G. JOHNSON.

HANGING SCAFFOLD.

APPLICATION FILED APR. 17, 1913.

1,090,856.

Patented Mar. 24, 1914.

5 SHEETS—SHEET 1.

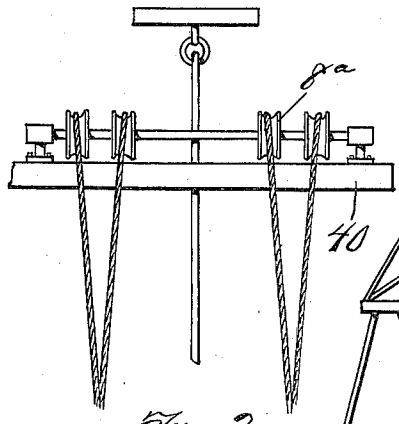


Fig. 2

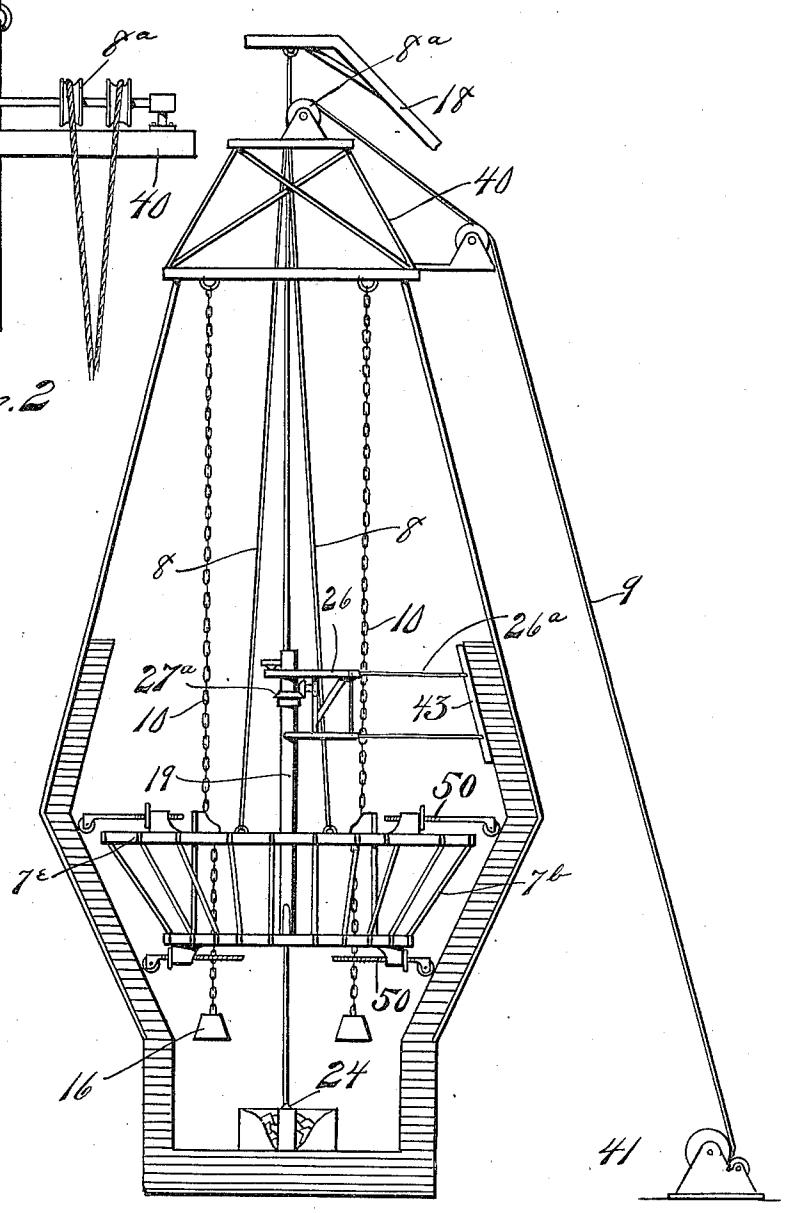


Fig. 1

Witnesses
H. L. Richey
Gertrude M. Kerner.

Inventor
Gustave Johnson
By John A. Bommhardt.
Attorney

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

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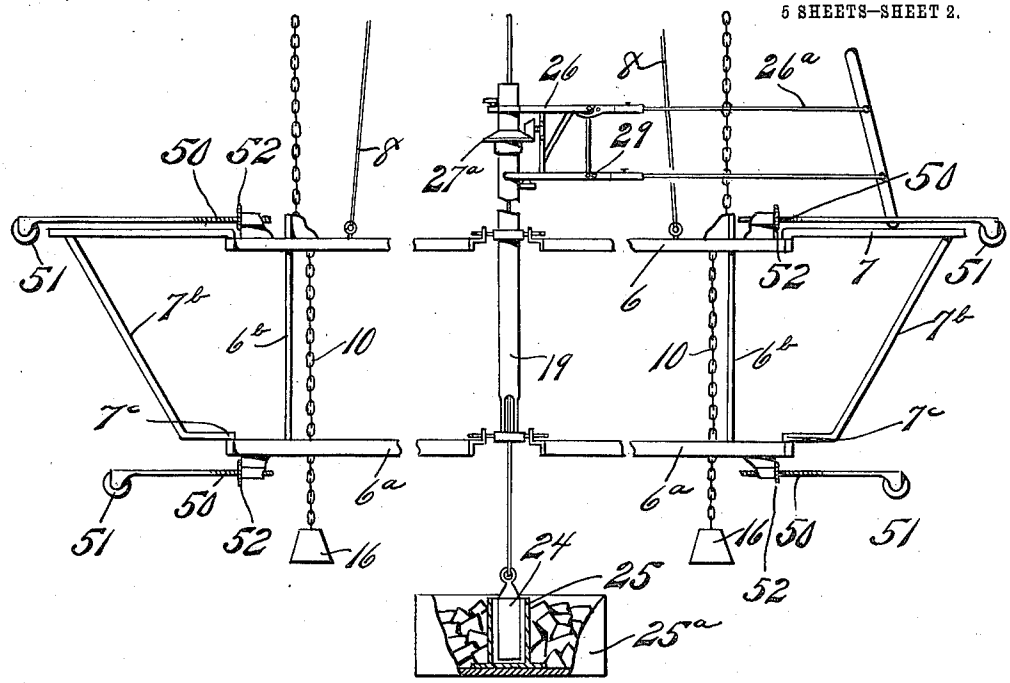


Fig. 3.

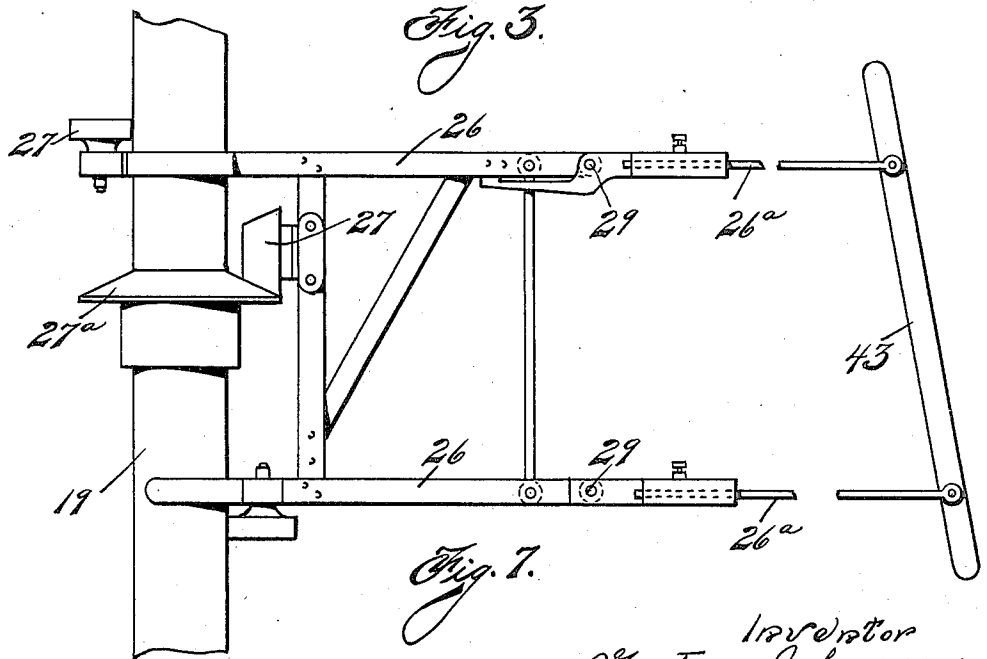


Fig. 7.

Witnesses
H. L. Richey
Gertrude M. Kerner.

Inventor
Gustave Johnson
By John A. Baumbardt
Attorney

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

G. JOHNSON.

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5 SHEETS—SHEET 3.

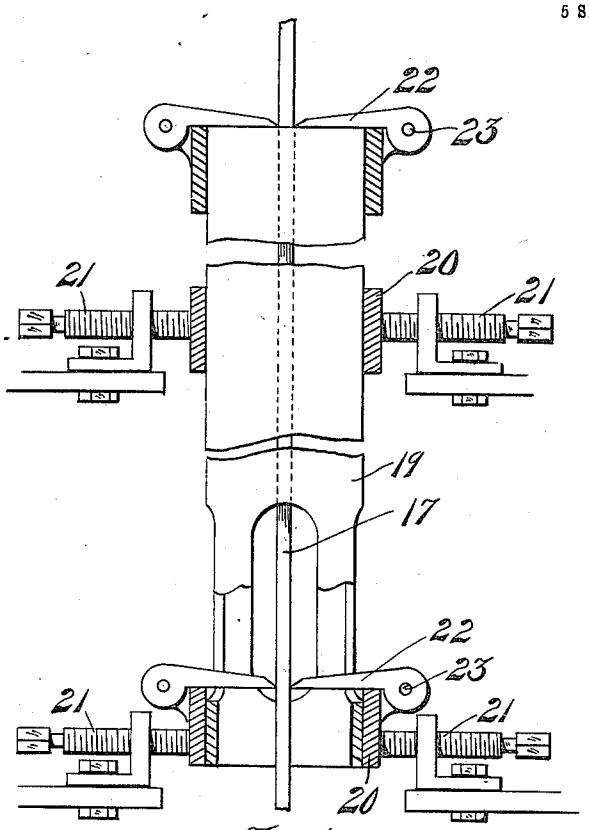


Fig. 6.

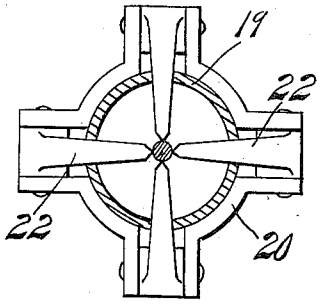


Fig. 4.

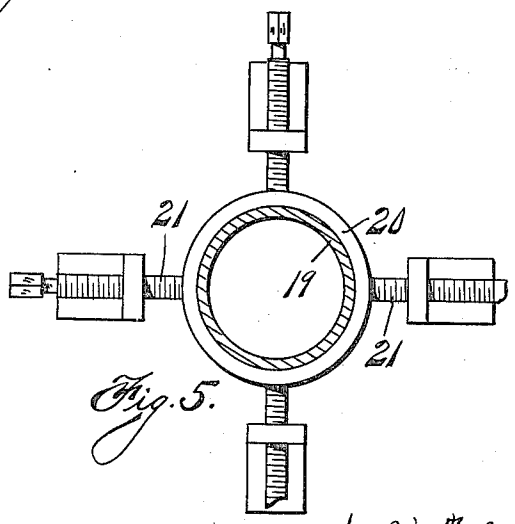


Fig. 5.

Witnesses
H. L. Richey
Gertrude M. Varner.

Inventor
Gustave Johnson
By John A. Bonnhardt
Attorney

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

G. JOHNSON.

HANGING SCAFFOLD.

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5 SHEETS—SHEET 4.

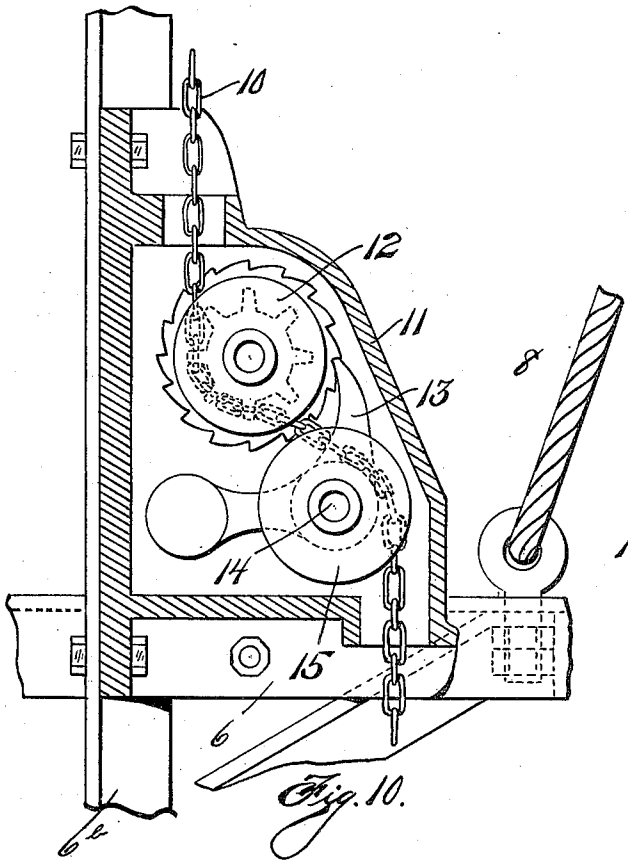


Fig. 10.

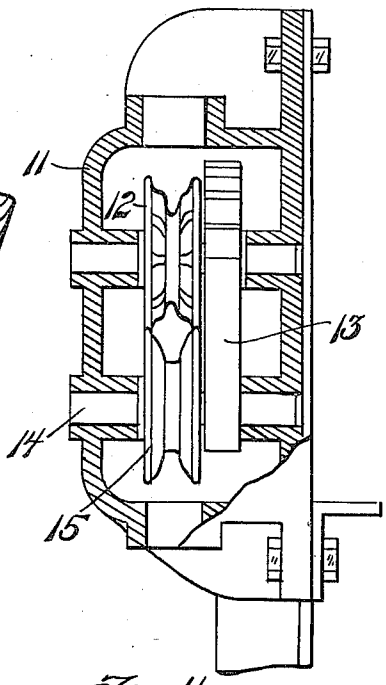


Fig. 11.

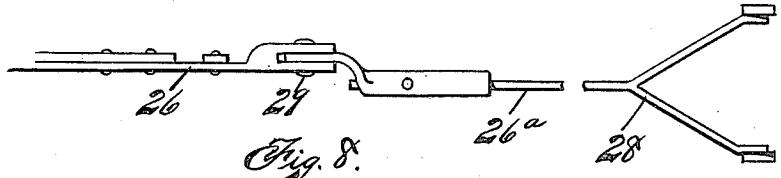


Fig. 8.

Witnesses

H. L. Richey

Gertrude M. Werner.

Inventor

Gustave Johnson

By John A. Bommhardt

Attorney

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

G. JOHNSON.

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5 SHEETS—SHEET 5.

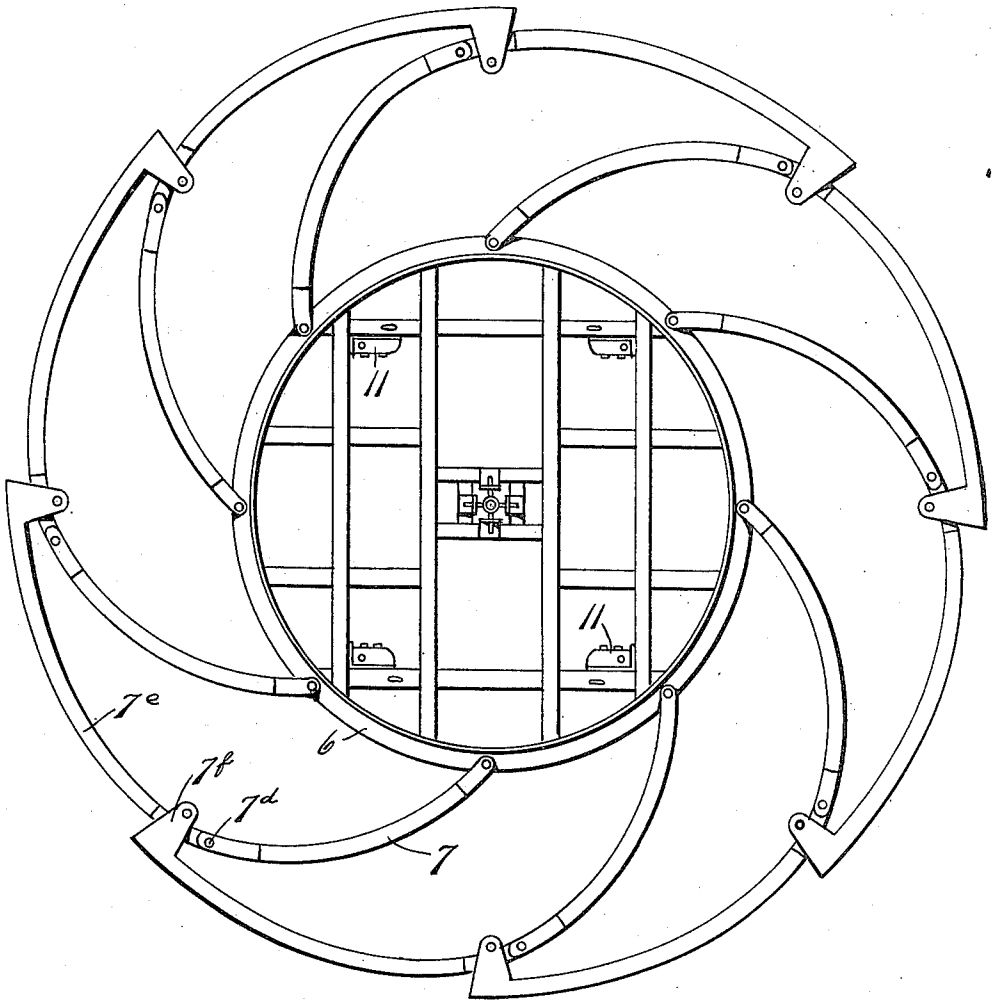


Fig. 9

Witnesses
H. L. Richey
Gertrude McKenney.

Inventor
Gustave Johnson
By John A. Bonnhardt
Attorney

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

GUSTAVE JOHNSON, OF CLEVELAND, OHIO.

HANGING SCAFFOLD.

1,090,856. Specification of Letters Patent. Patented Mar. 24, 1914.

Application filed April 17, 1913. Serial No. 761,752.

To all whom it may concern:

Be it known that I, GUSTAVE JOHNSON, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Hanging Scaffolds, of which the following is a specification.

This invention relates to hanging scaffolds and particularly to scaffolds adapted for use for building the shells and lining of blast or other tubular furnaces, chimneys and the like.

The object of the invention is to provide improved supporting means for the scaffold, and improved means for adjusting the same vertically within the furnace or structure being built.

A further object of the invention is to provide improved means for centering and plumbing the scaffold in the furnace, and for supporting a tram or gage for the inside of the work.

A further object of the invention is to provide an improved working platform on the scaffold.

A further object of the invention is to provide improved safety suspending devices.

Further objects and advantages will be apparent from the following specification.

In the accompanying drawings—Figure 1 is an elevation illustrating the manner of use of the device, in a blast furnace. Fig. 2 is a detail illustrating the hoisting connections. Fig. 3 is an enlarged view of the scaffold frame and working platform. Figs. 4, 5 and 6 are details in plan and section of plumb line devices. Fig. 7 is a detail in side elevation of the revolving tram. Fig. 8 is a detail in top view of one of the tram arms. Fig. 9 is a detail in plan of the collapsible support for the working platform. Figs. 10 and 11 are details in section of the safety suspending devices.

Referring specifically to the drawings, 6 indicates the circular frame of the hanging scaffold, preferably constructed of angle metal and including upper and lower rings 6^a and connecting braces and uprights 6^b. The supports for the working platform comprise curved arms 7 pivoted at 7^a to the upper ring and provided with braces 7^b pivoted at 7^c to the lower ring of the central frame. The outer ends of the arms 7 are pivoted at 7^d to one end of segmental bars 7^e, at the other ends of which are clips or keepers 7^f through which the bars 7^e are slidable. The described pivotal connections permit the support to be expanded or contracted to suit the diameter of the work. It will be understood that boards or the like will be placed on the arms 7, to form a platform.

The frame 6 is raised or lowered by means of four cables 8 connected thereto and running over pulleys 8^a on a support or frame 40 at the top of the furnace or structure being built, and connected to a cable 9 leading to a crab or other hoisting device 41, by means of which the scaffold may be hoisted.

Chains 10 are fastened to the frame 40 at the top of the furnace, and each chain extends down through a locking device shown particularly in Figs. 10 and 11. Each locking device is fastened at one of the corners of the scaffold 6, and comprises a casing 11 which has a cog and ratchet wheel 12 held by a pawl 13 mounted on the shaft 14 of a loose pulley 15 over which the chain also passes. When the pawl is engaged with the ratchet it locks the cog and prevents slip of the chain, but permits the frame to be hoisted. A weight 16 is attached to the lower end of the chain, to hold it taut.

A plumb line 17 is attached at its upper end to an overhanging bracket or support 18, and extends down through a tram pipe 19 at the center of the frame 6. This pipe 19 has slight lateral adjustment, being held in place by rings 20 and screws 21, to center it exactly. At its upper and lower ends the pipe carries centering arms 22 which are pivoted at 23 and project on four sides toward the plumb line 17. The plumb line has a weight 24 at its lower end, which hangs in a sleeve 25 in a box 25^a set around the center of the furnace at the bottom, and this box may be filled with weights to keep it from shifting. 26 are the tram poles or arms supported by upper and lower rollers 27 on the pipe 19. One roller travels on a collar 27^a on the pipe and the others engage opposite sides of the pipe respectively. The extension rods 26^a of the tram arms are adjustable in and out to vary the diameter and are forked as indicated at 28, the forked ends carrying wooden strips 43, so as to give a wide or two point bearing against the wall of the furnace, and the rods 26^a are hinged to the arms 26, as indicated at 29, so that they may be swung up to pass the hoist-

ing cables and chains when the tram is swung around to different radial positions. The central frame 6 also carries a plurality of upper and lower centering screws 50 projecting in different radial positions and having rollers 51 at their outer ends and these screws may be adjusted in or out by means of the hand nuts 52, so as to exactly center the scaffold the rollers being set against the wall of the furnace.

In use, the scaffold may be raised or lowered by the hoisting cables, the revolving tram arms being swung up and the braces 50 being released. The braces will then be readjusted to the sides of the furnace and the devices centered by means of the plumb line 17, with a fine adjustment of the tram pipe 19 by the screws 21 and centering points 22. Then by rotating the tram the outline of the structure can be exactly generated and tested as the building progresses. The workmen will be supported on the platform on the arms 7, which as stated may be expanded or contracted according to the diameter of the work. The chains 10 and safety devices shown in Figs. 10 and 11 will support the scaffold in case the hoisting cable 9 breaks. The rods 26[a] are adjusted in as the work progresses and the scaffold is hoisted.

What I claim as new is:

1. The combination of a scaffold adapted for use within a tubular structure, means to raise or lower the same, means to center the same, and a revolving tram mounted on the scaffold, to gage the wall of the structure.

2. The combination of a scaffold adapted for use within a tubular structure, means to raise or lower the same, means to center the same, including a plumb line suspended adjacent the scaffold, and a revolving tram mounted on the scaffold and adjustable to center the same with respect to the plumb line.

3. The combination of a scaffold adapted for use within a tubular structure, a plumb line extending through the scaffold at the center, a centering tube supported on the scaffold and through which the line extends, and a revolving tram mounted on the tube.

4. The combination of a scaffold adapted for use within a tubular structure, a plumb line extending through the scaffold at the center, a centering tube supported on the scaffold and through which the plumb line extends, means to adjust the tube laterally to exactly center the same with respect to the plumb line, and a revolving tram mounted on the tube.

5. The combination of a scaffold adapted for use within a tubular structure, hoisting cables connected to said scaffold, a plumb line extending through the scaffold at the center, and means to center the scaffold with respect to the plumb line, said means including peripheral adjustable braces engageable with the wall of the structure.

6. The combination of a scaffold adapted for use within a tubular structure, hoisting cables connected to said scaffold, a plumb line extending through the scaffold at the center, and means to center the scaffold with respect to the plumb line, said means including upper and lower peripheral adjustable braces engageable with the wall of the structure.

7. The combination of a scaffold adapted for use within a tubular structure, a plumb line, a tube at the center of the scaffold through which the plumb line extends, centering devices at the upper and lower ends of the tube and adapted to coöperate with the plumb line, and a tram mounted on the tube.

8. The combination of a scaffold adapted for use within a tubular structure, means to raise or lower the same, means to center the same, and a revolving tram mounted on the scaffold, to gage the wall of the structure, said tram having upper and lower arms adjustable in and out and adapted to support a gage strip.

9. The combination of a scaffold adapted for use within a tubular structure, means to raise or lower the same, means to center the same, and a revolving tram mounted on the scaffold, to gage the wall of the structure, said tram having upper and lower arms forked at their outer ends and adapted to support a gage strip, the arms being adjustable radially.

10. The combination of a scaffold adapted for use within a tubular structure, means to raise or lower the same, a central tube mounted on the scaffold and provided with a collar, and a revolving tram mounted on the tube, said tram having upper and lower rollers bearing against the tube, and another roller resting on the collar.

11. The combination of a scaffold adapted for use within a tubular structure, means to raise or lower the same, a central tube mounted on the scaffold and adjustable laterally with respect thereto, a plumb line extending through the tube, pivoted fingers 22 mounted on the tube and adapted to cooperate with the plumb line, and a revolving tram mounted on the exterior of the tube.

In testimony whereof, I do affix my signature in presence of two witnesses.

GUSTAVE JOHNSON.

Witnesses:
WM. G. FORDING,
JOHN A. BOMMHARDT.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."