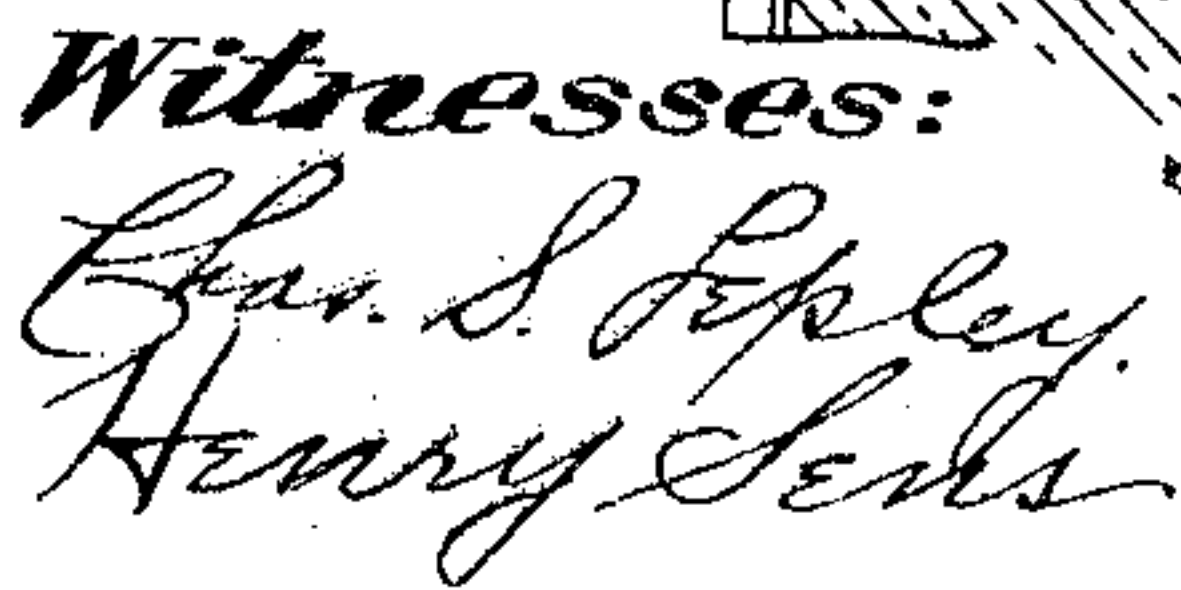


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5 SHEETS—SHEET 1.



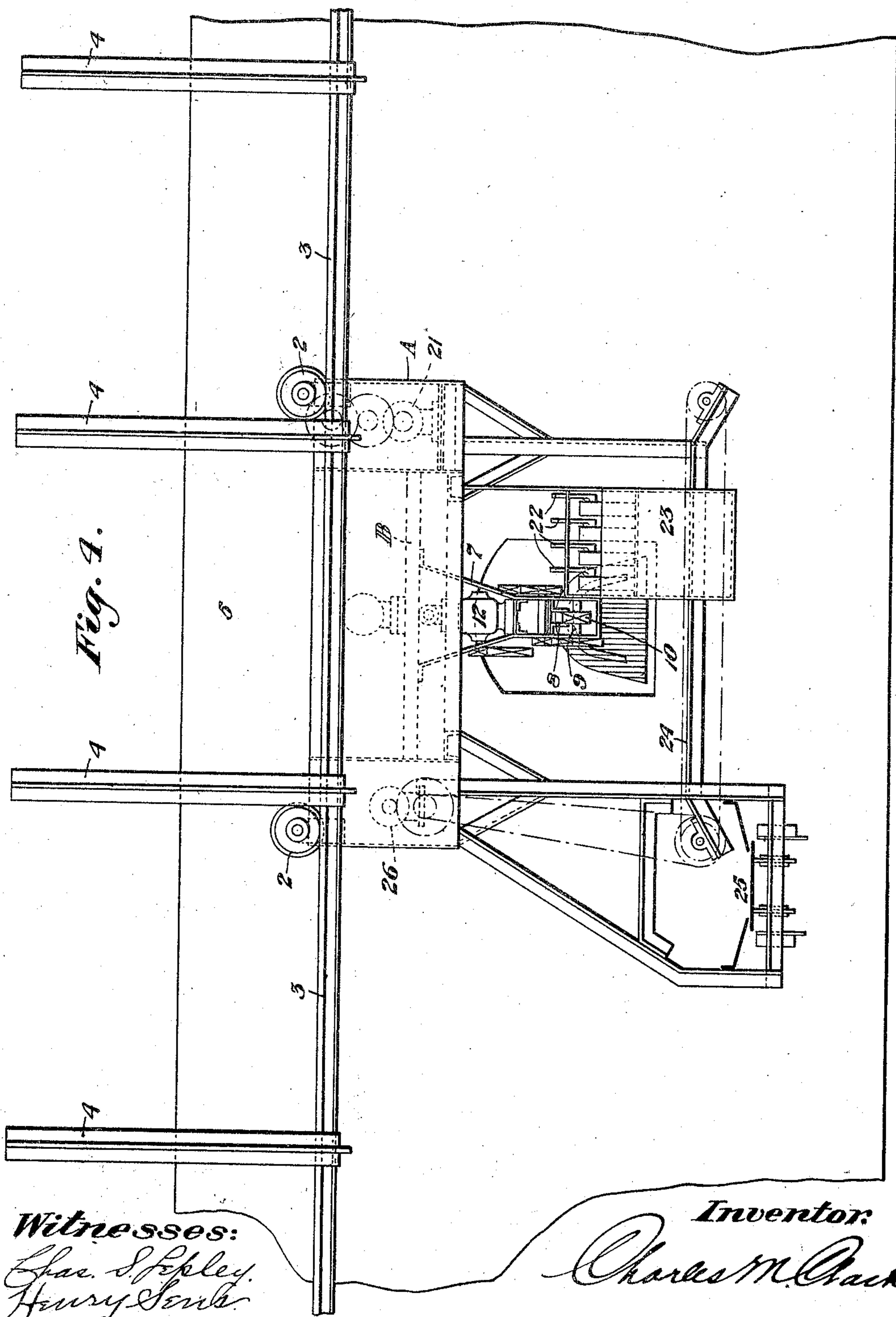
Charles M. Clark

923,140.

C. M. CLARKE.
COKE DRAWING APPARATUS.
APPLICATION FILED OCT. 3, 1908.

Patented June 1, 1909.

5 SHEETS—SHEET 2.

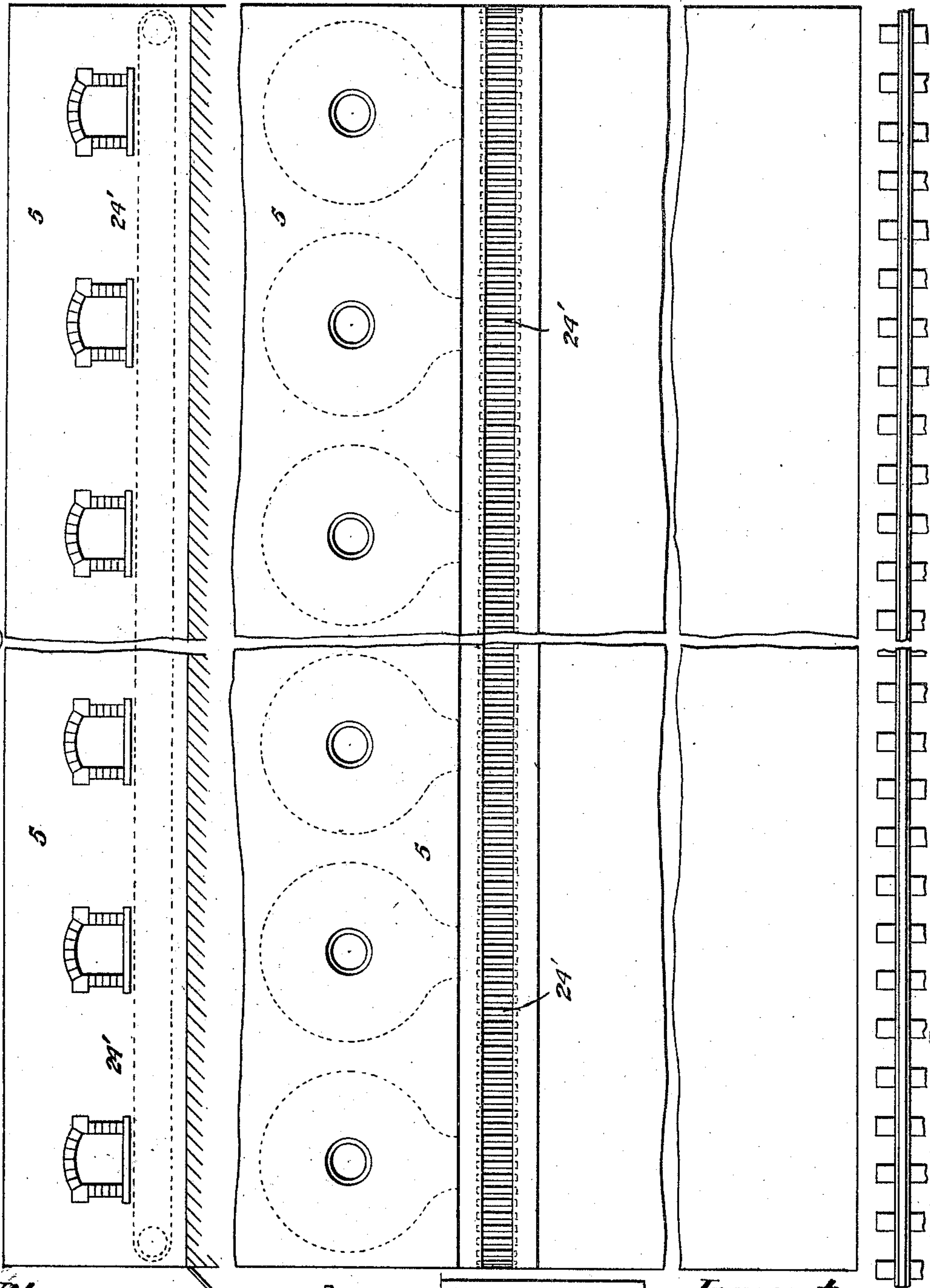


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Patented June 1, 1909.

5 SHEETS—SHEET 3.

Fig. 5.



Witnesses:

Chas. S. Spley
Harry Senn

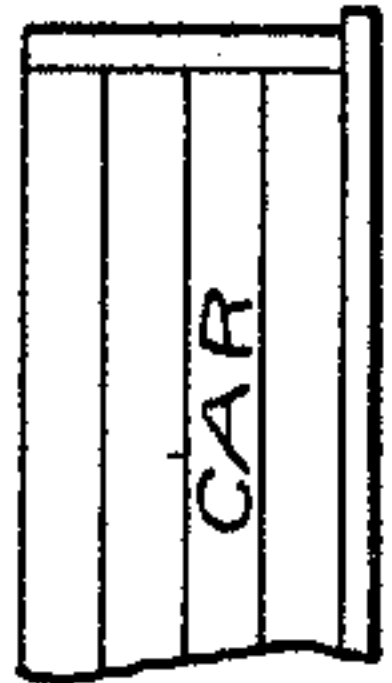
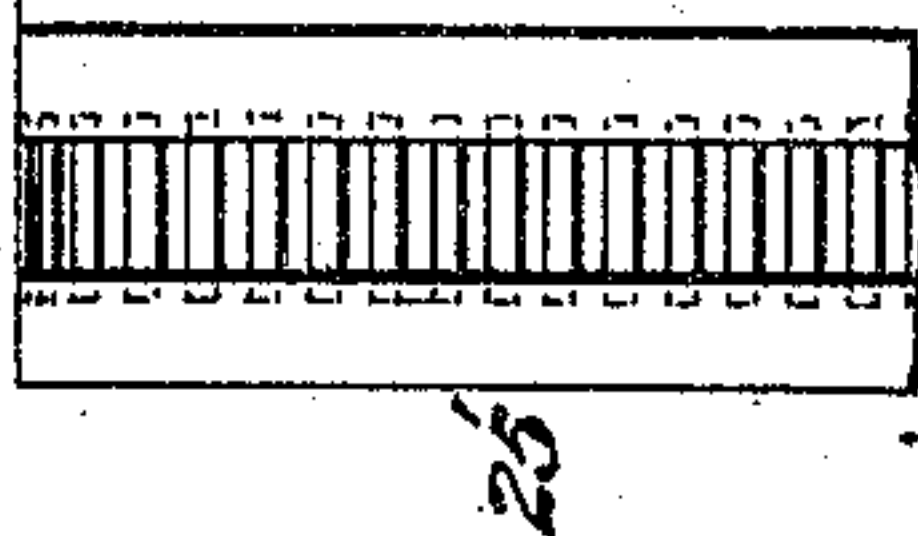


Fig. 6.



Inventor

Charles M. Clarke

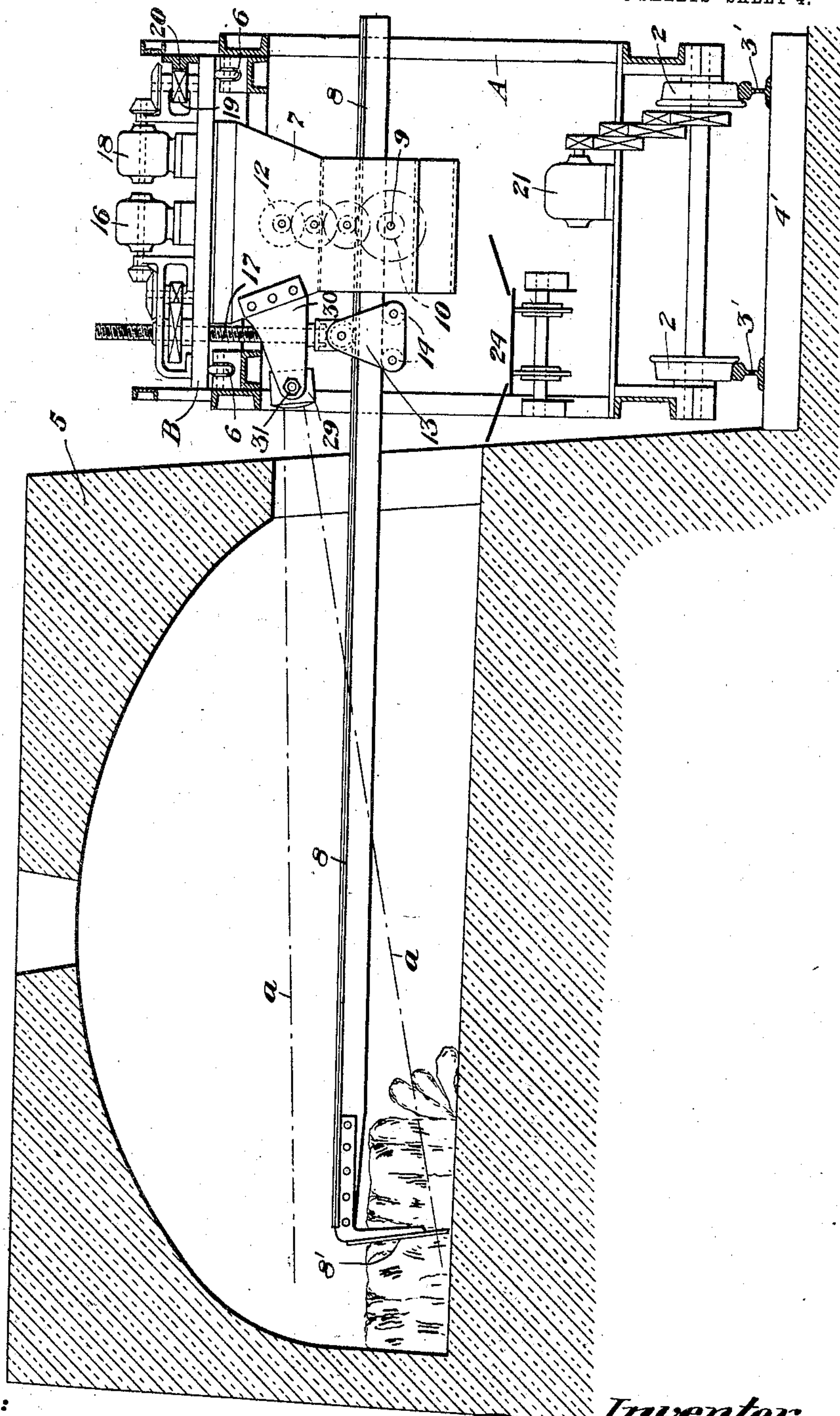
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COKE DRAWING APPARATUS.
APPLICATION FILED OCT. 3, 1908.

Patented June 1, 1909.

5 SHEETS—SHEET 4.

Fig. 7.



Witnesses:

Chas. S. Lyley
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Inventor:

Charles M. Clarke

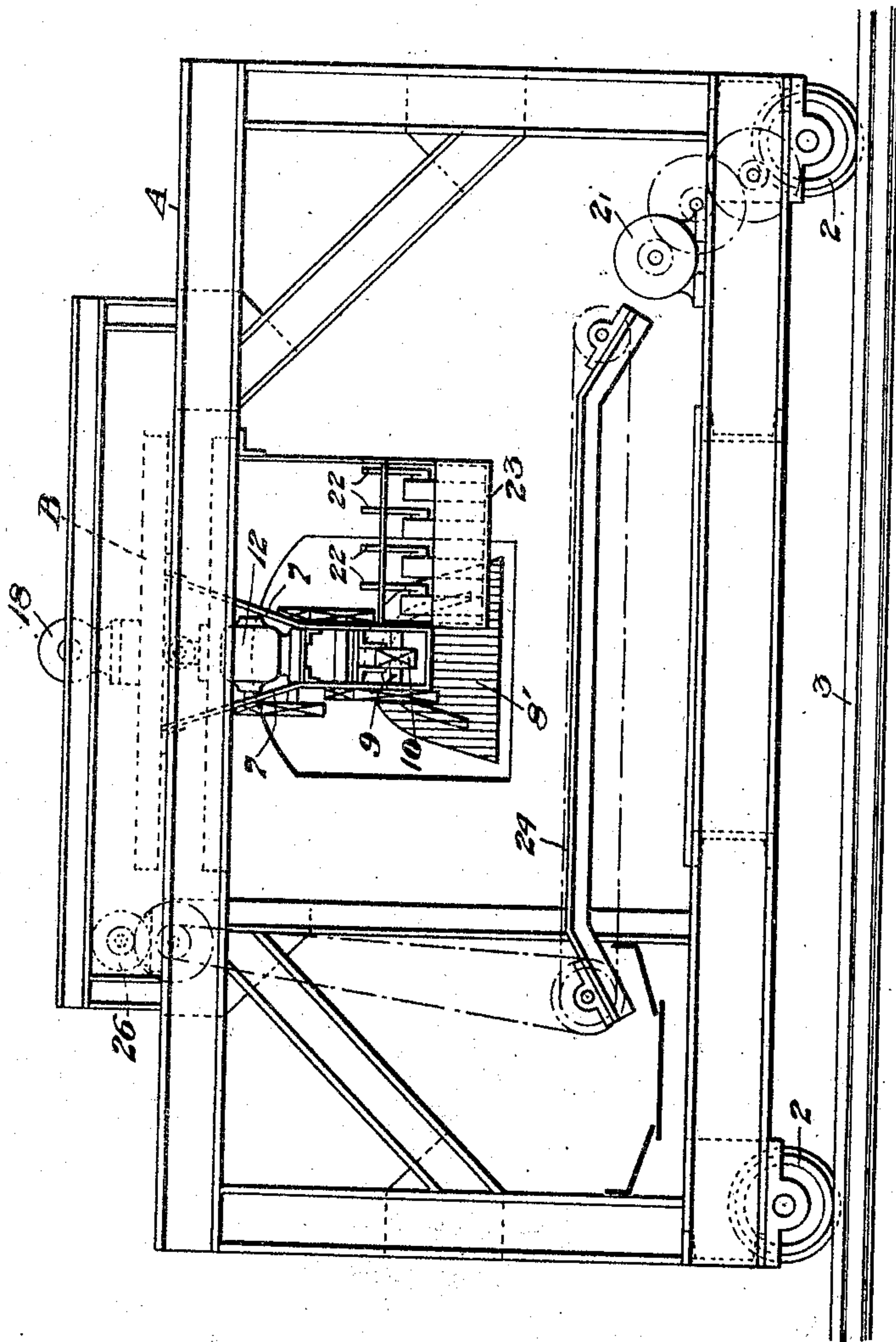
923,140.

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COKE DRAWING APPARATUS.
APPLICATION FILED OCT. 3, 1908.

Patented June 1, 1909.

5 SHEETS—SHEET 1

Fig. 8.



Witnesses:
Chas. S. Pepley
Henry Sons

Inventor:
Charles M. Clarke

UNITED STATES PATENT OFFICE.

CHARLES M. CLARKE, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO THE HEBB COKE DRAWER COMPANY, OF UNIONTOWN, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

COKE-DRAWING APPARATUS.

No. 923,140.

Specification of Letters Patent.

Patented June 1, 1909.

Application filed October 3, 1908. Serial No. 456,021.

To all whom it may concern:

Be it known that I, CHARLES M. CLARKE, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Coke-Drawing Apparatus, of which the following is a specification, reference being had therein to the accompanying drawing, forming part of this specification in which—

Figure 1 is a view in side elevation of my improved coke drawing apparatus, showing it mounted upon overhead supporting tracks and in position in front of an oven. Fig. 2 is a horizontal sectional view on the line II. II. of Fig. 1. Fig. 3 is a detail view showing a beam provided with a hinged rake head. Fig. 4 is a view in elevation from the back, looking toward the oven. Fig. 5 is a view in front elevation of a series of coke ovens provided with a receiving conveyer arranged longitudinally in front of the doors. Fig. 6 is a plan view of Fig. 5. Fig. 7 is a view in side elevation, partly in section, similar to Fig. 1, showing the machine mounted upon supporting ground tracks in working position in front of an oven, and provided with a search light. Fig. 8 is a view in elevation from the back, looking toward the oven.

My invention refers to the class of apparatus for drawing coke from an oven, or for performing any similar operation, and is designed for the purpose of providing such an apparatus adapted to be supported by and transported along tracks arranged in front of a bank of ovens or retorts.

In general, the invention comprises an active element consisting of a rake beam or scraper adapted to be projected into and withdrawn from the oven and means for producing said movement, together with means for supporting the beam, elevating or depressing it to vary the height of the scraper, means for deflecting the beam laterally so as to reach all parts of the oven on a horizontal plane, with means for moving the apparatus along in front of the oven to facilitate such adjustment of the beam, and also to shift it from one oven to another. These various movements are designed to be imparted to the operative elements by means of mechanism under the control of an operator mounted upon the traveling carriage. The machine may also include mechanism by

which the coke is carried away and delivered to any suitable point after having been withdrawn from the oven.

The present application comprises in part a continuation of my prior application filed April 14, 1904 Serial No. 203155 renewed November 30, 1906, Serial No. 345809, and is hereby substituted for said application and also for application filed June 15, 1908 Serial No. 438488, for the purpose of embodying in a single patent an illustration of the alternative construction included in the original disclosure and therein claimed, to wit; the supporting car or truck, the overhead turntable carried thereby having the depending extractor beam frame, with the various motors and other elements for imparting lateral longitudinal and vertical movement to the extractor.

Referring now to the drawings, A represents a carriage constructed in any suitable or preferred manner, and supported by means of wheels 2 upon rails 3, carried by any suitable supporting framework 4, extending outwardly in front of the upper portion of the oven structure 5.

B is a turntable rotatably mounted upon the carriage A as by means of casters or rollers 6 supported upon the lower portion of the carriage framing or upon the turntable. Depending downwardly from the turntable B is a frame 7, made of plates or other suitable material adapted to provide a rotatable support for the scraper beam 8 having the downwardly extending rake or scraper 8' at the front end.

In Fig. 3 I have shown a modified construction of scraper, pivotally mounted in the end of the beam so as to allow it to fold upwardly in entering the restricted door opening over the coke and provided with a spring 8'' adapted to automatically erect the beam to operative position. This construction conforms to the rake device shown and described in the Hebb patent referred to later.

The beam 8 is incorporated with or mounted between the sides of the framing 7, in which is also mounted a driving shaft 9 carrying a pinion 10 in engagement with a rack 11, forming a portion of the rake beam 8. The pinion 10 is adapted to be rotated in one direction or the other by any suitable mechanism, and I have shown a reversing motor

12 mounted on the depending framework 7 and geared with the pinion 10, by suitable reducing gearing as indicated in Figs. 1 and 4. Any other suitable means by which longitudinal movement may be imparted to the beam may be substituted for the rack and pinion.

For the purpose of raising or depressing the scraper end of the beam I have provided a vertically movable frame 13, adapted to engage the beam from below and above by means of rollers 14, 15, such frame being adapted to be raised or lowered by any convenient means mounted upon the turntable

B. For this purpose I have shown a reversible motor 16 adapted to actuate gearing, which in turn imparts upward or downward movement to the frame 13 through any suitable mechanism, as a threaded shaft 17.

The turntable B and its depending mechanism is adapted to be rotated in one direction or the other, and for this purpose I have provided a reversible motor 18, adapted to actuate a pinion 19 engaging an annular rack 20, secured to the relatively stationary carriage A.

For the purpose of transporting the entire mechanism along the tracks 3 one or both axles may be driven through the usual toothed gearing as shown, by a reversible motor 21, mounted in any suitable position upon the carriage framework, in the well known manner of traveling cranes. The various motors 12, 16, 18, and 21 are governed by suitable controllers 22, located in a pulpit 23, depending from the turntable B as clearly shown. These controllers, preferably one for each motor, are within reach of the operator carried by the pulpit, and it will be seen that each of the various functions of the different elements may be thus separately governed and controlled by him. It will be observed that the operator's pulpit is so located that he may readily see and observe the interior of the oven and thereby accurately direct and manipulate the beam and scraper.

24 is a conveyer located in front of and adjacent to the oven and adapted to receive the coke and to convey it to any suitable receiving vessel as a car, either directly, or through a supplemental conveyer 25, located approximately at right angles to conveyer 24 and adapted to receive the coke therefrom. Both of these conveyers, if carried by the carriage, are driven at their proper speeds by means of suitable mechanism, as sprocket gearing, actuated by a separate constantly running motor 26. It is obvious however, that one continuously running motor might be mounted upon the carriage and that the various movements to perform the different functions may be taken therefrom through suitable gearing, shafts, and clutch mechanism by means of proper levers within

the control of the operator. I do not desire therefore to be limited to the employment of separate motors, or in fact to any particular design or type of power imparting means, since it is obvious that various substitutions in the way of prime movers or power generating or imparting mechanism may be substituted for the motors within the discretion of the designing engineer.

If desired, the receiving conveyer may be entirely independent of the coke drawing apparatus, arranged in front of a bank of ovens below their doors, as shown in Figs. 5 and 6. The usual endless chain conveyer provided with flights is well adapted to this purpose as it may be made of any practicable length desired and continuously arranged along in front of the oven doors as shown. This conveyer 24' may discharge directly into receiving cars or other vessels at its end, or into a supplemental conveyer 25' arranged at an angle to the main conveyer and adapted to convey the coke to cars located on the usual tracks in front of the oven yard. With either construction the carriage is relieved of the weight and necessity of driving the conveyers, and will operate to draw the coke out upon the receiving one which then conveys it away as described, it being understood that the conveyers are provided with their own fixed driving means.

An advantage of electric motors is that the current may be continuously supplied through the well known trolley system in common use.

The operation of the apparatus will be readily understood from the foregoing description. The carriage is moved from one oven to the other and stopped in front of an oven ready to be drawn. The beam provided with the rake at its front end, which may be rigidly connected or pivotally connected as shown in Patent 727790 granted to John A. Hebb, is then projected inwardly over the top of the coke, being sufficiently raised by the mechanism described, until sufficiently far advanced in the oven to engage a body of coke to be drawn. The rake is then depressed downwardly into engagement with the coke and when so engaged, power is imparted to the beam in a reverse direction, causing it to travel outwardly, drawing with it a section of coke which is delivered upon the conveyer 24.

When it is desired to reach in toward the right or left of the oven, the turntable B is partially rotated so as to vary the horizontal angular position of the beam, its longitudinal and vertical adjusting functions being performed in the same manner as already described at whatever angle the turntable and its supporting framework may assume.

For the purpose of bracing the apparatus to counteract the strain of pulling against the mass of coke, a rail 27 is located along the

face of the ovens above the doors upon which wheels 28 mounted upon the inner sides of the carriage will bear at varying positions.

From the foregoing description, it will be seen that I secure a considerable advantage in supporting the beam below the turntable by a carrying structure which in turn is carried by the turntable. It is also evident that the mounting of the turntable on the track-supported carriage as shown in the principal drawings, will not always be necessary in order to secure these desirable results, but that other arrangements or designs of beam supporting and manipulating means may be employed with the carriage to provide a pendently carried beam, as by mounting the carriage on ground tracks and extending it upwardly above the oven door level to provide an overhead turntable support. In Figs. 7 and 8 I have illustrated such construction, and also shown the machine as provided with a lighting device. In these drawings A' represents the carriage constructed in any suitable or preferred manner, mounted by wheels 2' upon rails 3' carried by any suitable support as ties 4' in front of the oven 5, and supporting the superposed rotatably mounted turntable B' by casters or rollers 6, the turntable having the depending frame 7 and the other elements, indicated by corresponding numerals and arranged to operate in the manner already described.

For the purpose of illuminating that portion of the oven and its contents to which the extracting element of the beam is directed to withdraw a section of the coke, I have provided a search light 29 mounted in any suitable manner as by a supporting frame 30 extending outwardly in front of the framework 7 at each side of the lifting mechanism 13 or otherwise and preferably adapted to be adjusted therein to properly locate the rays and direct them to the back or darker portion of the oven, in alinement with the beam and its path. The adjustment may be effected by any suitable means as nuts 31 adapted to fixedly secure the pivotal trunnion bearings, as will be readily understood, while the mounting of the search light in frame 30 insures its lateral movement with the lateral movement of the frame 7 depending below the turntable, and resulting lateral adjustment of the beam 8, whereby the rays *a* will always be maintained in alinement with the beam, corresponding to its working path at any position in the oven.

It will be understood that current for the search light, as for the motors, may be supplied by suitable connections and the usual trolley apparatus from any producing point.

The advantages of the search light will be appreciated by those familiar with this class of apparatus as it obviates the objections of obscuring the work in the oven due to darkness, vapor, etc.

From the foregoing description it will be seen that I secure a further considerable advantage in supporting the beam below the turntable by a carrying structure which in turn is supported and laterally adjusted by the turntable, for the reason that the working mechanism, being located above or overhead, the parts at or below or level of the oven doors are reduced to a minimum, thus giving the operator a non-obstructed view and ample space.

Changes and variations may be made by the skilled mechanic in the design, arrangement or various details of the invention, but all such changes are included as within the scope of the following claims:

What I claim is:

1. A coke drawing apparatus consisting of an overhead carriage, a tilting rake beam depending from the carriage, with means for moving the beam into and out of the oven.
2. A coke drawing apparatus consisting of an overhead carriage, a tilting rake beam depending from the carriage, with means for moving the beam into and out of the oven and for raising and lowering it.
3. A coke drawing apparatus consisting of an overhead carriage, a rake beam and frame depending from the carriage, with means for moving the beam into and out of the oven, means for raising and lowering it, and means for turning the frame and beam toward one side or the other.
4. A coke drawing apparatus consisting of an overhead carriage, a rake beam and frame depending from the carriage with means for moving the beam into and out of the oven, means for raising and lowering it, and means for turning the frame and beam toward one side or the other, with means for moving the carriage.
5. The combination with an overhead track, of a carriage, a turntable supported by the carriage, a reciprocating beam provided with a rake supported below the turntable, with means for imparting longitudinal movement to the beam and for rotating the turntable.
6. The combination with an overhead track, and a bracing track, of a carriage, a turntable supported by a carriage, a reciprocating beam provided with a rake supported below the turntable, with means for imparting longitudinal movement to the beam and for rotating the turntable.
7. The combination with an overhead track, of a carriage, a turntable supported by the carriage, a reciprocating beam provided with a rake supported below the turntable, with means for imparting longitudinal and vertical movement to the beam and for rotating the turntable.
8. The combination with an overhead carriage, of a rake beam supported below the carriage and provided with a rack, a pinion

in engagement with the rack, and means for actuating the pinion.

9. The combination with an overhead carriage, of a rake beam supported below the carriage and provided with a rack, a pinion in engagement with the rack, and means for actuating the pinion in opposite directions.

10. The combination with an overhead carriage, of a turntable provided with a downwardly extending supporting framework, a rake beam provided with a rake mounted therein, means for imparting longitudinal movement to the beam, and means for raising and depressing the inner end of the beam.

11. The combination with an overhead carriage, of a turntable provided with a downwardly extending supporting framework, a beam provided with a rake and a rack mounted therein, a pinion in engagement with the rack, with means for actuating the pinion in opposite directions.

12. The combination with an overhead carriage, of a turntable provided with a downwardly extending supporting framework, a beam provided with a rake and a rack mounted therein, a pinion in engagement with the rack, with means for actuating the pinion in opposite directions, and means for raising and depressing the inner end of the beam.

13. The combination with a bank of ovens provided with an overhead track, of a carriage mounted on the track, a rake beam supported from the carriage and provided with a pivoted rake, with means for moving the beam into and out of the oven.

14. The combination with a bank of ovens provided with an overhead track, of a carriage mounted on the track, a rake beam supported from the carriage and provided with a pivoted rake, and means for automatically erecting the rake, with means for moving the beam into and out of the oven.

15. The combination with a bank of ovens provided with a fixed conveyer, and an overhead track, of a carriage mounted on the track, a rake beam supported from the carriage and provided with a rake, and means for moving the rake into and out of the oven.

16. The combination with a bank of ovens provided with a fixed conveyer arranged along in front of the ovens, a supplemental conveyer arranged at an angle thereto, and an overhead track, of a carriage mounted on the track, a rake beam supported from the carriage and provided with a rake, and means for moving the rake into and out of the oven.

17. The combination with a bank of ovens provided with a fixed conveyer arranged along in front of the ovens, a supplemental conveyer arranged at an angle thereto, and an overhead track, of a carriage mounted on the track, a turntable mounted on the car-

riage provided with a supporting framework, a rake beam provided with a rake mounted therein, means for imparting longitudinal movement to the beam in either direction, means for raising or depressing the end of the beam, means for rotating the turntable, and means for propelling the carriage along the track.

18. The combination with a bank of ovens provided with a fixed conveyer arranged along in front of the ovens, a supplemental conveyer arranged at an angle thereto, and an overhead track, of a carriage mounted on the track, a turntable mounted on the carriage provided with a supporting framework, a rake beam provided with a pivoted rake mounted therein, means for imparting longitudinal movement to the beam in either direction, means for raising or depressing the end of the beam, means for rotating the turntable, and means for propelling the carriage along the track.

19. The combination with a bank of ovens provided with a fixed conveyer arranged along in front of the ovens, a supplemental conveyer arranged at an angle thereto, and an overhead track, of a carriage mounted on the track, a turntable mounted on the carriage provided with a supporting framework, a rake beam provided with a pivoted automatically erected rake mounted therein, means for imparting longitudinal movement to the beam in either direction, means for raising or depressing the end of the beam, means for rotating the turntable, and means for propelling the carriage along the track.

20. The combination with a bank of ovens provided with a fixed conveyer arranged along in front of the ovens, a supplemental conveyer arranged at an angle thereto, and an overhead track, of a carriage mounted on the track, a turntable mounted on the carriage provided with a supporting framework, a rake beam provided with a pivoted spring controlled rake mounted therein, means for imparting longitudinal movement to the beam in either direction, means for raising or depressing the end of the beam, means for rotating the turntable, and means for propelling the carriage along the track.

21. In a coke drawing apparatus, the combination with an overhead track, of a carriage mounted thereon provided with rotatably movable supporting mechanism having a beam carrying frame, a rake beam mounted therein, means for actuating the rake beam, and means for actuating the supporting mechanism, substantially as set forth.

22. In a coke drawing apparatus, the combination with an overhead track, of a carriage mounted thereon provided with rotatably movable supporting mechanism having a beam carrying frame, a rake beam mounted therein, means for actuating the rake beam, means for actuating the supporting mechanism,

ism, and means for propelling the carriage along the track, substantially as set forth.

23. In a coke drawing apparatus, the combination with an overhead track, of a supporting carriage, a rake beam provided with a scraper, means for directing the rake at varying angles horizontally to explore the entire area of a circular oven, means for reciprocating the rake, means for raising and lowering it, and means for propelling the carriage along the track, substantially as set forth.

24. The combination with a series of "bee-hive" ovens, of a conveyer located in front of their doors, a suspended carrier traveling above and in front of said doors, and a rake on said carrier and means for moving it to discharge the contents of the ovens onto the conveyer.

25. The combination with an oven, of a stationary conveyer and a carriage suspended in front of the oven and having thereon a rake, and means to move the rake reciprocally and also with vertical and horizontal angular movements, substantially as described.

26. The combination with a series of ovens, of a stationary conveyer below and in front of the doors of the ovens, a carriage suspended above and in front of the doors provided with means for moving from one oven to the other, and having mounted thereon a rake provided with means for reciprocating it into the ovens and for universal angular movement.

27. In a coke drawing apparatus, the combination of a car, a turntable carried thereby, a vertically rocking and horizontally sliding rake beam mounted on the table, and motors carried by the table for rocking and sliding the rake beam.

28. In a coke drawing apparatus, the combination with a suspended structure and means thereon for propelling it along in front of a bank of ovens, of a tilting rake beam depending from said structure and means for moving the beam into and out of the oven, substantially as set forth.

29. In a coke drawing apparatus, the combination with a suspended structure and means thereon for propelling it along in front of a bank of ovens, of a tilting rake beam depending from said structure and means for moving the beam into and out of the oven, and for raising and lowering it, substantially as set forth.

30. In a coke drawing apparatus, the combination with a suspended structure and means thereon for propelling it along in front of a bank of ovens, of a tilting rake beam depending from said structure, means for moving the beam into and out of the oven, means for raising and lowering it, and means for turning the supporting structure and beam toward one side or the other, substantially as set forth.

31. In a coke drawing apparatus, the combination with a supporting structure provided with a turntable, gearing, and a motor for actuating the turntable, of a rake beam supported thereby, gearing for imparting longitudinal movement to the beam, and a separate motor adapted to actuate said gearing, with a controller therefor, substantially as set forth.

32. The combination with a "bee-hive" oven, of a conveyer, a carriage suspended in front of the door of the oven, and a rake suspended on said carriage and having means for reciprocating it and for moving it angularly in both horizontal and vertical directions.

33. The combination with a series of "bee-hive" ovens, of a conveyer in front of their doors, a track above the doors, a carriage on said track suspended in front of the doors, a rake suspended from said carriage having means on the carriage for universal movement of the rake, and a motor for moving the carriage.

34. In a coke drawing apparatus, the combination with a set of ovens, and an overhead track and a supporting carriage suspended therefrom, of a rake beam suspended from said carriage, means for reciprocating the beam, means for raising and lowering the inner end of the beam, means for turning the beam toward one side or the other, means for propelling the carriage along the track, and separate motors for each of said means with separate controllers therefor, substantially as set forth.

35. In a coke drawing apparatus, the combination with a set of ovens and a suspended carriage, of a tilting rake beam depending from said carriage and provided with a rack, a pinion in engagement with the rack, and means for actuating the pinion, substantially as set forth.

36. In a coke drawing apparatus, the combination of a track, a supporting carriage mounted on the track, a turntable, a carrying frame supported by the turntable, a rake beam depending from said carrying frame, means for reciprocating the rake beam, means for raising and lowering its inner end, means for turning the rake beam toward one side or the other, and means for propelling the carriage along the track, substantially as set forth.

37. In a coke drawing and conveying apparatus, the combination with a bank of ovens and a traveling extracting apparatus comprising an overhead carriage having a depending reciprocating extracting element and means for varying the direction of said element laterally; of separate conveying mechanism arranged to receive the contents of the ovens discharged by the extractor.

38. In a coke drawing machine, the combination of a carriage mounted on a track,

means for propelling said carriage along the track, a turntable mounted on said carriage, a scraper beam supported beneath said turntable and means for rotating said turntable
5 and operating said scraper beam.

39. In a coke drawing machine, the combination of a carriage mounted on a track, means for propelling said carriage along the track, a turntable mounted on said carriage,
10 means for rotating said turntable, a scraper beam supported beneath said turntable, means for reciprocating said scraper beam and means for raising and lowering the operative end of the same.

40. In a coke drawing machine, the combination of a carriage mounted on a track, means for propelling said carriage along the track, a turntable mounted on said carriage,
20 a scraper beam supported beneath said turntable and means for rotating said turntable and operating said scraper beam.

41. In a coke drawing machine, the combination of a carriage mounted on a track, means for propelling said carriage along the track, a turntable mounted on said carriage,
25 means for rotating said turntable, a scraper beam supported beneath said turntable, means for reciprocating said scraper beam and means for raising and lowering the operative end of the same.
30

42. In a coke drawing machine, the combination of a carriage mounted on a track, means for propelling said carriage along the track, a turntable mounted on said carriage,
35 a frame depending from said turntable, a scraper beam mounted in said frame and means for rotating said turntable and operating said scraper beam.

43. In a coke drawing machine, the combination of a carriage mounted on a track,
40 means for propelling said carriage along the

track, a turntable mounted on said carriage, a frame depending from said turntable, means for rotating said turntable, a scraper beam mounted in said frame, means for reciprocating said scraper beam and means for raising and lowering the operative end of the same. 45

44. In a coke drawing machine, the combination of a carriage mounted on a track, a motor adapted to propel said carriage along the track, a turntable, a scraper beam depending from said turntable, and a motor supported by said turntable and adapted to rotate the same and operate said scraper beam. 55

45. In a coke drawing machine, the combination of a supporting carriage mounted on a track, a turntable mounted on said carriage; a carrying frame supported by said turntable, a scraper beam depending from said frame, means for reciprocating said scraper beam, means for raising and lowering its operative end, means for swinging said scraper beam from side to side and means for propelling the carriage along the track. 65

46. In a coke drawing machine, the combination of a track, a supporting carriage mounted on the track, a turntable, a carrying frame supported by said turntable, a scraper beam depending from said frame, means for reciprocating said beam, means for raising and lowering its operative end, means for swinging said beam from side to side and means for propelling said carriage along the track. 75

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

CHARLES M. CLARKE.

Witnesses:

CHAS. S. LEPLEY,
HENRY SENS.