No. 721,956. PATENTED MAR. 3, 1903.

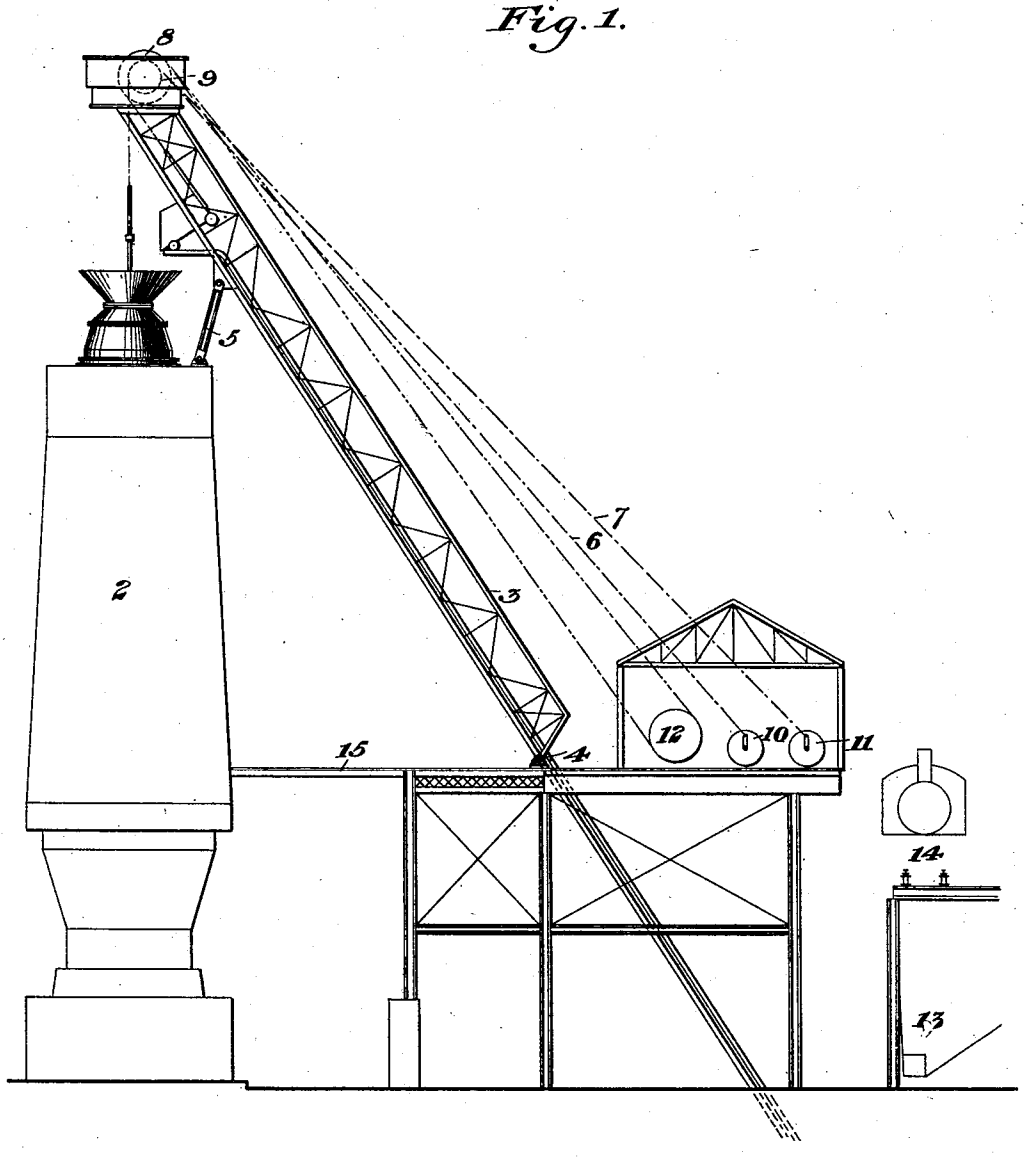
C. W. A. KOELKEBECK.

BLAST FURNACE.

APPLICATION FILED OCT. 17, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

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W. F. Stewart

INVENTOR

Carl W. A. Koelkebeck

by James K. Bakewell

his attorney

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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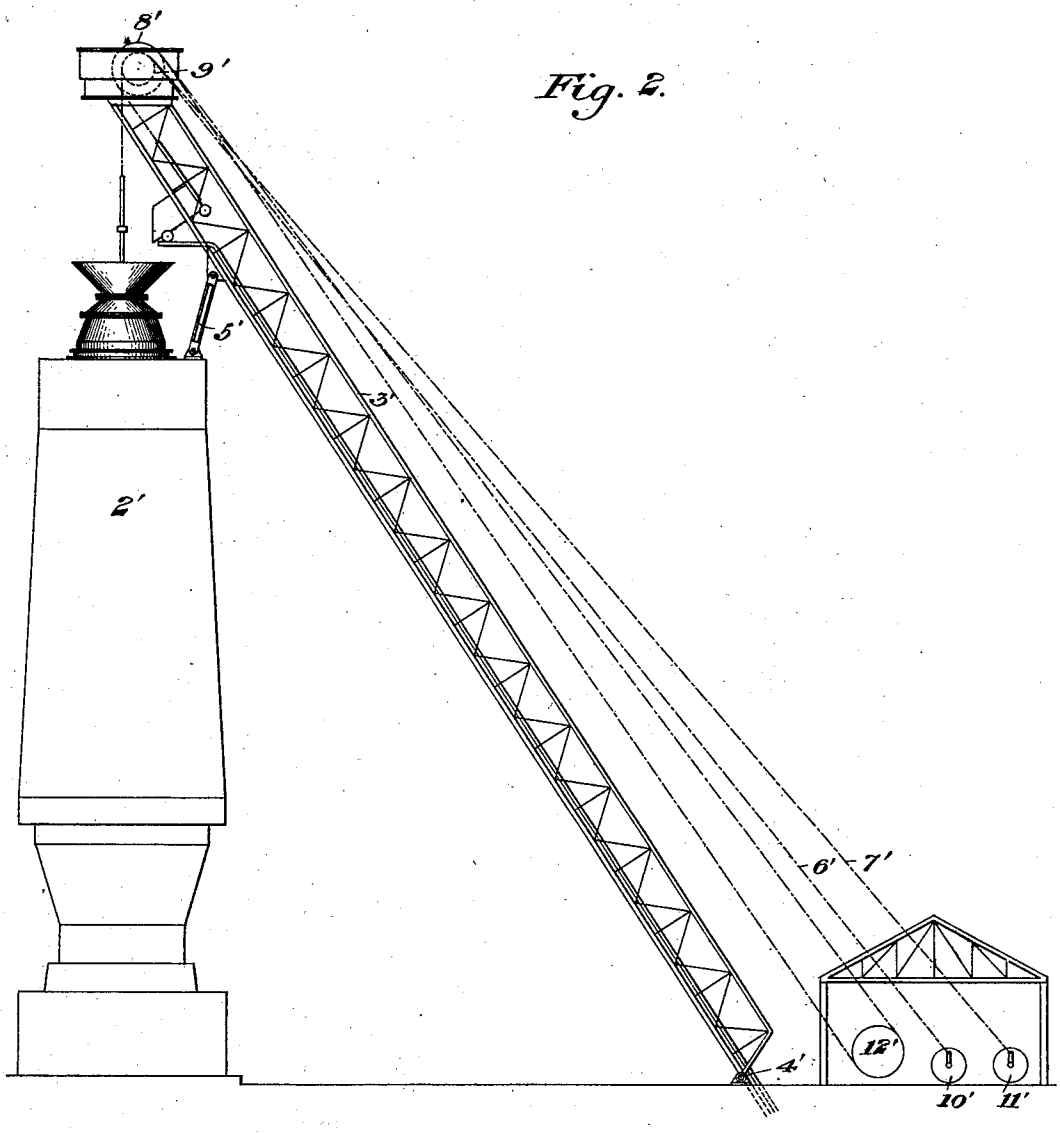
C. W. A. KOELKEBECK.

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APPLICATION FILED OCT. 17, 1902.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.



WITNESSES

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UNITED STATES PATENT OFFICE.

CARL W. A. KOELKEBECK, OF CLEVELAND, OHIO.

BLAST-FURNACE.

SPECIFICATION forming part of Letters Patent No. 721,956, dated March 3, 1903.

Application filed October 17, 1902. Serial No. 127,680. (No model.)

To all whom it may concern:

Be it known that I, CARL W. A. KOELKEBECK, of Cleveland, Cuyahoga county, Ohio, have invented a new and useful Blast-Furnace, 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 diagrammatic side elevation of a blast-furnace constructed in accordance with my invention, and Fig. 2 is a similar view showing a modified form.

My invention relates to that class of blast-furnaces which are provided with automatic filling apparatus comprising an inclined track leading to the top of the furnace, along which a skip or car is moved and its contents dumped into the furnace-hopper; and the object of the invention is to prevent the straining and injury to the furnace and the supporting-bridge for the track which have resulted from the expansion and contraction of the furnace and the rigid connection at its top to the bridge.

To that end my invention consists in connecting the bridge in its upper portion to the furnace-top in such a way that a movement of one is allowed relatively to that of the other without straining the connected parts. This is preferably carried out by means of a pivotal link connection between the upper part of the bridge and the top of the furnace, though other connections may be employed which will allow this relative movement.

In the drawings, referring to Fig. 1, 2 represents the blast-furnace, and 3 the inclined bridge leading upwardly to the top and supporting the track upon which is moved the skip-car. The lower end of this bridge is pivotally supported upon suitable trunnions at 4, and the upper part of the bridge is carried by a pair of links 5, which are pivoted at their lower ends to the furnace-top and at their upper ends to the upper part of the bridge. These links are preferably provided with cross lattice-work or bracing between them. In this form I have shown the links as connected to an intermediate part of the bridge, which overhangs and forms a cantaliver extension above the furnace. I have also shown the bell and hopper mechanism as operated by cables 6 and 7, which extend over upper pulleys 8 and 9 and thence down to cranks or drums 10 and 11 in the engine-room. One of these cables actuates the lower bell, while the other actuates the upper or supplemental bell of the upper hopper. This, however, forms no part of the present application, as it is included in another copending application, and any desirable mechanism may be used for operating the bells. 12 represents the hoisting-drum for moving the skip in either direction along the track. In this figure I have shown the bridge as terminating at the level of the engine-room above the ground-level and the track as extending downwardly below the level of the engine-room to a point where the skips may receive the charges from bins 13, supplied from an overhead track 14. A brace 15 extends between the furnace and the lower end of the bridge. The blast-furnace is operated in the usual manner, and its expansion and contraction will operate through the link connections to shift the upper end of the bridge, which swings from the pivot or axis at its lower end.

In Fig. 2 I show a form similar to that of Fig. 1, similar parts being designated by similar numerals with the prime-mark applied, except that the bridge extends down to the ground-level and is pivoted thereat, the engine-room being also at this level.

It is evident that many changes may be made in the connection between the pivoted bridge and the furnace-top which will allow relative movement of the one relative to the other, and I intend to cover the same broadly in my claims.

The advantages of my invention result from the pivoting of the bridge at its lower end and also from the loose connection between its upper portion and the furnace-top, since thereby the expansion and contraction of the furnace is prevented from injuring the furnace and bridge and movement of one is allowed relatively to that of the other.

The bridge may be pivoted at one or both ends, and many other changes may be made in the form and arrangement of the parts without departing from my invention.

I claim—

1. The combination with a blast-furnace, of an inclined bridge leading to its top, and

a loose connection between said bridge and the top arranged to allow movement of the one relatively to that of the other; substantially as described.

2. The combination with a blast-furnace, of an inclined bridge pivotally mounted in its lower portion, and having a loose supporting connection with the upper part of the furnace; substantially as described.

3. The combination with a blast-furnace, of an inclined bridge having a pivotal mounting in its lower portion, and a pivotal link connection between the bridge and the upper part of the furnace; substantially as described.

4. The combination with a blast-furnace, of an inclined bridge leading to its top, said bridge being arranged to swing on its lower portion, and having a pivotal link connection with the furnace-top, and a skip movable along the track supported upon the bridge; substantially as described.

5. The combination with a blast-furnace, of a pivoted inclined bridge leading from a point at or near the bottom of the furnace to the top thereof; substantially as described.

6. The combination with a blast-furnace, of an inclined bridge having a pivotal connection with the blast-furnace top; substantially as described.

7. The combination with a blast-furnace, of a pivoted inclined bridge leading to its top, and having an overhanging top cantaliver portion; substantially as described.

8. A blast-furnace having an inclined bridge, and a brace extending from the furnace to the lower portion of the bridge; substantially as described.

9. A blast-furnace having an inclined pivoted bridge and a brace extending from the furnace to the lower portion of the bridge; substantially as described.

In testimony whereof I have hereunto set my hand.

CARL W. A. KOELKEBECK.

Witnesses:

H. D. SMITH,

JOHN C. CROMWELL.