No. 791,685. PATENTED JUNE 6, 1905.

S. J. FOWLER.

APPARATUS FOR CHARGING RETORTS.

APPLICATION FILED NOV. 18, 1904.

3 SHEETS—SHEET 1.

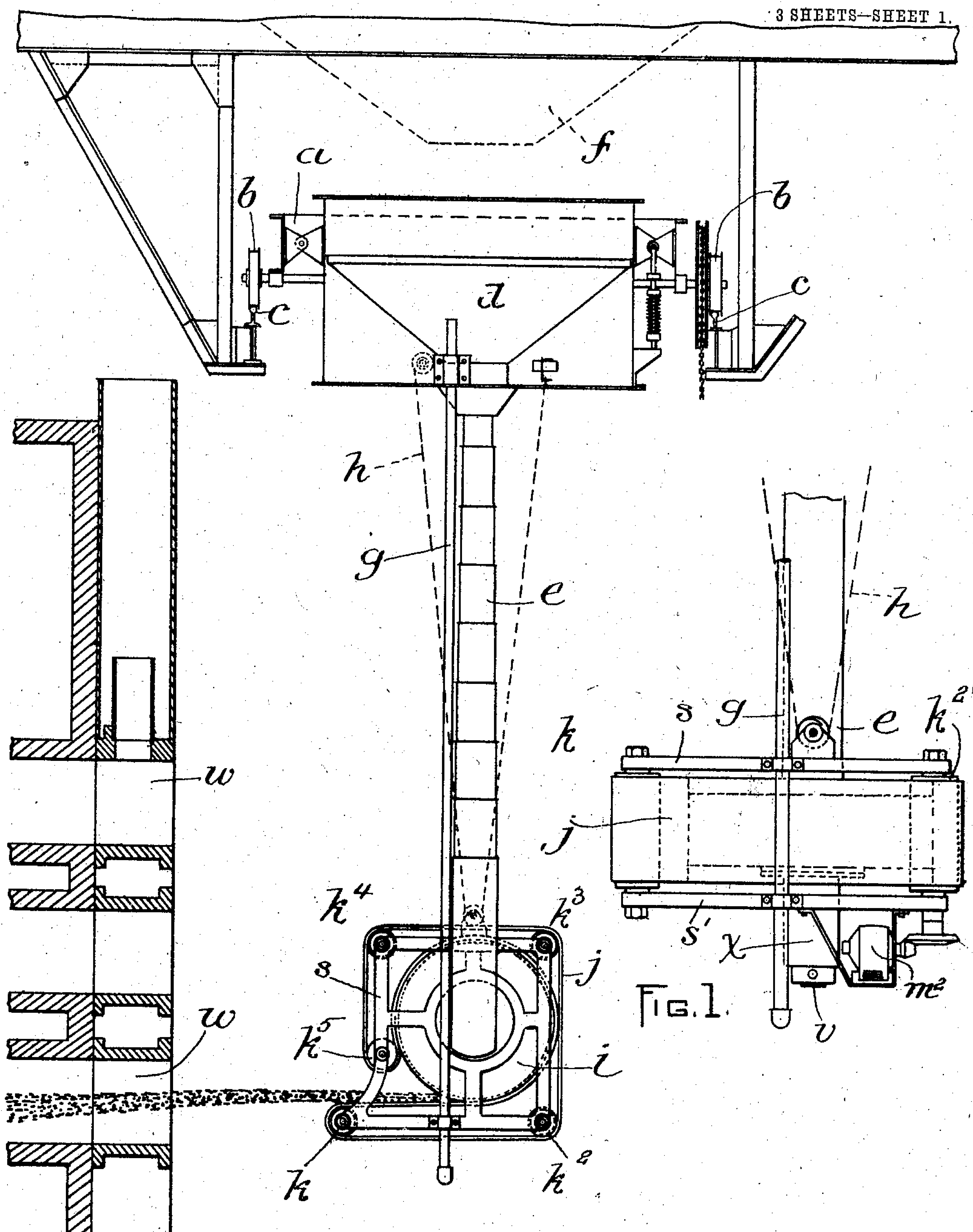

FIG. 1.

FIG. 2.

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3 SHEETS—SHEET 2.

FIG 3.

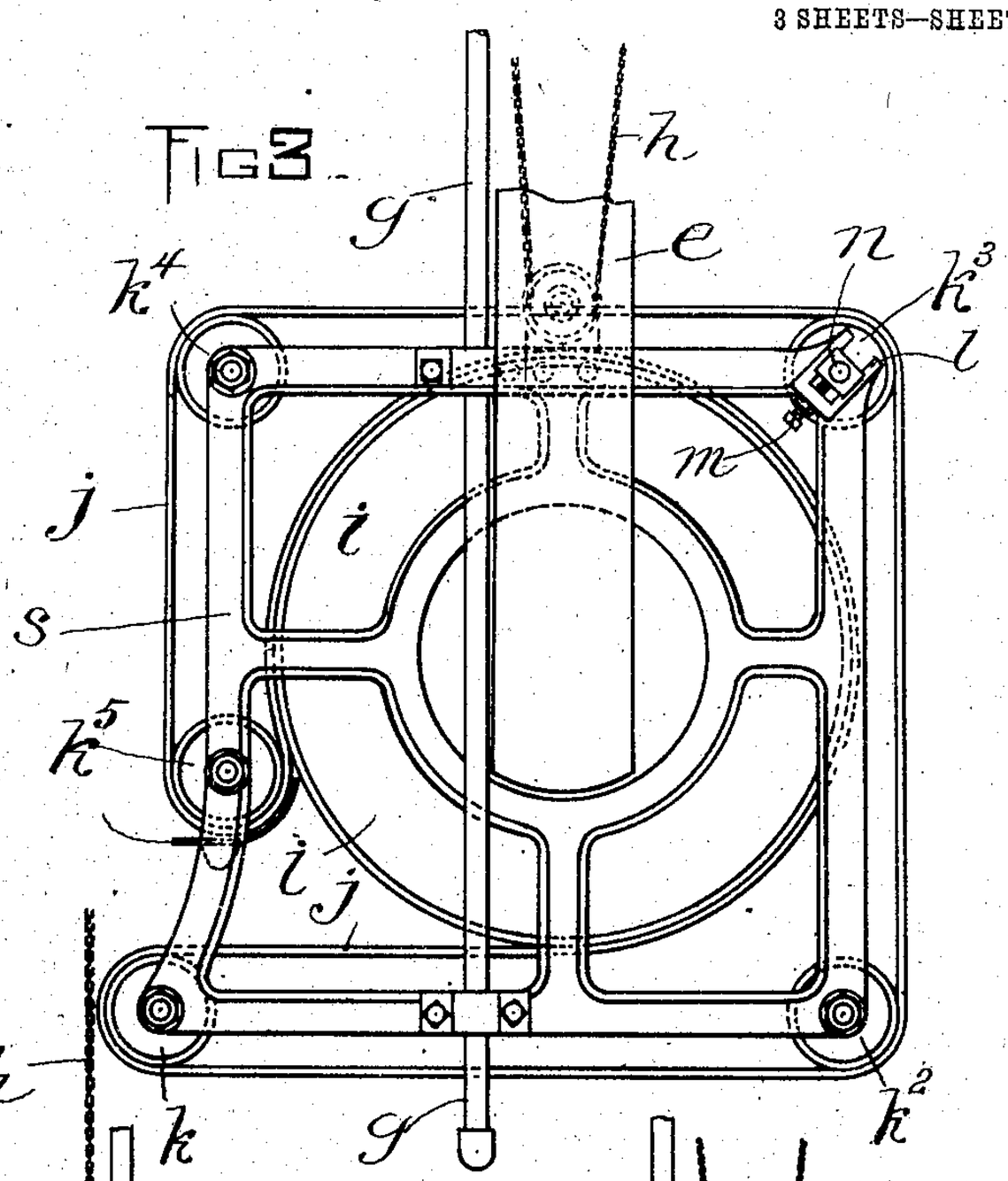


FIG 4.

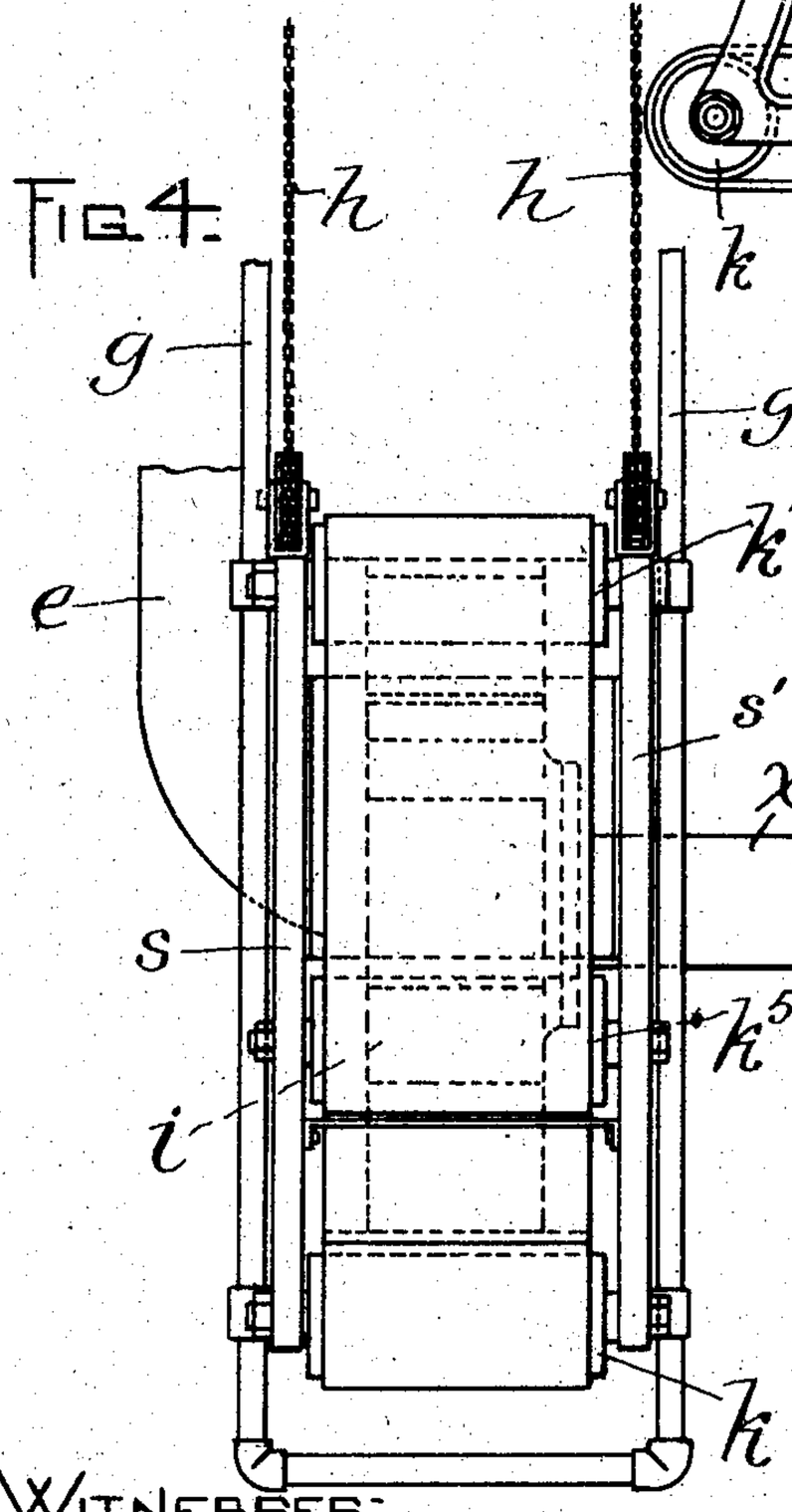
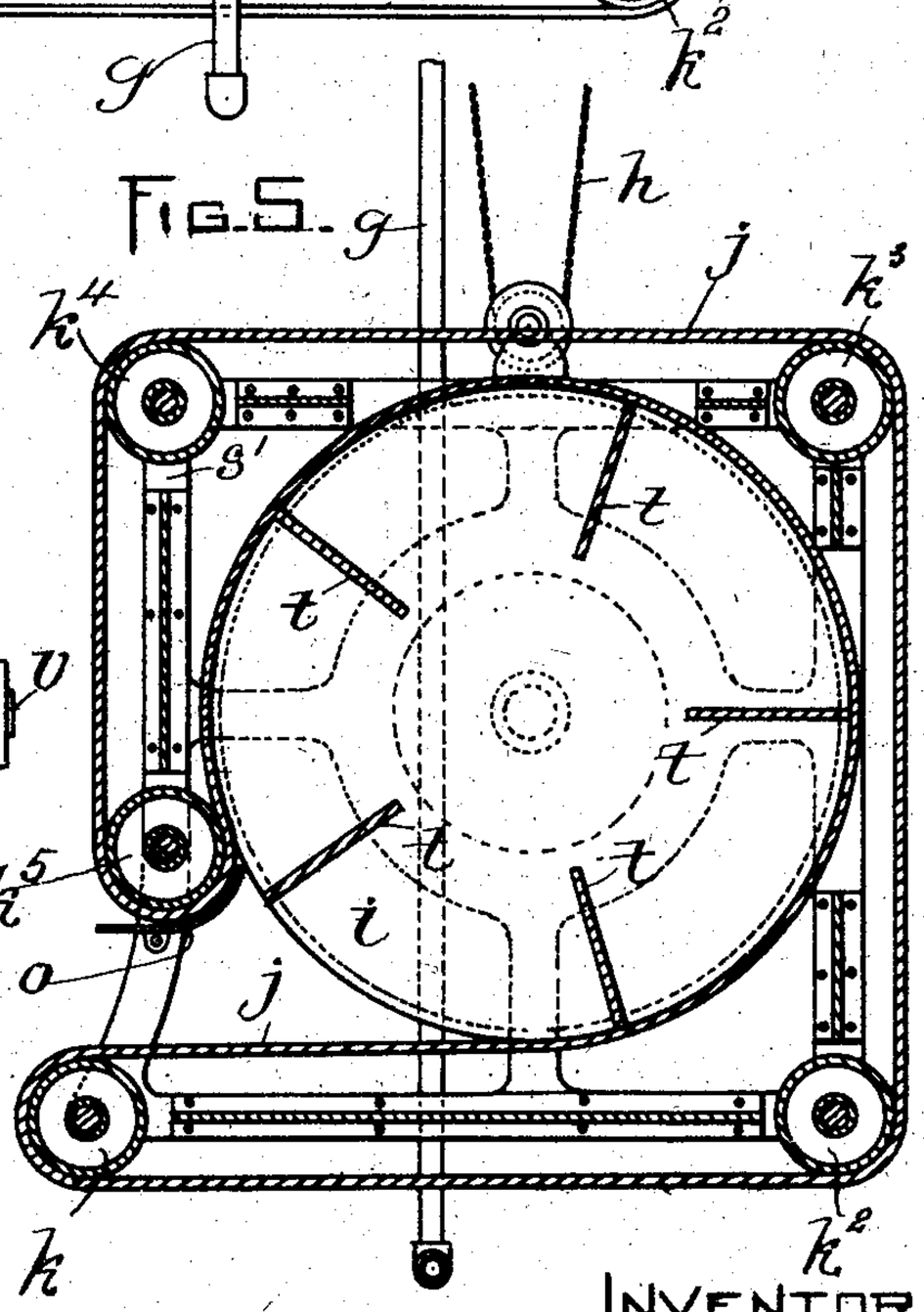


FIG 5.



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3 SHEETS—SHEET 3.

Fig. 7.

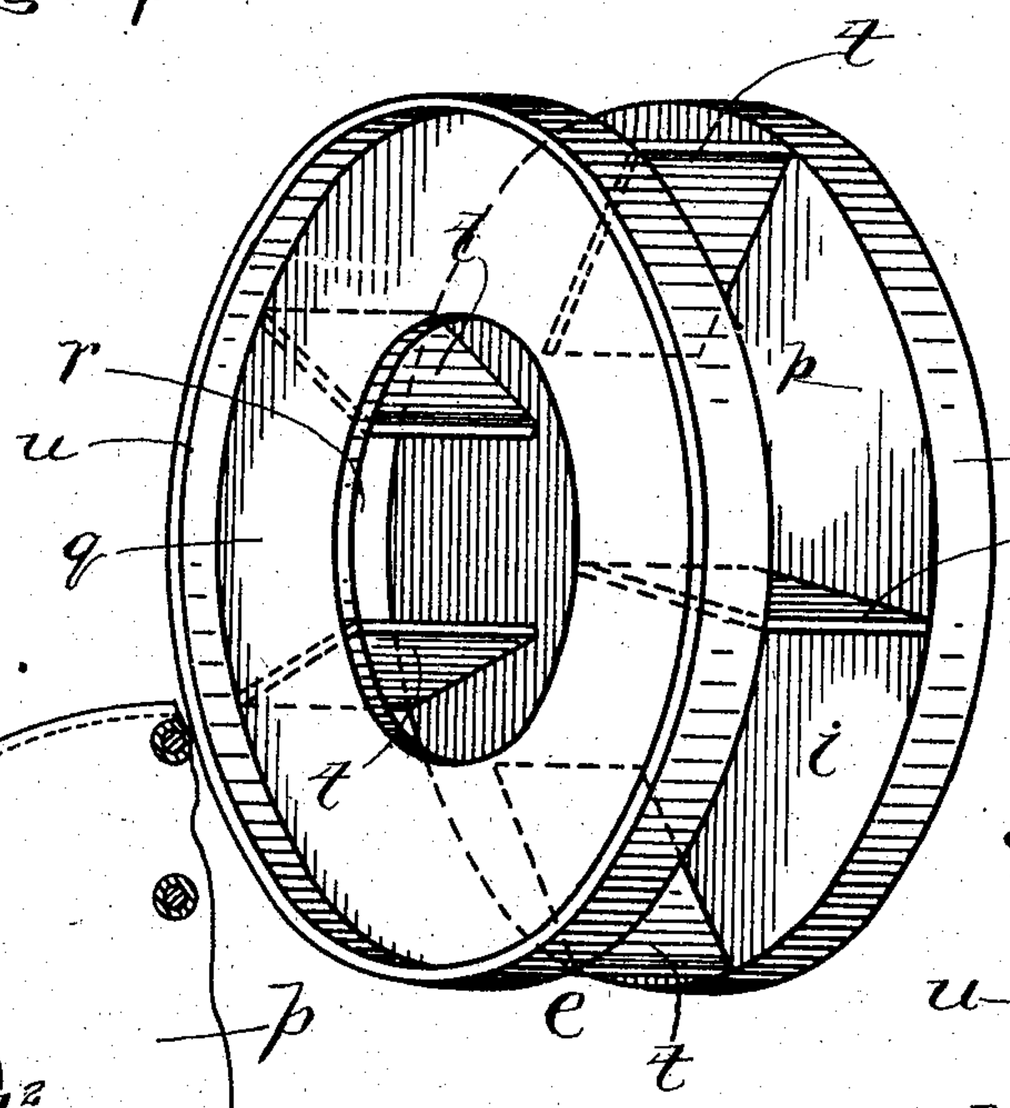


Fig. 9.

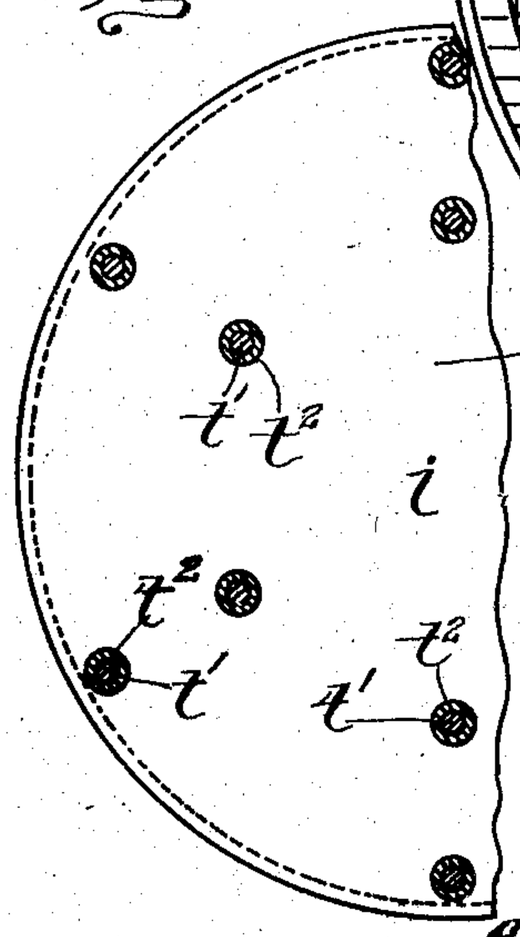


Fig. 8.

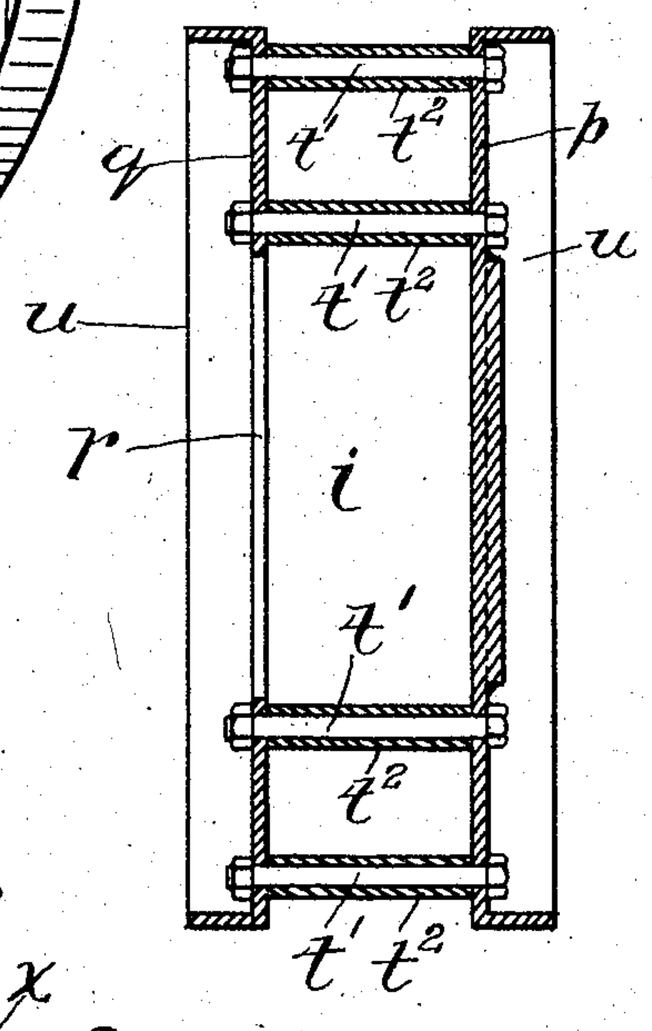
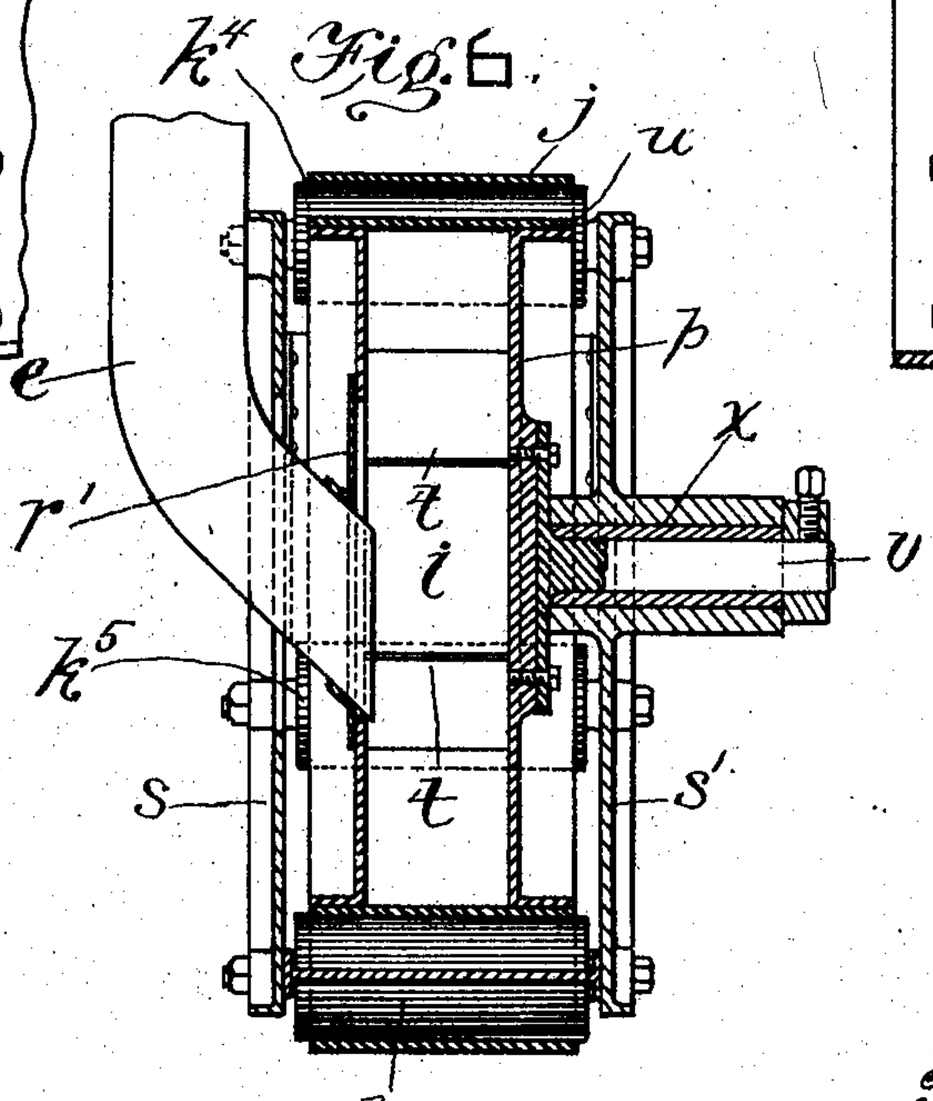


Fig. 6.



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UNITED STATES PATENT OFFICE.

SAMUEL J. FOWLER, OF CAMBRIDGE, MASSACHUSETTS.

APPARATUS FOR CHARGING RETORTS.

SPECIFICATION forming part of Letters Patent No 791,685, dated June 6, 1905.

Application filed November 18, 1904. Serial No. 233,351.

To all whom it may concern:

Be it known that I, SAMUEL J. FOWLER, of Cambridge, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Charging Retorts, of which the following is a specification.

The present invention has reference to devices for charging gas-retorts with coal, and has for its object to provide an apparatus of this character capable of projecting the coal in a low trajectory into a retort.

The invention consists of the apparatus having the novel features hereinafter particularly described and claimed.

Of the accompanying drawings, Figure 1 represents a side elevation of an apparatus embodying the preferred form of my invention and showing the projecting apparatus supported horizontally, the axes of its rotating parts being vertical. Fig. 2 represents a side elevation of an apparatus embodying my invention, the axes of the rotating parts being horizontally arranged. This horizontal arrangement of the axes is illustrated in this and in some of the succeeding figures for the sake of convenience, the preferred arrangement being that shown in Fig. 1. Fig. 3 represents a similar view, on an enlarged scale, of a portion of the projecting apparatus. Fig. 4 represents an elevation of the same as seen from the right of Fig. 3. Fig. 5 represents a section of the projecting apparatus transverse to the axis of the projecting-wheel. Fig. 6 represents a transverse axial section of the apparatus. Fig. 7 represents a perspective view of the projecting-wheel used with this apparatus. Fig. 8 represents a cross-sectional view showing a modified form of projecting-wheel. Fig. 9 represents a side elevation of the same.

The same reference characters indicate the same parts in all the figures.

The charging apparatus consists of a projector which is preferably suspended from a carriage *a*, provided with wheels *b*, supported by a track *c* to permit of its being moved to carry the projector from one retort to another, though it may be mounted in any way desired which will permit of such motion, and is also provided with a measuring chamber or hopper *d* and a chute *e*, leading from the bottom of the chamber to the projector, adapted to guide the coal discharged from an overhead bin *f* into the projecting apparatus. The chute is made of telescopic sections in order that its length may vary to permit raising and lowering of the projector, which is supported by chains or ropes *h*, by which it may be moved to different levels, and is held steady in any position by the guide-rods *g*, depending from the carriage. The projecting apparatus itself consists, essentially, of a frame *s s'*, in which are journaled and which supports a projecting-wheel *i* and an endless guiding-belt *j*, supported and guided by pulleys *k*, k^2, k^3, k^4, and k^5, which are so located as to maintain a portion of the belt in contact with the greater portion of the periphery of the projecting-wheel. The frame preferably will be mounted horizontally, so that the projecting-wheel and pulleys turn about vertical axes, as shown in Fig. 1, though it may be arranged vertically, as shown in certain of the other views; but however the projector is mounted the relative arrangement of the wheel, pulleys, belt, &c., will be the same.

The guide-pulley *k* is located some distance to the rear of the axis of the projecting-wheel with its upper limb approximately on the tangential line of the projecting-wheel and the retort to be charged, so that the portion of the belt passing over this pulley will extend on a line tangential to said projecting-wheel. The guide-pulley k^5 is located adjacent to the wheel *i* and a slight distance from pulley *k*, thereby causing the belt to surround a large proportion of the periphery of the wheel and leave a narrow passage adjacent the periphery of the wheel through which the coal may be thrown, the other pulleys being located in any desired position to guide the belt, so that it will run freely. In order to take up slack in the belt and keep it in close engagement with the periphery of the projector-wheel, one or more of the guide-pulleys, as k^3, is adjustably mounted in a guideway *l*, formed in the frame of the projector and preferably extending radially outward from the center of the projecting-wheel, the pulley being held

at the proper distance from said center by adjusting-screws *m*, which act on the bearing-blocks *n* of the pulley. A plate or shield *o*, attached to the frame near the guide-pulley k^5 and extending in close proximity to the belt toward the projecting-wheel, serves to protect the belt from injury by lumps of coal which may fly out as they are projected from the apparatus and to guide the stream of coal. This protector is particularly applicable when the apparatus is mounted horizontally, as shown in Fig. 1, as it then prevents the tendency of the stream to spread and guides it in a compact mass.

The projecting-wheel consists of a disk *p* and a second disk *q*, having an orifice *r* formed therein at its central part, thereby constituting the latter disk an annulus. Upon both the disk *p* and annulus *q* flanges *u* are formed which extend outwardly and form a bearing-surface to support the belt *j*. The disk and annulus of one form of wheel included in my invention (shown in Figs. 4, 5, 6, and 7) are connected together by ribs or blades *t*, which are preferably formed of flat plates of metal arranged radially of the wheel and extending perpendicularly between the disk and annulus, holding the latter at the proper distance apart and parallel to each other. The ribs extend from the periphery of the wheel to the edge of the orifice *r* and form between them passages leading from the central orifice to the rim of the wheel. The structure of the wheel just described is not essential, as the wheel may be made in other slightly-different ways—such, for instance, as that illustrated in Figs. 8 and 9, wherein the ribs *t* are dispensed with and the disks *p* and *q* held together by studs or bolts *t'*, the proper distance between the disks being maintained by sleeves t^2, surrounding the bolts *t'*, or by other abutments and bearing at their ends on the inner surfaces of the disks.

Upon the outer sides of the disk *p* is secured in any suitable manner a shaft *v*, which is journaled in a bearing *x*, formed on the plate *s'*, constituting part of the frame of the projecting apparatus, the guide-pulleys for the belt *j* being rotatably mounted on the studs extending between the plates *s* and *s'* of the frame.

The chute *e*, which leads the coal from the bin to the projecting apparatus, is preferably offset at its lower end to extend toward the projecting-wheel and projects into the central orifice *r*, constituting a nozzle which directs the stream of coal flowing from the bin into the central part of the projecting-wheel, the coal then falling into the space between the disks *p* and *q* and the belt *j* and being retained therein by the belt. A shield *r'* is preferably attached to the chute *e* and extended over the orifice *r*. The belt is caused to travel about its pulleys and the projecting-wheel to rotate in contact therewith by any suitable driving means, which may be an electric motor, as m^2, Fig. 1, connected directly or by gearing to the shaft of one of the pulley-wheels, or a belt so connected and driven from any suitable source of power, in which case the belt would be the driving means and the projecting-wheel driven thereby, or the projecting-wheel may be positively driven and act to drive the belt. As the projecting-wheel and belt move in contact with each other, they both travel at the same speed.

In operation the wheel and belt are first set in motion and allowed to attain the necessary speed, which depends on the distance the coal is to be projected. A valve in the coal-hopper is then opened and the coal allowed to run down the chute into the central part of the projecting-wheel and through the passages in said wheel, which latter, together with the belt, acts upon the coal to project it by centrifugal force, the belt coöperating with the disks which form the sides of the wheel to guide the coal in a narrow compact stream and to cause it to move away from the apparatus in a line tangential to the rim of the projecting-wheel into a retort *w*. The ribs *t* in the form of the invention illustrated in Figs. 4, 5, 6, and 7 act also as buckets, between which are left passages through which the particles of material to be projected are thrown by centrifugal force and which assist by positively propelling the material. The pulley k^5 being located at only a slight distance from the tangential part of the belt will deflect any pieces of coal which might be thrown erratically outward by the wheel, and so prevent scattering of the coal and cause it all to fall within the mouth of the retort.

In the embodiment of the invention shown in Fig. 1 the apparatus as a whole is mounted with the position of the parts such that the projecting-wheel and belt move in a horizontal plane, and the wheel throws the coal from the center horizontally outwardly by centrifugal force, the latter being restrained by the belt and caused to leave the apparatus through the opening between the pulleys *k* and k^5 in a line tangential to the wheel. The device may also be positioned vertically with the rotating parts arranged to turn about horizontal axes, this form being shown in most of the figures for convenience of illustration and arrangement of views on the drawings.

Changes of detail may be made without departing from the spirit of my invention.

I claim—

1. A projecting apparatus comprising a rotary wheel having provisions for admitting material adjacent its axis and ejecting the same at its periphery, an endless belt surrounding a greater portion of said wheel in contact with the periphery thereof and coöperating with said wheel to permit the material to be projected through the space not surrounded by the endless belt.

2. A projecting apparatus comprising a rotary wheel adapted to receive material adjacent its axis and deliver the same at its periphery, a progressively-moving guiding means surrounding the greater portion and adjacent the periphery of the wheel and arranged to coöperate with the wheel to project the material in a compact stream through the space not surrounded by the progressively-moving guiding means.

3. A projecting apparatus comprising a rotary wheel having provisions for receiving material adjacent its axis and for projecting the material from its periphery, a progressively-moving guiding means arranged in contact to the periphery of said wheel and surrounding the greater portion thereof, the adjacent portions of the guiding means forming between them a narrow outlet and being adapted to guide the material in a compact stream in a line tangential to the periphery of the wheel, and to prevent scattering of the particles of the material being projected through the narrow outlet by the apparatus.

4. A projecting apparatus comprising a rotary projecting-wheel provided with a central orifice, means for feeding the material into the central orifice, buckets in said wheel arranged to guide the material to be projected to the periphery of the wheel and discharge it therefrom, a progressively-moving guiding means partially surrounding and coöperating with said wheel so arranged to cause the projected material to move in a path tangential to the periphery of the wheel and out through the space not surrounded by the progressively-moving guiding means.

5. A projecting apparatus comprising a rotary projecting member having an orifice adjacent its axis of rotation and ribs forming buckets with passages between them extending thence to its periphery, an endless traveling belt partially surrounding said wheel in contact with its periphery, and forming a narrow discharge-outlet for the projected material, and a chute located adjacent to said wheel and arranged to discharge the material to be projected into the orifice in the wheel.

6. An apparatus of the character described, comprising a projecting-wheel having an extended peripheral bearing-surface, formed with a space extending from the periphery toward the center, and a central orifice communicating with said space, and an endless belt partially surrounding said wheel in contact with its periphery and forming a narrow discharge-outlet for the material projected tangentially from the wheel.

7. An apparatus of the character described, comprising a projecting-wheel comprising a disk, an annulus spaced apart from said disk and parallel therewith and formed with a central orifice, spacing members connected to the disk and annulus to retain them at the proper distance apart, flanges formed on the peripheries of the disk and annulus to form an extended belt-engaging surface, and an endless traveling belt partially surrounding said wheel and forming a narrow discharge-outlet for the material projected tangentially from the periphery of the wheel.

8. A projecting apparatus comprising a projecting-wheel having a central orifice in one side thereof and passages leading therefrom to the periphery, an endless belt partially surrounding the wheel, guide-pulleys therefor arranged to hold the belt in contact with the greater part of the periphery of said wheel, one of the pulleys being located to hold a portion of the belt extended tangentially from the periphery of the wheel, and another pulley located adjacent the wheel a short distance from said tangential portion of the belt to form a narrow orifice for guiding the material projected by the wheel, and means for feeding material into said central orifice.

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

SAMUEL J. FOWLER.

Witnesses:

PATRICK COYLE,

JAMES W. NOURBOURN.