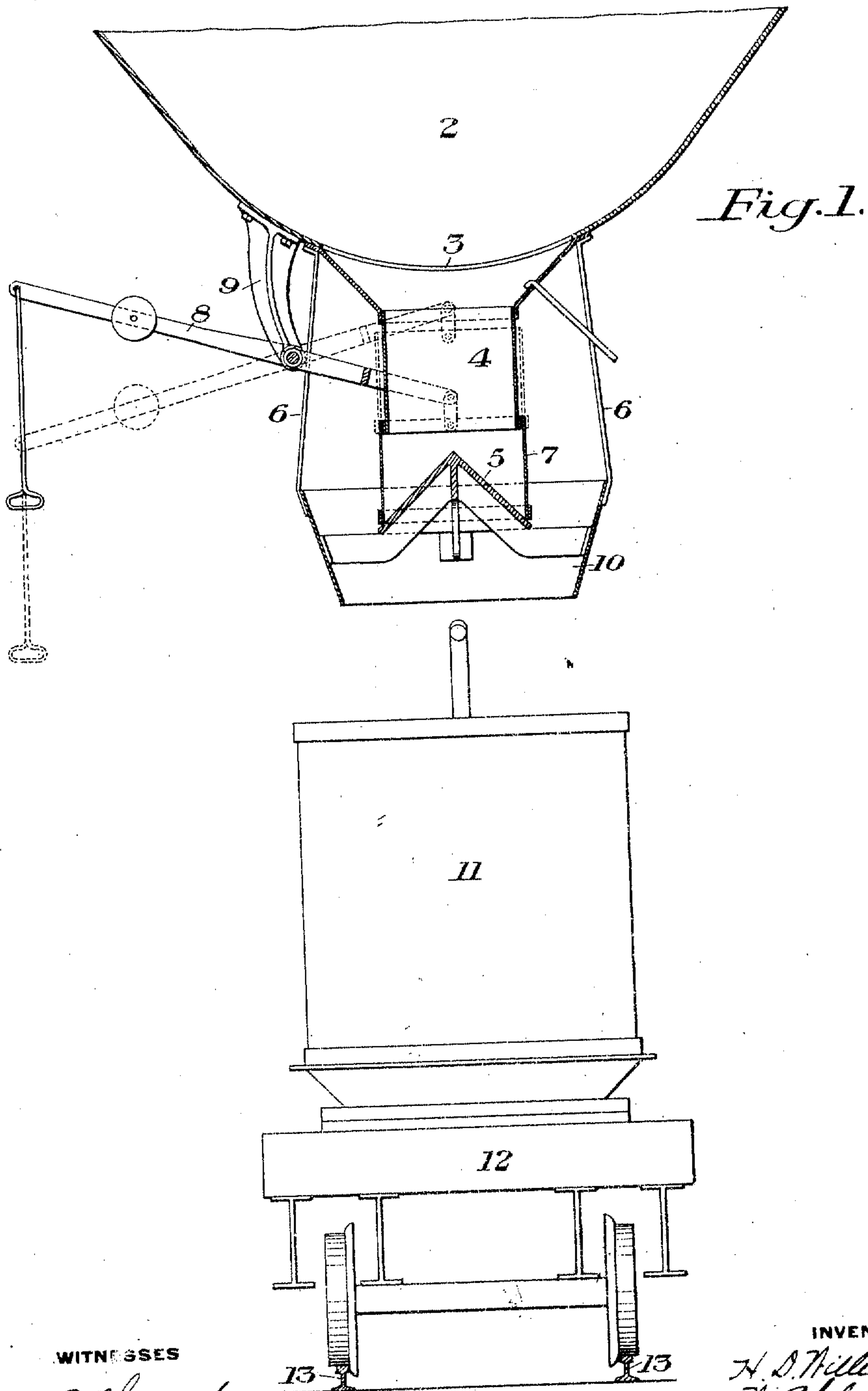


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APPLICATION FILED DEC. 17, 1909.

Patented June 6, 1911.

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2 SHEETS—SHEET 1.



WITNESSES
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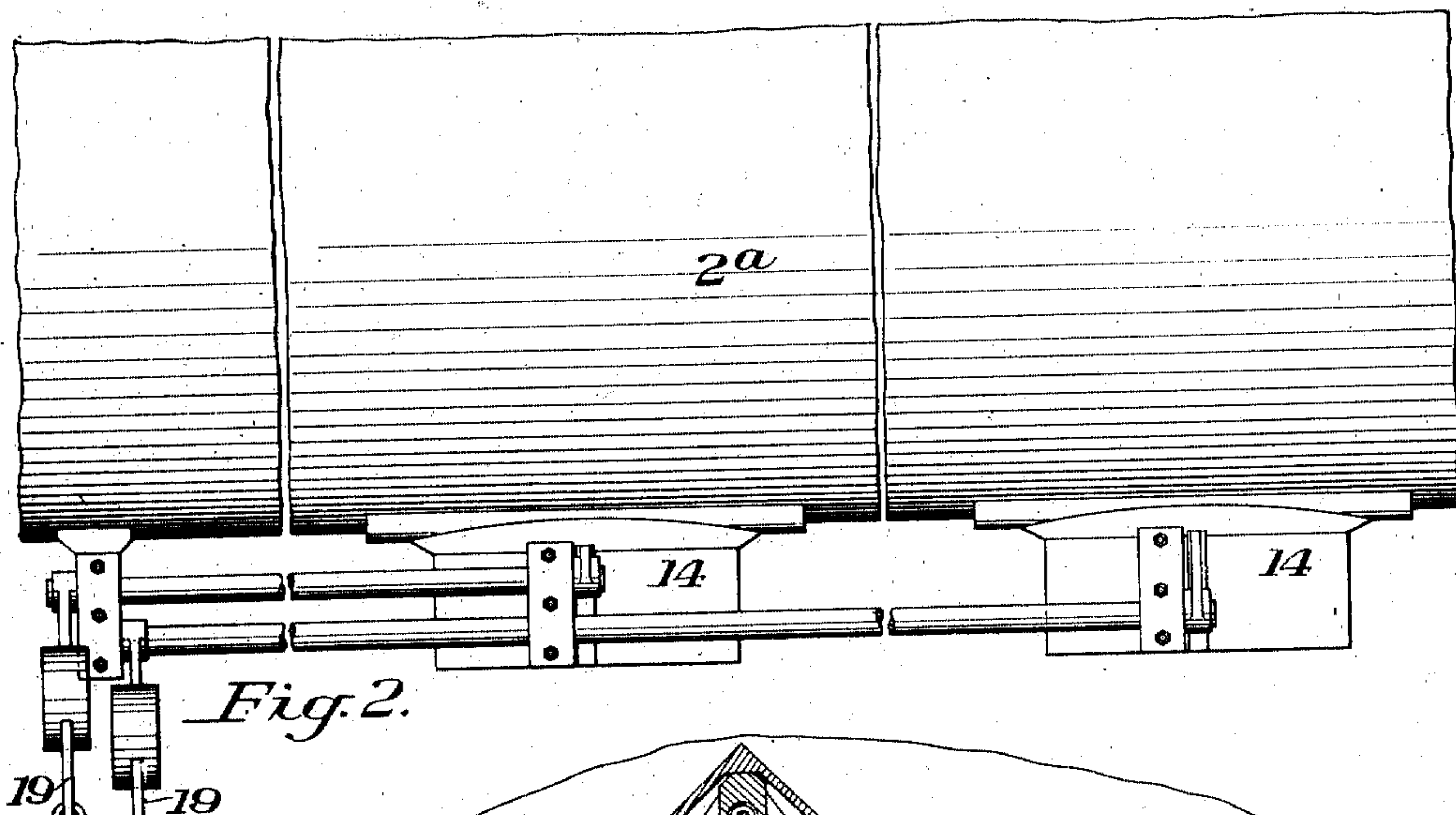


Fig. 2.

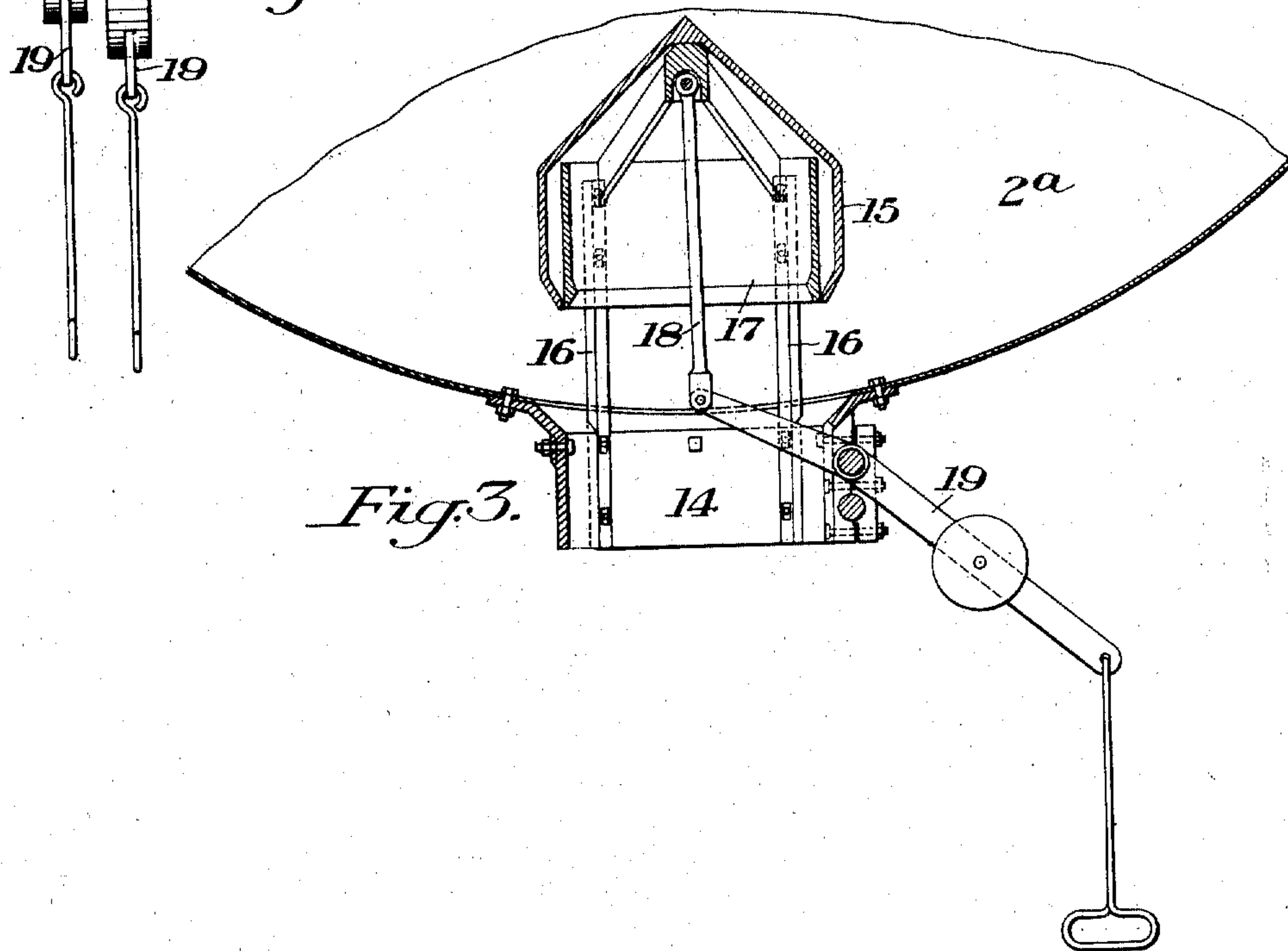


Fig. 3.

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UNITED STATES PATENT OFFICE.

HOMER D. WILLIAMS, WILLIAM AHLEN, AND VICTOR ROSS, OF DUQUESNE, PENNSYLVANIA.

METHOD OF CHARGING BLAST-FURNACES.

994,550.

Specification of Letters Patent.

Patented June 6, 1911.

Application filed December 17, 1909. Serial No. 533,637.

To all whom it may concern:

Be it known that we, HOMER D. WILLIAMS, WILLIAM AHLEN, and VICTOR ROSS, all of Duquesne, Allegheny county, Pennsylvania, have invented a new and useful Method of Charging Blast-Furnaces, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a sectional end elevation of a stock bin having a distributing discharge chute or gate, adapted for use in carrying out the improved method forming this invention. Fig. 2 is a partial side elevation of a stock bin showing a modified form of distributing discharge chute or gate mounted thereon. Fig. 3 is a sectional end elevation on the line III—III of Fig. 2, showing the chute or gate of Fig. 2 as applied for use on a stock bin.

Our invention relates to a novel and effective method of uniformly distributing the coarse and fine materials forming the successive charges of burden forming materials preparatory to being hoisted to the top of a blast furnace in which the separate charges are finally deposited.

In the handling of materials of various sizes forming the burden of blast furnaces, such as ore, limestone, coke and other materials, while transferring the materials from the stock bins or storage pockets into other receptacles in charging the materials into blast furnaces, the coarser portions are deposited to one side and the finer portions of such materials to the opposite side of the vertical axis of the buckets or carriers. The effect of such distribution of materials, in a blast furnace, is well known, and various methods and apparatus have been devised for overcoming the unequal distribution of such materials.

We have discovered that by providing a discharge chute or gate of improved construction, on the discharge outlet of the bins or pockets in which the materials forming the burden of the furnace are stored, that the coarser and finer parts of the material can be uniformly distributed in the charging bucket or other receptacle in which they are conveyed to the top of the blast furnace.

An ideal receptacle for conveying the burden forming materials to the top of a blast furnace after having been distributed

in accordance with our invention, is described and shown in the Rothoff and Neeland Patent, No. 579,011, for a blast furnace hoisting and charging apparatus, dated March 16, 1897.

In Fig. 1 of the drawings, 2 represents the bottom portion of a storage bin or receptacle, in which iron ore or other materials are deposited and stored. Surrounding the discharge opening 3 in the bottom of this bin is a cylindrical throat or discharge spout 4 having a conical bell 5 suspended by straps or hangers 6 from the bottom of the bin 2. A cylindrical vertically movable throat section 7 surrounds the section 4 of the throat and is connected to one end of the operating lever 8, which is pivotally connected to a bracket 9 secured on the bin 2, and by means of which the chute is operated in opening and closing. Beneath the throat formed by the sections 4 and 7, and also secured to the straps or hangers 6 is a conical deflector 10 which is employed for a purpose described hereinafter. Beneath the chute or discharge outlet opening on the bin 2 is a removable charging bucket 11, which is shown mounted upon a truck or car 12, arranged to run upon the track formed by the rails 13 in conveying the bucket 11 to and from the point at the base of the furnace from which it is removed from the car and hoisted to the top of the blast furnace, preferably with apparatus like that shown in the above referred to Rothoff and Neeland Patent No. 579,011.

In Figs. 2 and 3 a modification is shown in which a cylindrical chute or throat 14 is secured on the bottom of the storage bin 2^a. Secured in the bin 2^a above the spout or throat 14 is a conical shield or deflector 15 which is held in place by posts or rods 16, which also form guides for the annular vertically movable gate 17 by which the throat or chute 14 is closed. The gate 17 is connected by the link 18 with one end of the hand-operating lever 19 by which the gates are opened and closed. The chutes or spouts 4 or 14 are located at suitable intervals in the length of the storage or stock bins 2, and in this way successive charges of various materials located at different parts of the stock bins can be uniformly distributed in being deposited in the charging buckets 11.

In carrying out our improved method, the ore or other material is placed in the

bins 2 in the usual manner. The buckets 11 on the cars 12 are brought into position beneath the gates, and, by means of the hand levers 8 or 19 the gate is opened to allow the ore or other material to flow from the bin through the open gate or spout 4 or 14. With the apparatus shown in Fig. 1, both the coarse and fine materials issuing from the spout 4, will be deflected outwardly by the conical bell 5, and by striking the sides of the conical deflector 10 its course will be diverted so as to discharge inwardly into the bucket 11 toward the vertical axis of the charging bucket. Both the coarse and the fine materials will be caused to flow toward the vertical axis of the bucket 11 at all points around the circumference of the throat or spout and in this way the coarse and fine materials will be uniformly distributed in the bucket 11. The charging buckets 11 are then conveyed on the tracks formed by the rails 13 to the base of the furnace, from which point they may be handled and discharged from the buckets 11 into the mouth of the furnace in a manner similar to that described in the Rothoff and Neeland Patent No. 579,011, or in any preferred manner.

In the construction shown in Fig. 1 considerable height or head room is necessary, in order to install this apparatus, and the necessary height in some localities may not be available. In such cases the apparatus shown in Fig. 3 may be used, and the conical shield and gate being installed within the bin, the necessary head room can be materially lessened.

The apparatus shown by Figs. 1 and 2 is operated in the same manner as that described for Fig. 1 and the result attained is the same, the annular vertically movable throat 17 of Figs. 2 and 3 engaging with the flaring upper margin of the hopper 14 in closing the gate of the bin.

The advantages of our invention will be apparent to those skilled in the art.

By uniformly distributing the materials discharged from the bins in the charging buckets, the necessity of using auxiliary ap-

paratus for effecting the distribution is overcome.

We claim:—

1. The method of charging blast furnaces consisting in placing the burden forming materials in stock bins, loading successive charges of the materials into carriers, uniformly distributing the materials in depositing the charges from the bins into the carriers, and depositing the distributed charges in the blast furnace; substantially as described.

2. The method of charging blast furnaces consisting in placing the burden forming materials in stock bins, loading successive charges of the materials into carriers, uniformly distributing the coarse and fine materials in depositing the charges from the bins into the carriers and depositing the distributed charges in the blast furnace; substantially as described.

3. The method of charging blast furnaces consisting in placing the ore in stock bins, loading successive charges of the ore into carriers, uniformly distributing the coarse and fine portions of the ore in depositing the charges from the bins into the carriers and depositing the distributed charges in the blast furnace; substantially as described.

4. The method of charging blast furnaces consisting in placing the burden forming materials in stock bins, loading successive charges of the materials into carriers, uniformly distributing the materials in depositing the charges from the bins into the carriers, conveying the distributed charges to the furnace top and depositing the materials in the blast furnace; substantially as described.

In testimony whereof we have hereunto set our hands.

HOMER D. WILLIAMS.
WILLIAM AHLEN.
VICTOR ROSS.

Witnesses:

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T. E. McDOWELL.