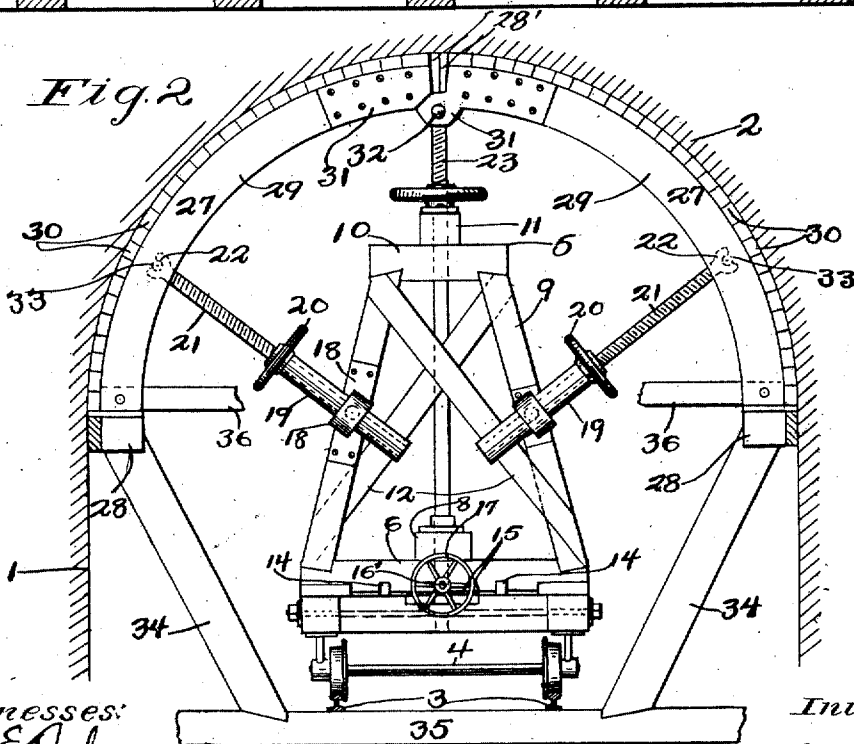
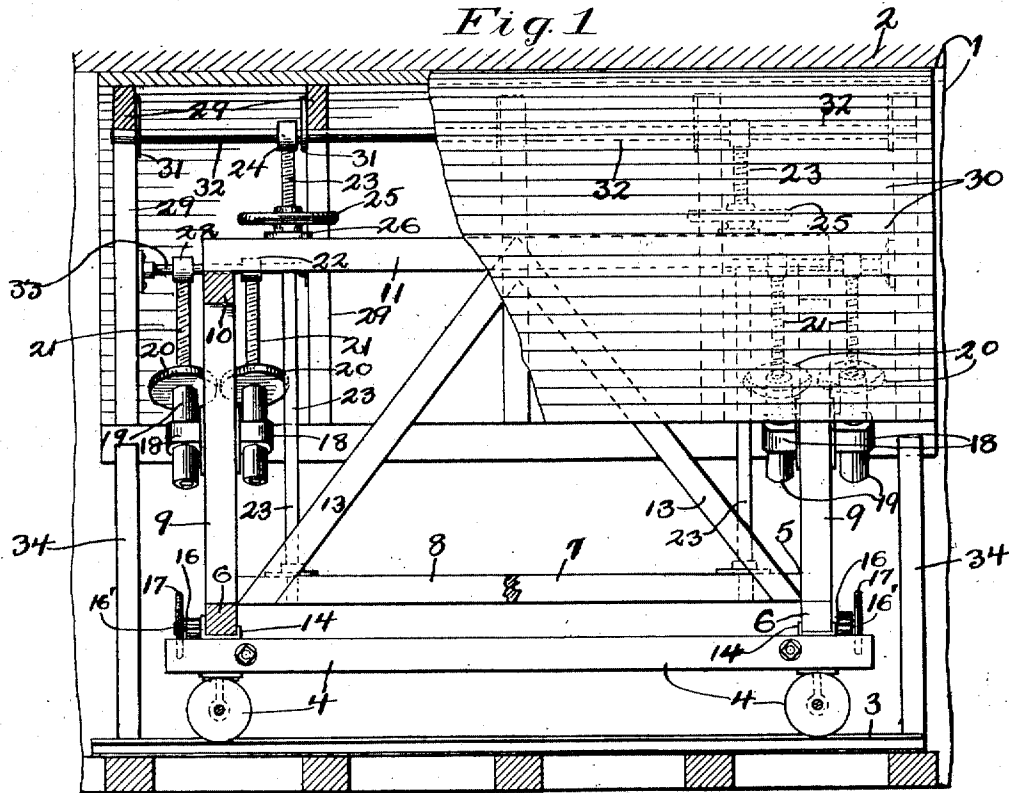
FRAMING FOR CONCRETE AND CEMENT CONSTRUCTIONS.

APPLICATION FILED APR. 30, 1908.

984,216.

Patented Feb. 14, 1911.

2 SHEETS—SHEET 1.



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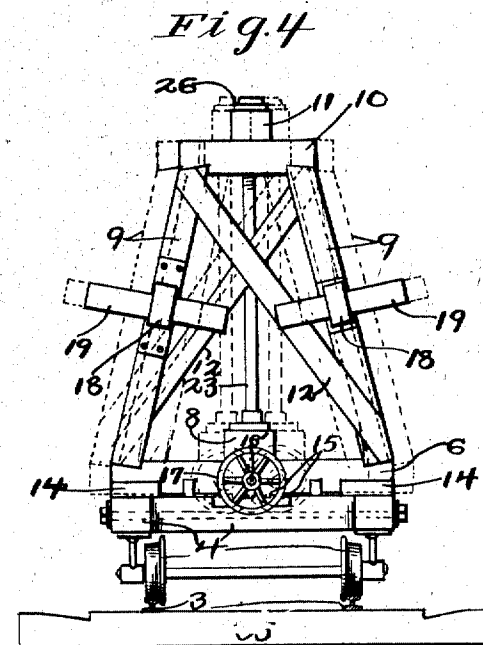
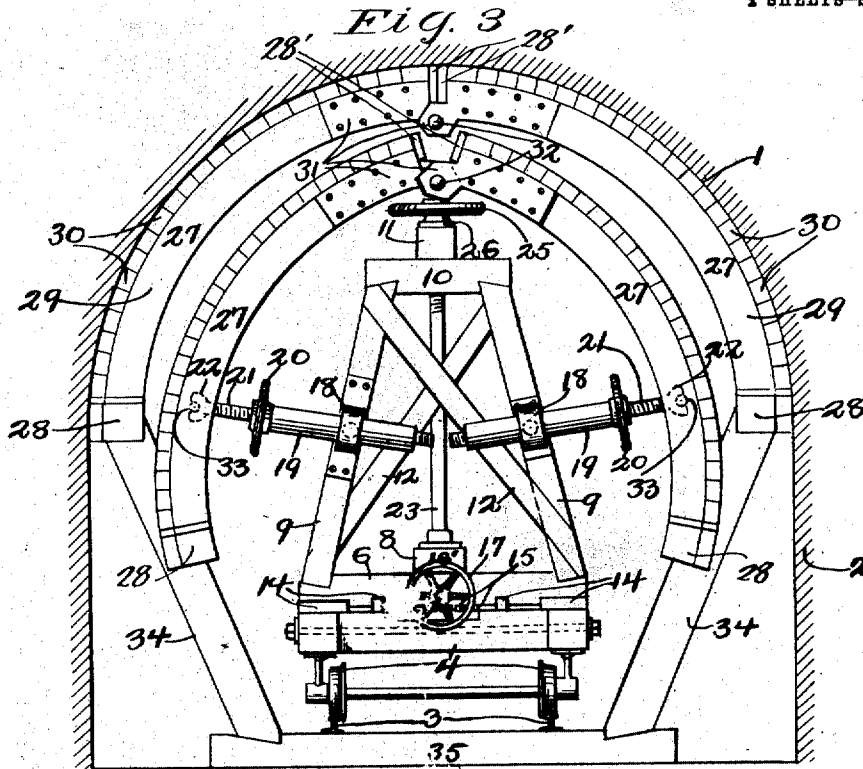
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2 SHEETS—SHEET 2.

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UNITED STATES PATENT OFFICE.

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FRAMING FOR CONCRETE AND CEMENT CONSTRUCTIONS.

984,216.

Specification of Letters Patent.

Patented Feb. 14, 1911.

Application filed April 30, 1908. Serial No. 430,064.

To all whom it may concern:

Be it known that I, WALKER HENDERSON, a citizen of the United States of America, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Framings for Concrete and Cement Constructions; and I hereby 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 pertains to make and use the same.

This invention relates to framing for concrete and cement constructions and more especially to the framing which is employed to temporarily support the plastic material with which the interiors of tunnels and similar arch constructions are finished.

One of the objects of the invention is to provide a frame-work which can be readily applied to the plastic material on the inner surface of tunnels, sewers, etc., and which, after the material has dried and hardened, may be removed intact and employed again.

A further object of the invention is to provide a frame-work of this character which can be supported from a truck and which can be collapsed so as to enable the truck, with the frame-work thereon, to be transported through the tunnel or sewer and through other similar frame-works which may be in position therein.

Still further objects of the invention are to combine a frame-work of this character with a truck in such manner as to permit of its ready adjustment with relation to the truck to compensate for the failure to locate the tracks for the truck within the center of the tunnel or sewer and to provide mechanism which will permit of the ready and convenient adjustment of the frame-work from the truck.

Generally speaking, the invention may be defined as consisting of the combination of elements illustrated in the drawings forming part hereof and embodied in the claims hereto annexed.

Referring to the drawings, Figure 1 represents a view, partly in side elevation and partly in section, of a truck having my frame-work thereon and so much of the interior of the tunnel as is necessary to show the manner of applying my invention thereto. Fig. 2 represents an end elevation of the construction shown in Fig. 1, the bottom sill of the frame-work being shown in sec-

tion. Fig. 3 represents a view, similar to Fig. 2, and illustrating the manner in which the frame-work can be collapsed; and Fig. 4 represents an end elevation of a truck having thereon the frame by which my collapsible frame-work is supported, the laterally adjusted positions of such frame being shown in dotted lines.

Describing the parts by reference characters, 1 represents a tunnel or sewer, the inner surface of which is provided with a cement or concrete lining 2. The tunnel is provided with tracks 3, whereon the truck 4 may be operated. This truck is provided with a floor frame on which there is mounted a frame 5, by means of which my frame-work may be supported and adjusted. Frame 5 comprises a pair of end sills 6 connected by side sills 7 and a center sill 8 extending from end sill to end sill. From each outer corner of the lower frame formed by the end sills 6 and side sills 7, there extends a corner post 9. The posts 9 at each end of the frame converge at their upper ends and are connected by an upper end sill 10. A central sill 11 connects and rests on top of sills 10. Cross braces 12 are provided, connecting the lower end of one of the corner posts 9 with the upper end of its opposite corner post, as clearly shown in Figs. 2, 3, and 4, and diagonal braces 13 connect the opposite ends of sill 8 with the central portion of sill 11. The frame formed of parts 6 to 13 inclusive is supported on top of the floor frame of the truck and is laterally adjustable thereon. This adjustment is secured by the following construction: The sills 6 are supported in straps 14 carried by the floor frame of the truck, at the corners thereof. Each end sill of the truck is provided with a rack 15 with which there meshes a pinion 16 carried by a shaft 16', which is supported by each end sill 6 of the frame 5. Each shaft is provided with a hand-wheel 17. By means of the construction just described the frame 5 may be adjusted laterally with respect to the truck, to compensate for the failure of the tracks 3 to occupy the exact central portion of the tunnel or sewer.

One corner post 9 has swiveled to opposite sides thereof clamps 18, each of which carries a sleeve 19. 20 denotes a hand-wheel nut which bears against each sleeve and which is threaded onto a threaded adjusting rod 21, the outer end of which is sub-

stantially U shaped to form a yoke 22. Near each end, the frame 5 is provided with a vertically extending rod 23, the lower end of which is supported by the sill 8 and the upper end of which extends through sill 11 and is provided with a yoke 24 similar to yoke 22. The upper end of rod 23, below yoke 24, is provided with a thread for the reception of a hand-wheel nut 25 which bears against a washer 26, carried by sill 11.

The frame-work which I employ with the supporting frame above described consists generally of a pair of symmetrical wings or sections shaped to conform to the curved inner surface of the tunnel or sewer and united by hinges.

27 denotes the opposite wings or sections of the frame-work. Each of these wings or sections comprises a bottom sill 28 and a top sill 28' connected by a suitable number of curved joists 29. The curvature of these joists will be the same as the curvature of the interior of the tunnel or sewer, and said joists carry the deck 30 which engages the interior of the tunnel wall and supports the cement while drying and hardening. The upper ends of the joists 29 are provided with hinges 31, by means of which the two wings or sections of the frame-work are hinged to a common hinge rod 32, which extends from end to end of the frame-work, as shown in Fig. 1. 33 denotes short rods extending between the end joists and the adjacent joists of each section or wing. These rods are adapted to be engaged by the yokes 22 on the upper ends of rod 21, and rod 32 is adapted to be engaged similarly by the yokes 24 on rods 23. The frame-work is thus supported on the vertically adjustable rods 23 and the laterally adjustable rods 21.

In operation, the frame-work will be applied to the supporting frame 5, with the yokes of the rods 23 and 21 in engagement with rods 32 and 33 respectively. By operating the hand wheel nuts 20 and 25 in the appropriate direction, the frame-work can be collapsed sufficiently to enable it to pass through any frame-work which may have been applied to the roof of the tunnel or sewer. When in proper position, the hand-wheel nuts 20 and 25 are adjusted in proper direction to elevate and expand the frame-work carried thereby and bring the same into engagement with the roof of the tunnel or sewer. After having been positioned in the manner described, braces 34 are applied to the sills 28, the lower ends of said braces being conveniently supported from one of the cross-ties 35. The hand-wheel nuts may then be unscrewed to disengage the yokes 22 and 24 from the frame-work, and the truck may then be sent from end to end of the tunnel or sewer without any interference with the frame-work.

Should the truck not occupy the exact central portion of the tunnel or sewer, before applying the frame-work to the roof the frame 5 may be adjusted laterally, as indicated in Fig. 4, to bring the frame-work to the exact central portion of the tunnel or sewer.

It will be apparent that, in order to remove the frame-work, it will be only necessary to move the truck thereunder, apply the ends of the rods 21 and 23 to the appropriate portions of the frame-work and remove the braces 34, whereupon the framework may be collapsed without injury and transported by the truck to a new point of use; this adaptability of the frame-work to be removed without destruction materially lessens the number of such frame-works that will be required in the construction of a tunnel or sewer. If desirable, the frame-work, when applied to the roof, may be further reinforced by means of a strut 36 connecting the lower portions of the wings or sections thereof, which strut will be removed prior to collapsing the frame-work.

Having described my invention, what I claim is:

1. In an apparatus of the character set forth, the combination of a frame-work comprising a pair of curved sections, a hinge rod connecting said sections, a frame, and means for supporting the frame-work from the frame, said means comprising a vertically adjustable connection engaging the hinge rod, and laterally adjustable connections engaging the sections of the frame-work, substantially as specified.

2. In an apparatus of the character set forth, the combination of a frame-work comprising a pair of curved sections, a hinge rod connecting said sections, a truck, a frame shiftably mounted on said truck, means for shifting said frame on said truck comprising a rack mounted on said truck, a shaft mounted on said frame and having a pinion rigidly secured thereon adapted to engage with said rack and means for rotating said shaft, and means for supporting said frame-work from the frame, said means comprising a vertically adjustable connection engaging the hinge rod, and laterally adjustable connections engaging the sections of the frame-work, substantially as described.

3. In an apparatus of the character set forth, the combination of a frame-work, a frame, and means for supporting said frame-work from said frame, said means comprising rods carried by said frame-work and adjustable rods carried by said frame and having yokes at their ends adapted to engage the rods of the frame-work, substantially as specified.

4. In an apparatus of the character set forth, the combination of a supporting frame, a frame-work comprising a pair of

hinge sections and means for mounting said frame-work on said frame so that the said frame-work may be adjusted vertically and expanded laterally, said means comprising
5 a vertically adjustable threaded rod mounted on said frame and adapted to engage the frame work, an adjusting nut for operating said rod, sleeves swiveled to said frame, a
10 a portion adapted to engage the frame-work and a nut on said rod bearing against said sleeve, substantially as described.

5. In an apparatus of the character set forth, the combination of a supporting
15 frame, a frame-work, and means for supporting the frame-work from the frame, said means comprising one or more sleeves swiveled to said frame, a threaded rod within each sleeve and having a portion adapted to
20 engage the frame-work, and a nut on said

rod bearing against said sleeve, substantially as specified.

6. In an apparatus of the character set forth, the combination of a supporting frame, a frame-work comprising a pair of
25 hinged sections, and means for adjustably supporting said frame-work from said frame, said means comprising a vertically adjustable threaded rod mounted on said frame and adapted to engage the frame-
30 work, an adjusting nut for operating said rod, and means for spreading the sections of the frame-work, substantially as specified.

In testimony whereof, I sign the foregoing specification, in the presence of two wit-
35 nesses.

WALKER HENDERSON.

Witnesses:

DANIEL E. DALY,
B. V. BARAGHER.