No. 803,586. PATENTED NOV. 7, 1905.

J. S. HAM.

COKE EXTRACTOR.

APPLICATION FILED APR. 5, 1905.

6 SHEETS—SHEET 1.

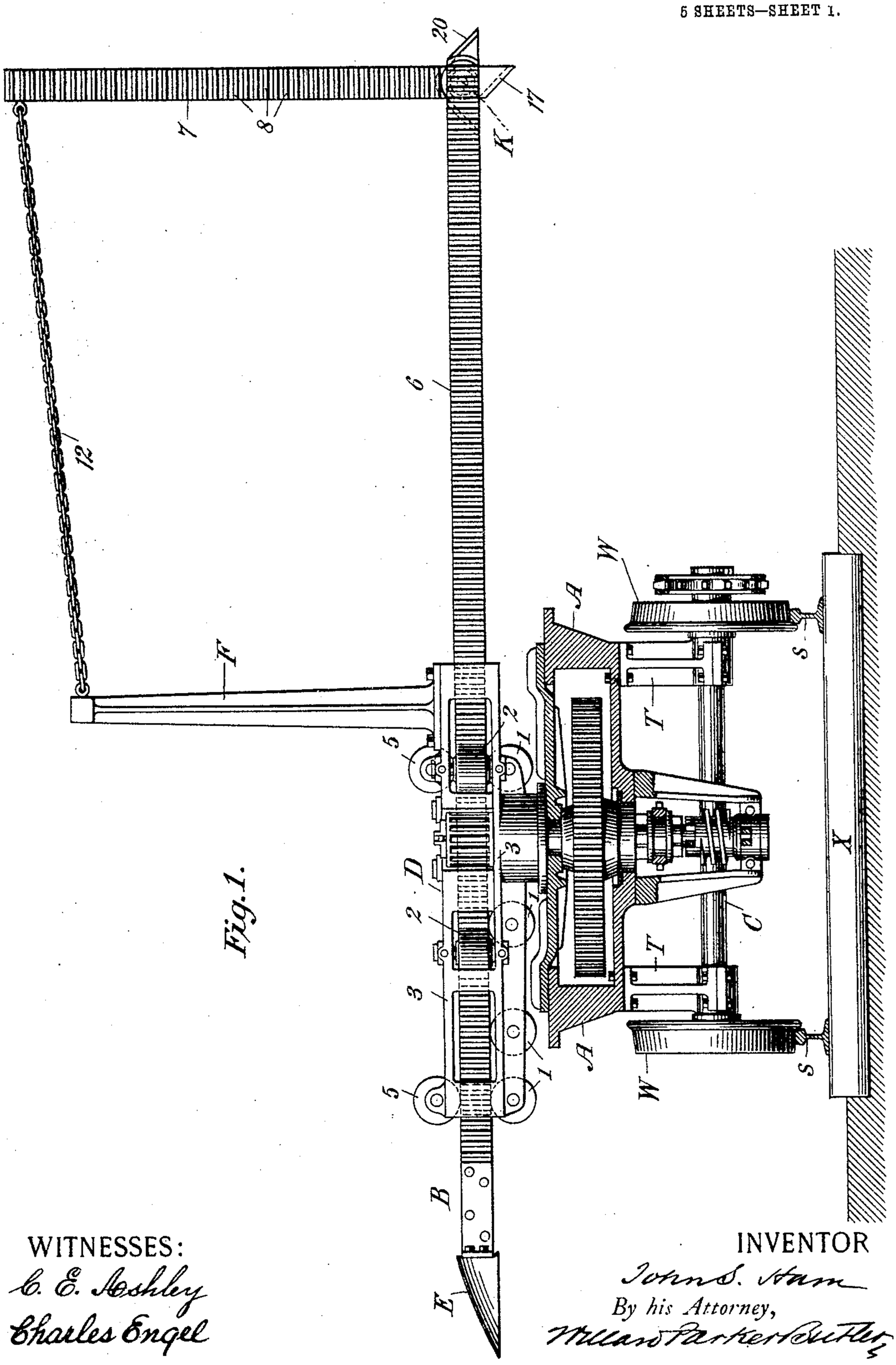

Fig. 1.

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5 SHEETS—SHEET 2.

Fig. 2.

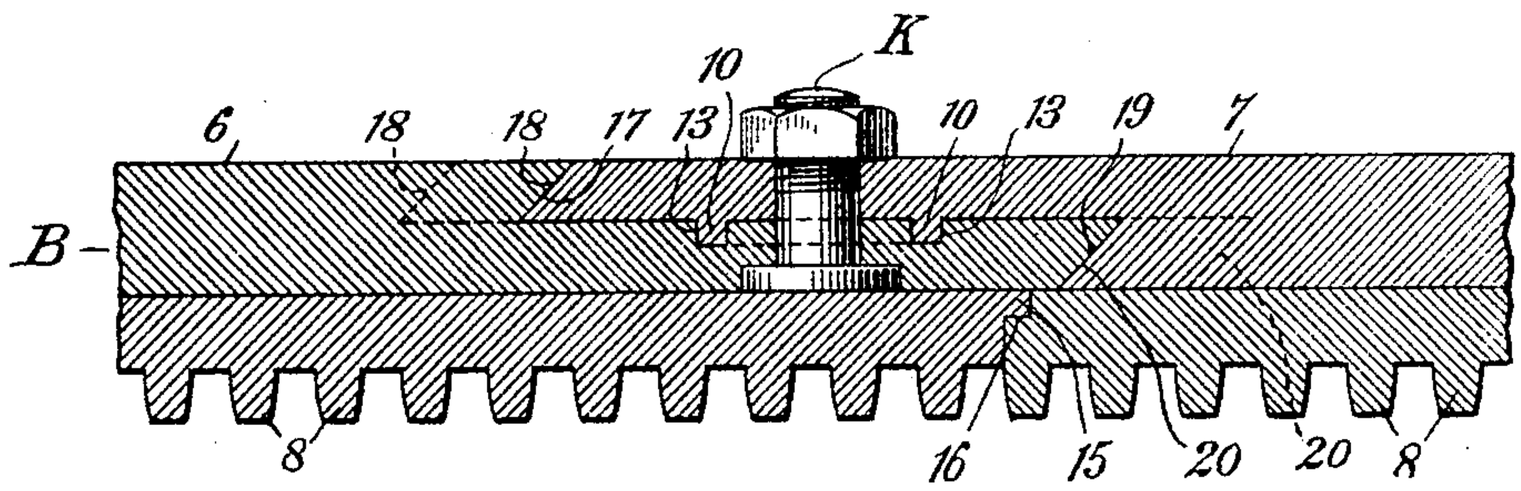


Fig. 3.

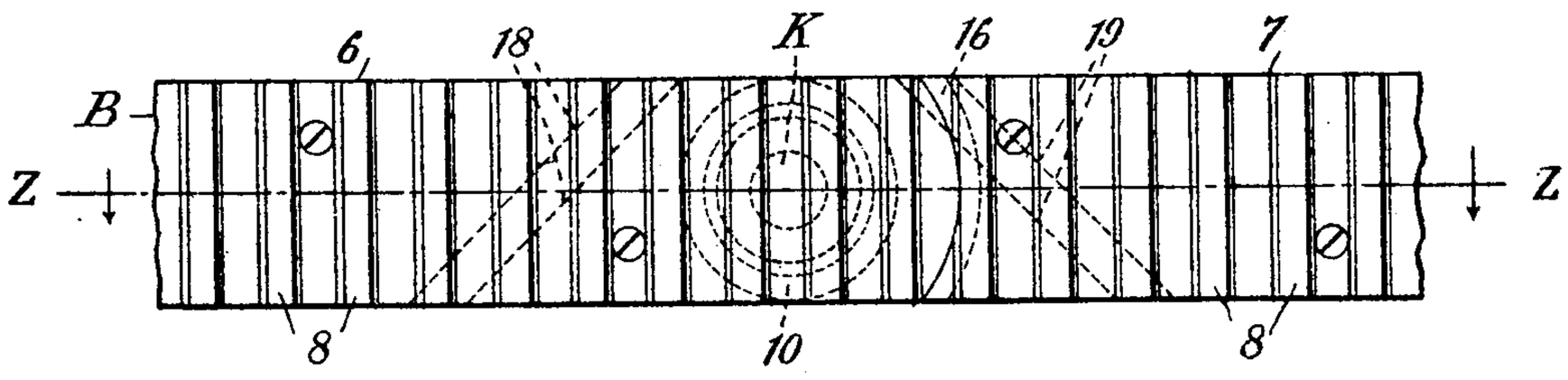
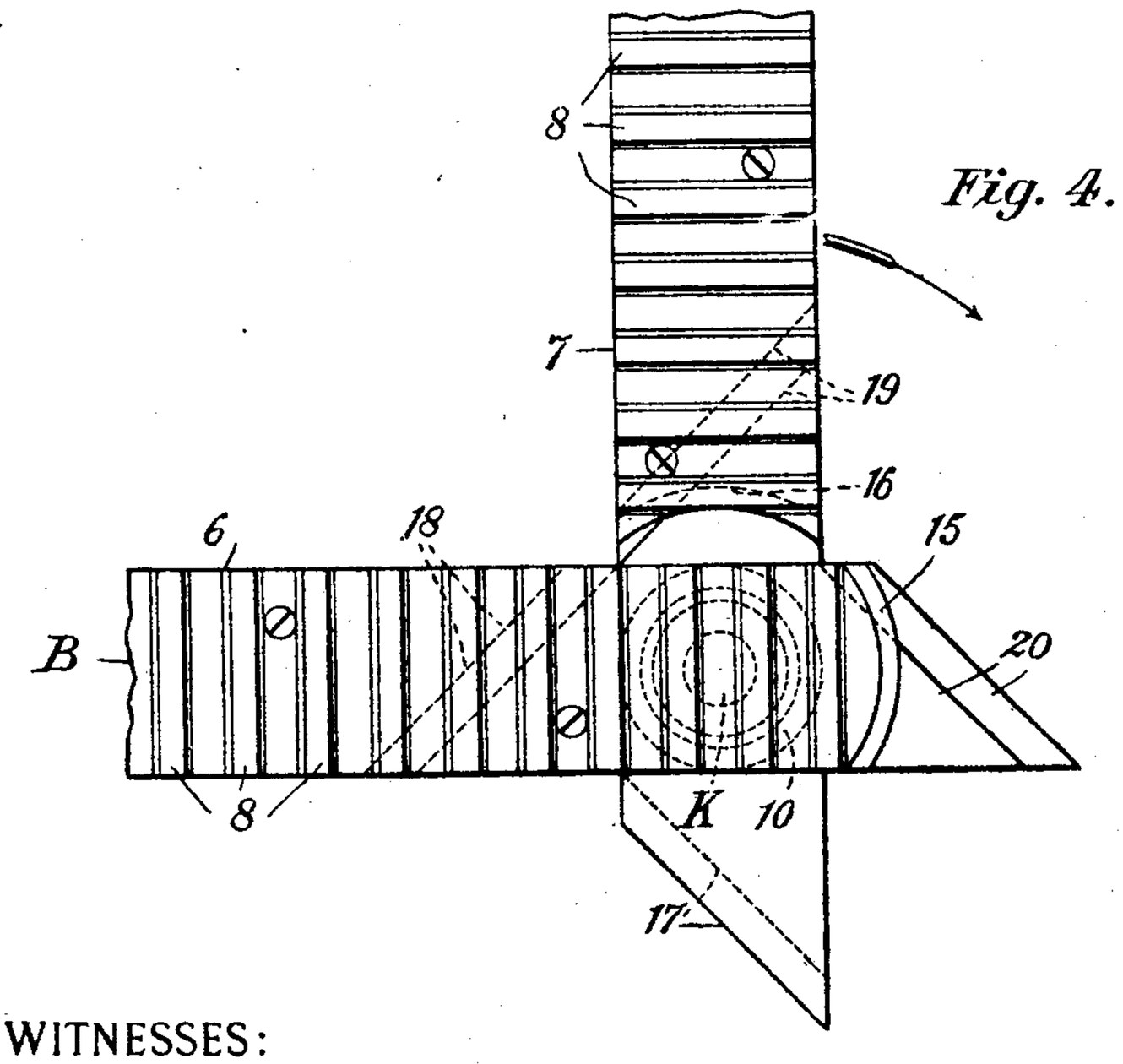


Fig. 4.



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5 SHEETS—SHEET 3.

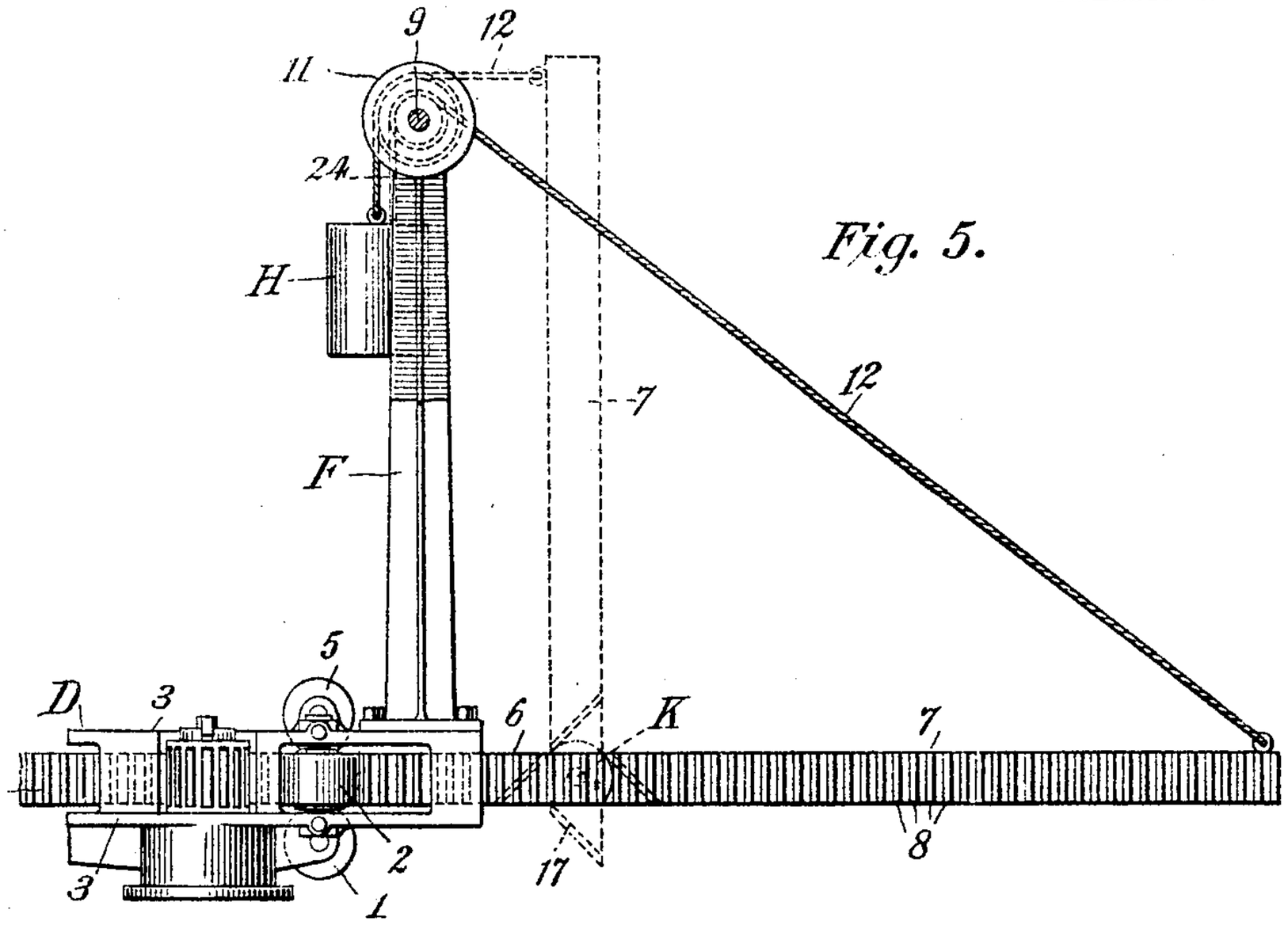


Fig. 5.

Fig. 6

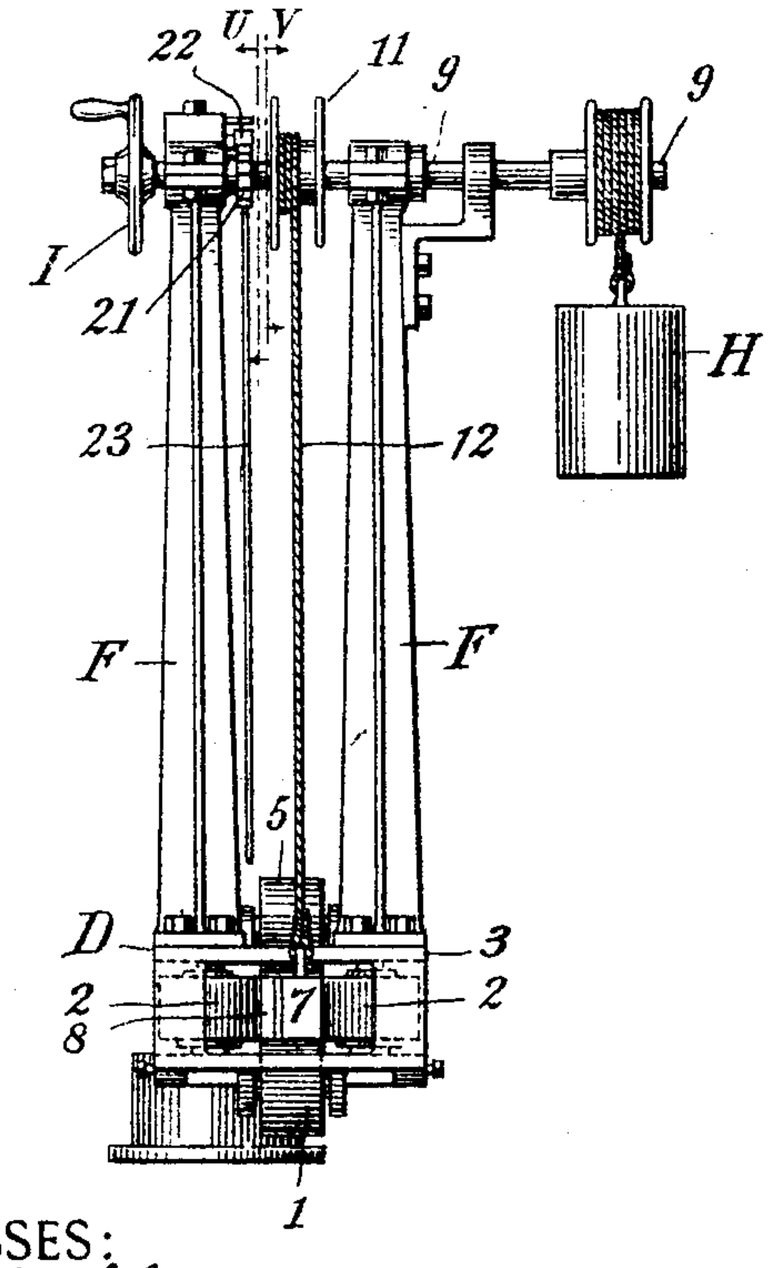
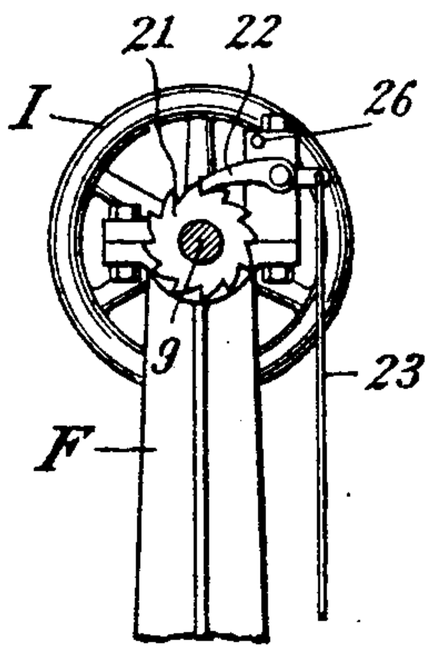


Fig. 7



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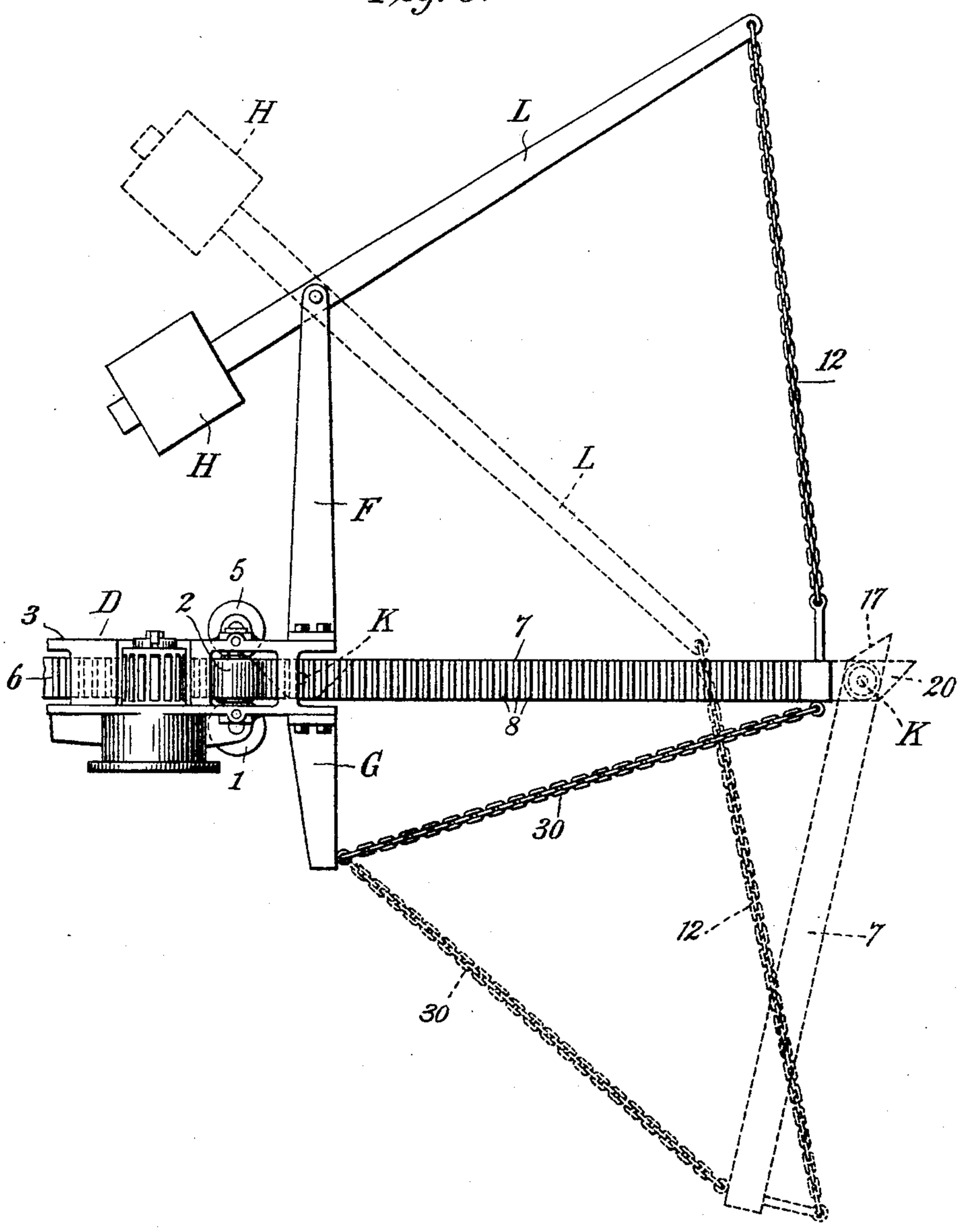
5 SHEETS—SHEET 4.

Fig. 8.



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5 SHEETS—SHEET 5.

Fig. 9.

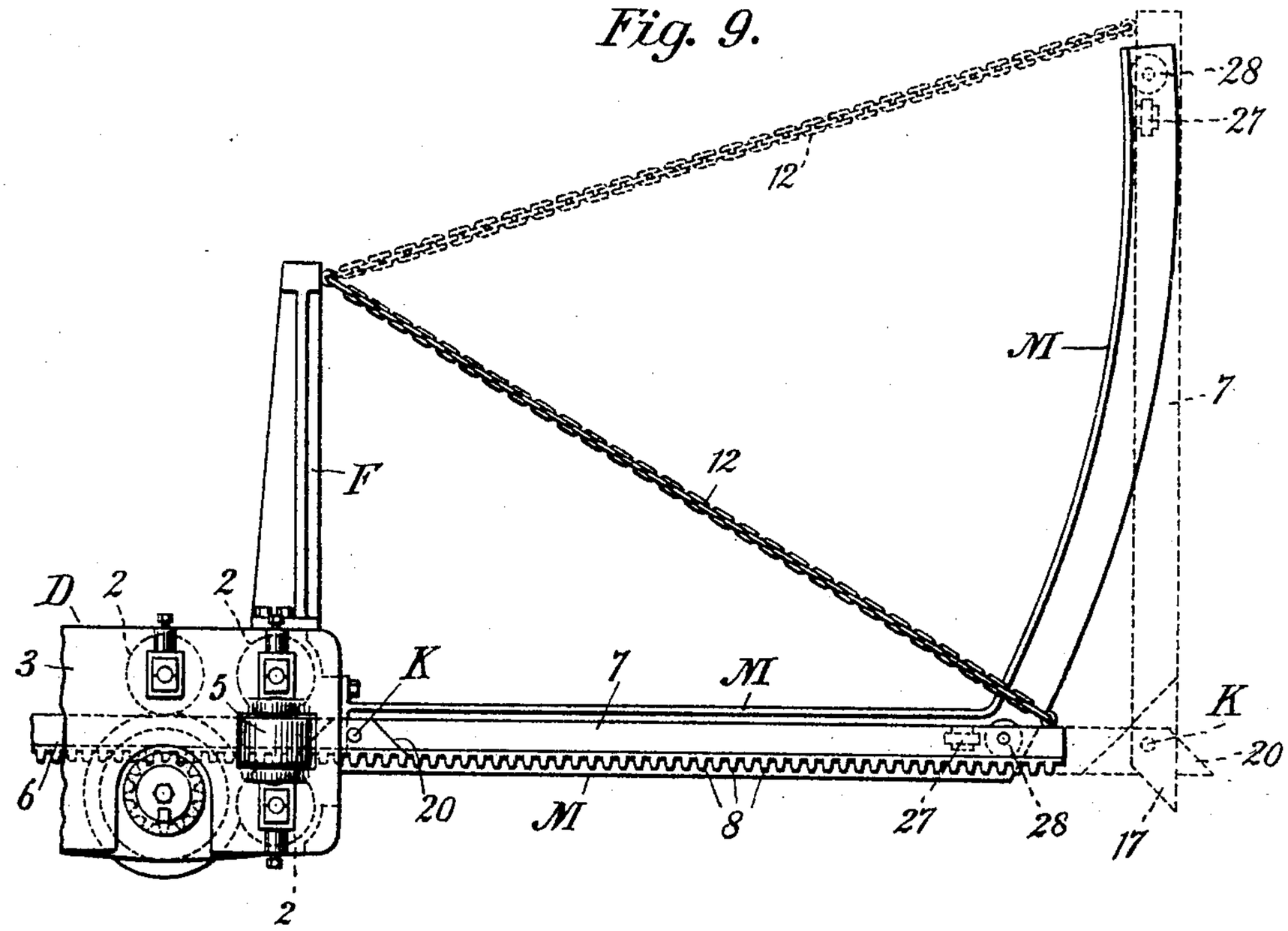


Fig. 10.

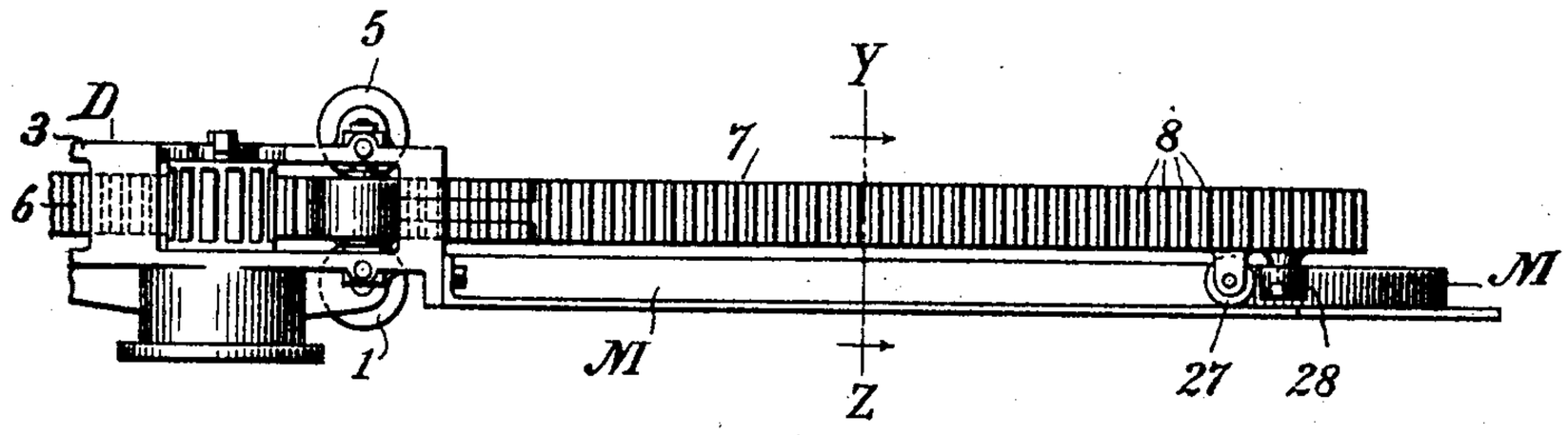
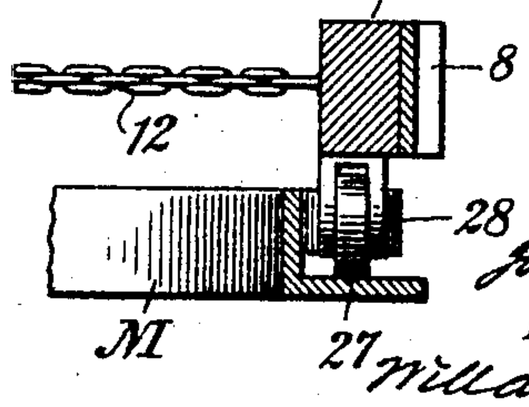


Fig. 11.



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UNITED STATES PATENT OFFICE.

JOHN S. HAM, OF COVINGTON, VIRGINIA, ASSIGNOR TO COVINGTON MACHINE COMPANY, A CORPORATION OF VIRGINIA.

COKE-EXTRACTOR.

No. 803,586. Specification of Letters Patent. Patented Nov. 7, 1905.

Application filed April 5, 1905. Serial No. 253,937.

To all whom it may concern:

Be it known that I, JOHN S. HAM, a citizen of the United States, and a resident of Covington, in the county of Alleghany, State of Virginia, have invented certain new and useful Improvements in Coke-Extractors, of which the following is a specification.

My invention relates to improvements in machinery for the extraction of coke from coke-ovens, and more particularly to that class of machine in which a plate or shovel is forced through the door of the oven and under the coke and then withdraws it, either by pushing it out of a door on the opposite side of the oven, or else by carrying it out of the door through which the tool or shovel is inserted.

It relates particularly to that class of machinery in which the tool which removes the coke from the oven is carried upon a carriage moving on a track in front of a series of ovens, which carriage by means of appropriate mechanism is caused to travel in front of the ovens and by appropriate mechanism to insert and withdraw the tool and so to move it horizontally and vertically that all parts of the oven in succession will be subjected to its effect. In this particular class of coke-extractor the plate or shovel is invariably attached to a bar or ram, which bar or ram slides in an appropriate ram-carriage between rollers and is necessarily of such length that the shovel or plate attached to it may reach the most remote parts of the coke-ovens. The consequence is that when the bar or ram is retracted it ordinarily projects a considerable distance outward in the rear of the machine. In the case of large ovens the bar is necessarily very long, and hence great difficulty has been experienced in using machines of this class in connection with and in front of large coke-ovens where the space in front of the oven is limited, for the reason that the retraction of a long bar or ram occupies very often more space than is available for the economical use of this class of machine. Now I have discovered that where the rear end of the bar or ram is composed of two or more articulated portions one of which is hinged at a point as near to the rear of the machine as possible after the ram has emerged from the ram-carriage during the operation of retraction and appropriate mechanism is provided for lifting, lowering, or deflecting to the right or left the rear portions on the articulated joints it is possible to use a coke-extractor of this character in a comparatively narrow space in front of and in connection with very large coke-ovens, and thereby effecting great economy in yard-space and making it possible to run cars directly back of the coke-extractor and effect loading thereof by means of a large variety of devices which have hitherto been incapable of use on account of the large amount of space taken up by the long ram retracted. Again, in certain cases coke-ovens are so constructed as to not permit of sufficient space between lines of ovens for the use of a machine having a long ram or bar. In such cases the present invention is particularly valuable, as it permits the use of the machine without disturbing the ovens.

The gist of the invention consists in providing a ram or bar which is rigid between the bed of the extractor and the coke-oven and flexible when in a position beyond in the rear of the extractor, so that when the bar is brought back it may be deflected from a right line and travel inside of a space which is less than the total length of the bar. This bar or ram may be of two or more parts and jointed together, and it may swing up, down, to the right, or to the left, as may be convenient; but in practice it is preferable to swing it upward.

The invention will be best understood by reference to the accompanying five sheets of drawings, in which—

Figure 1 is a vertical end view, partly in cross-section, of a coke-extracting machine of the type shown in the United States Letters Patent issued to William H. McConnell, No. 768,067, on the 23d day of August, 1904, embodying the present invention, and in which the articulated end of the bar or ram is raised by means of a chain automatically. Figs. 2, 3, and 4 are detailed views of the construction of the articulated joints of the ram or bar, showing the methods of joining the articulated portions. Figs. 5, 6, and 7 are detailed views of a hand mechanism for raising the rear end of the ram or bar after retraction. Fig. 8 is a view of a device for lowering the rear end of the bar. Figs. 9, 10, and 11 are views of the mechanism or parts thereof for deflecting the articulated end of the bar horizontally to one side, Fig. 11 being a view on

the line Y Z of Fig. 10 looking in the direction indicated by the arrows.

Similar characters refer to similar parts throughout the several views.

In the drawings, A represents the bed-plate of the machine, which is made rectangular in form and is of the same general type of bed-plate as shown in the aforesaid patent. This is mounted on the pedestals T, which in turn are mounted on the wheels W on the axles C.

S represents the rails upon which the extractor moves, placed in front of the series of furnaces upon ties K.

B is the bar or ram of the coke-removing tool, attached to which, at one end, is a scoop or shovel E. The ram B is mounted upon a horizontally-rotating ram-carriage D, as shown in Fig. 1 and in the patent above referred to, and arranged to slide therein in a series of vertical rollers 2 2, which rotate in appropriate boxes inserted in the top and bottom plates 3 3 of the carriage D, as shown in Fig. 1. The ram is supported underneath at either end by two horizontal rollers 1 1, which are supported in appropriate extension-pieces, and the ram is held in place on top by two rollers 5 5, also at either end on top of it. A variety of devices may be used for controlling the movement of and actuating the ram; but these play no part in the present invention.

The rod, arm, or bar B, as shown in the drawings, in the present case is composed of two parts 6 and 7, although any number may be used, if desired, and is provided on either side with the toothed rack 8, as shown in Figs. 2, 3, and 4. The two portions 6 and 7 are dovetailed at either end, as shown in Figs. 2 and 3, and beveled, as shown, the part 7 being provided with the shoulders 10, which move in grooves 13 on the surface of the part 6. The toothed racks 8 on the parts 6 and 7 engage with each other and are strengthened in position by means of a shoulder 15, engaging with the corresponding recess 16 on the other portion of the rack 8, attached to part 7. A pivot K holds the two parts 6 and 7 together, and in this way the bar when it drops becomes and is held rigid, for the reason that the extremities of the two portions 4 and 5 are beveled, as shown by the dotted lines 18 to 20, inclusive, and engage, as there shown. Any other mechanism for effecting an articulate joint between the various parts may be employed.

In cases where the rear end of the bar B is lifted it may be accomplished by any desirable mechanism, but in practice the device shown in Fig. 1 is preferable. This consists of an upright post F of appropriate height placed at the rear of the carriage D, the upper end of which is connected rigidly at one or more points by one or more chains 12, attached to the rear part 7 of the bar B. When the bar B begins to be retracted by the action of the machine at the moment when the articulate joint passes out from under the roller 5, the post F being stationary and of sufficient height, the effect of the chain 12 is to raise the end of the bar to the position shown in Fig. 1. Another form of mechanism which may be employed and which will be found particularly useful in cases where the movable end of the bar consists of one or more articulated joints is shown in Figs. 5, 6, and 7. This consists of shaft 9, supported on frame F F, placed at the rear of the carriage D. The movement of the shaft is effected in one direction by means of a weight H, attached to a cord 24, passing around a pulley at one end of the shaft 9. The shaft 9 carries at its extremity a hand-wheel I, by means of which it is turned in one direction, and a ratchet 21 and a pawl 22 control the movement of the shaft as it is turned. The shaft carries a second drum 11, to which one end of the cord 12 is attached, the other end of which is attached to the rear part 7 of the bar B. In the operation of this construction when the bar B begins to be retracted by the action of the machine at the moment when the articulate joint passes out from under the roller 5 the operator turns the wheel I, and the effect of the weight H, acting upon the shaft 9, is to wind up the cord 12 on the drum 11 and raise the bar to the position shown by the dotted lines in Fig. 5. When the bar begins to move forward, the ratchet 22 is tripped by an appropriate mechanism on the machine acting on the rod 23, and the weight of the bar being greater than the weight H will cause the bar to fall upon being released and the weight H to assume the position shown in Fig. 5. The relation of the weight H to the portion 7 of the bar is such that the two will substantially balance each other, but so that the bar will rise and fall rapidly.

In the form of device shown in Fig. 8 the bar is lowered instead of being raised, and in this construction two rigid posts F and G are provided, attached to the ram-carriage D. The post F carries a lever L, pivoted to it, as shown. On one end of this lever is carried a counterweight H of appropriate weight, and the other end is attached to one end of the chain 12, the other end of which chain is attached to the extremity of the movable part 7 of the bar 8. A second chain connects the end 7 of the bar 8 with the lower end of the post G, as shown. The instant that the bar is retracted so that the joint K is moved clear of the rollers the chain 30 draws down the part 7, thereby lifting the counterweight H through the arm L to the point shown by the dotted lines, and the articulated end of the bar drops, as shown by the dotted lines. When it is designed to raise the end of the bar, the weight H is moved downward and the bar will be restored to its initial position.

Still another form of device which may be employed where the bar is moved sidewise is

shown in Figs. 9, 10, and 11. This consists of a permanent extended arm F of appropriate length, the end of which is connected with the movable end of the bar by a chain 12, similar to that employed in the construction shown in Fig. 1. In this construction the movable end of the bar is supported on an appropriately-formed track M by means of the roller 27 and is guided along the flange of the track by guide-roller 28, as shown in Figs. 10 and 11. When the bar is retracted, the effect of the force exerted from the permanent bar F, which is stationary and of sufficient length through the chain 12, is to move the end of the bar to one side, as shown in Fig. 9.

I claim as my invention—

1. In a coke-extractor the combination of a truck mounted on wheels, a ram-carriage arranged to rotate on the truck and a ram or bar arranged to move horizontally therein, the rear end of which is composed of parts joined together so that the ram is rigid at the end toward the coke-oven, and rigid or flexible at the outer end as may be desired.

2. In a coke-extractor, the combination of a truck mounted on wheels, a ram-carriage, arranged to rotate on the truck, a ram or bar arranged to move horizontally therein, the rear end of which is composed of parts joined together so that the ram is rigid at the end toward the coke-oven, and rigid or flexible at the outer end as may be desired, and means for deflecting the end of said bar from a right line so that the bar may be retracted in a space which is less than the total length of the bar.

3. In a coke-extractor, the combination of a truck mounted on wheels, a ram-carriage arranged to rotate on the truck and a ram or bar arranged to move horizontally therein, the rear end of which is composed of a plurality of parts each connected by articulate joints so arranged that they are rigidly connected when the bar is being advanced or retracted or in its horizontal position; and when desired one or more portions may be retracted in a space which is less than the total length of said bar.

4. In a coke-extractor, the combination of a truck mounted on wheels, a ram-carriage arranged to rotate on the truck, a ram or bar arranged to move horizontally therein, the rear end of which is composed of articulate parts so arranged as to form a rigid bar while the bar is being advanced or retracted and means substantially as described for deflecting the rear end of the bar from a right line on the articulate joints.

5. In a coke-extractor, a ram or bar arranged to slide in a suitable carriage rotating on the frame of the machine, composed of two separate parts connected by an articulate joint so arranged that they are rigidly connected when the bar is being advanced or retracted and one portion may be raised or lowered with respect to the other when the bar is retracted.

6. In a coke-extractor, the combination of a truck mounted on wheels, a ram-carriage arranged to rotate on the truck, a ram or bar arranged to move horizontally therein, composed of two articulate parts so engaging as to form a rigid bar while the bar is being advanced or retracted, and means substantially as described for raising or lowering the extremity of the bar on the articulate joint when the bar is retracted.

7. In a coke-extractor, the combination of a truck mounted on wheels, a ram-carriage arranged to rotate on the truck, a ram or bar arranged to move horizontally therein, composed of two articulate parts so engaging as to form a rigid bar while the bar is advanced or retracted, and means substantially as described for raising or lowering the extremity of the bar on the articulate joint when the bar is retracted, and for causing the bar to become rigid when the operation of the machine recommences.

8. In a coke-extractor, the combination of a suitable ram-carriage, a ram or bar arranged to move horizontally therein, composed of two articulate parts, so engaging as to form a rigid bar while the bar is being advanced or retracted, a post fixed to the ram-carriage and of appropriate height, and a chain attached at one end to the post and at the other end to the movable end of the bar for raising the same.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 23d day of January, 1905.

JOHN S. HAM.

Witnesses:

WILLARD PARKER BUTLER,

JOHN FRENCH.