No. 736,690. PATENTED AUG. 18, 1903.

C. R. CLAGHORN.

CAR UNLOADING APPARATUS.

APPLICATION FILED NOV. 22, 1901.

NO MODEL. 4 SHEETS—SHEET 1.

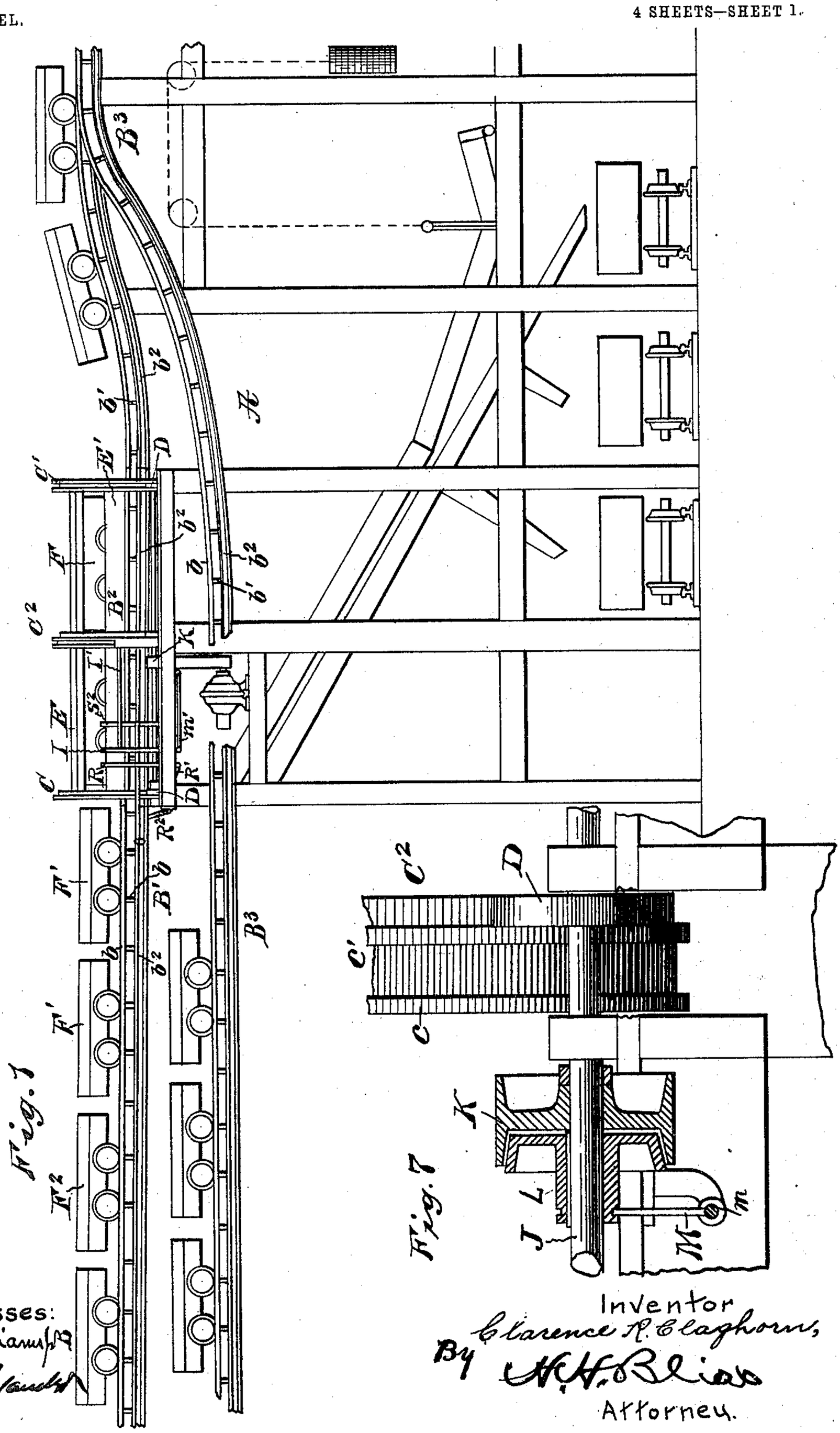

Fig. 1

Fig. 7

Witnesses:
A. K. Williamson
C. R. Alexander

Inventor
Clarence R. Claghorn,
By H. H. Bliss
Attorney.

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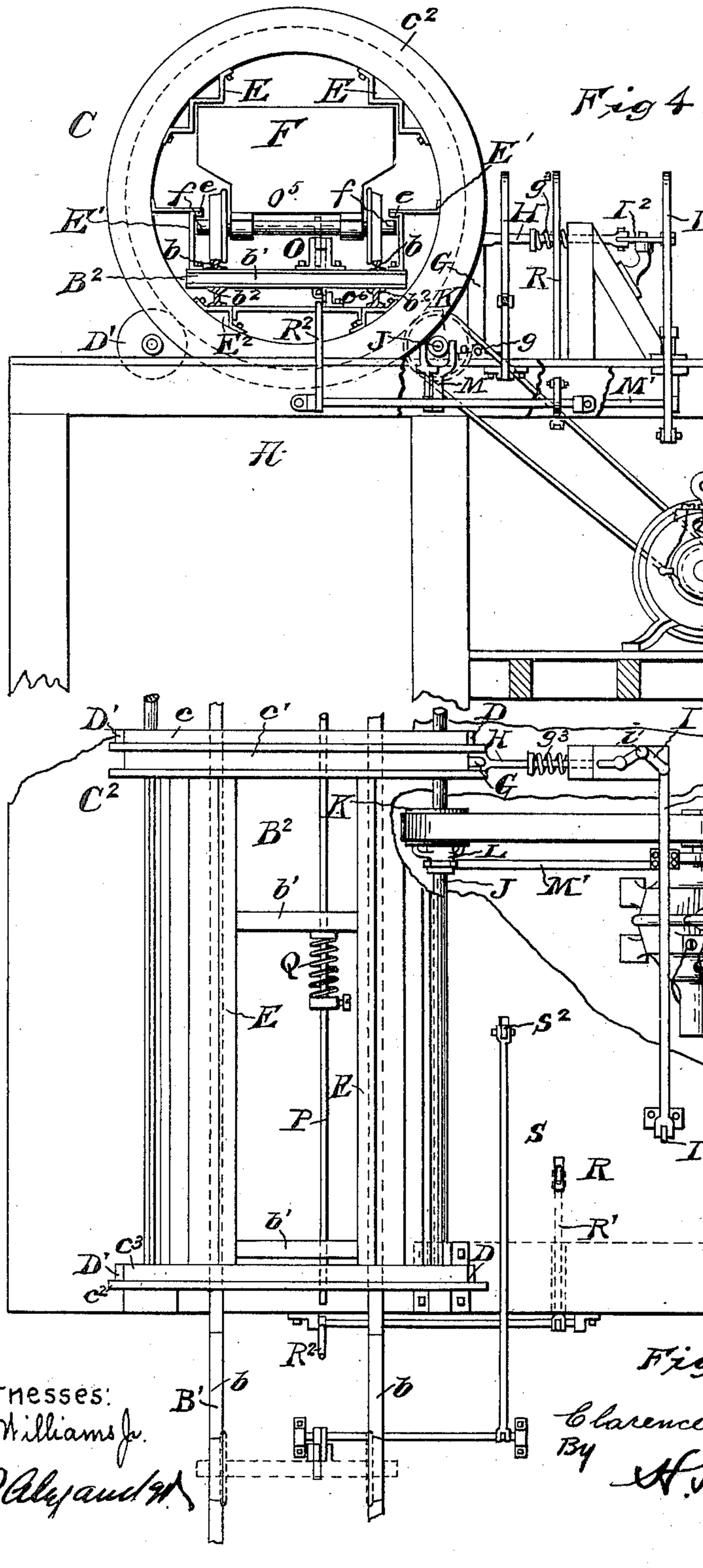

Fig. 4

Fig. 2

Witnesses:
A. K. Williams Jr.
E. P. Alexander

Inventor:
Clarence R. Claghorn,
By H. H. Bliss
Attorney.

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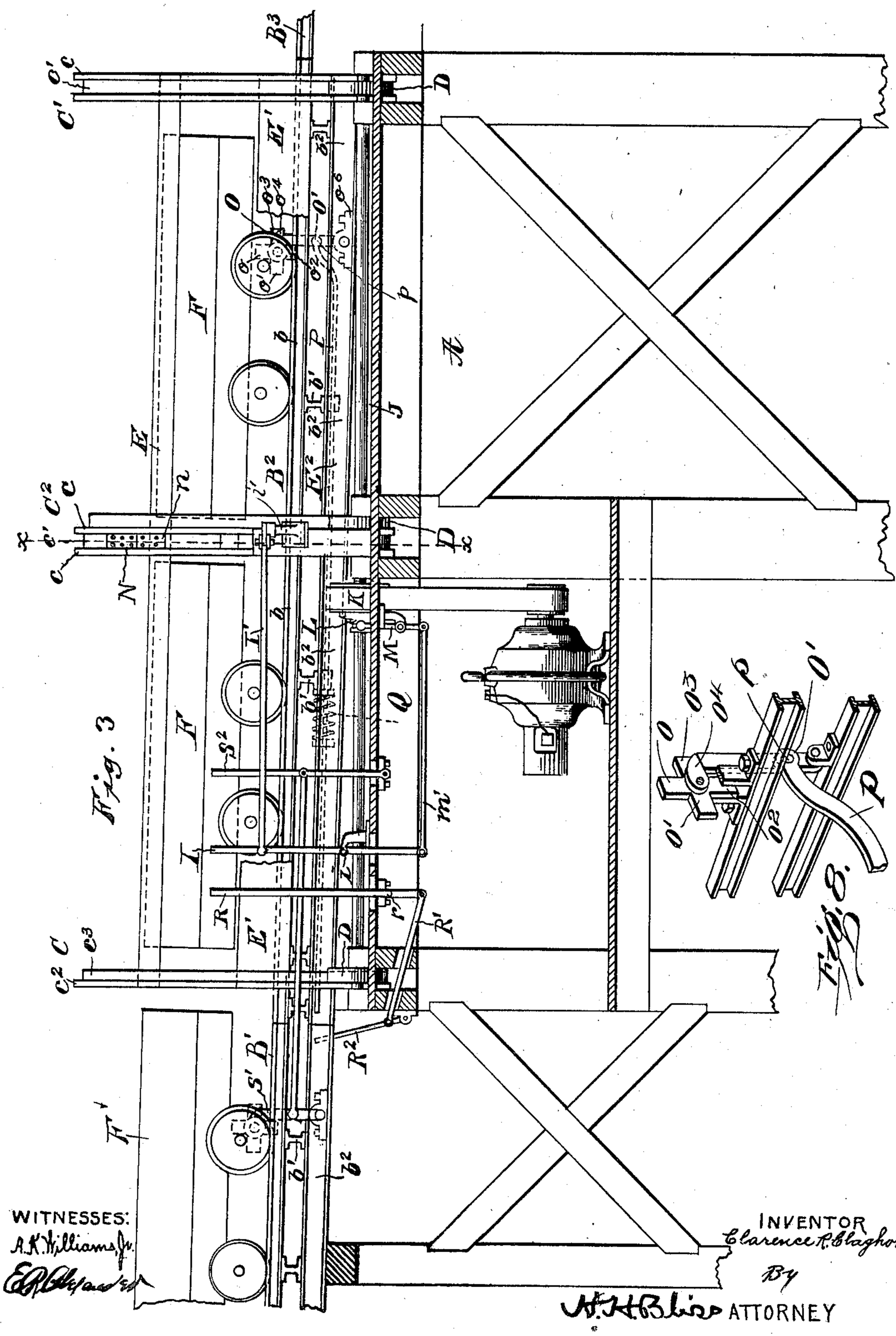
NO MODEL. 4 SHEETS—SHEET 3.



WITNESSES:
A. K. Williams, Jr.
E. P. Blyard

INVENTOR
Clarence R. Claghorn
By
W. H. Bliss ATTORNEY

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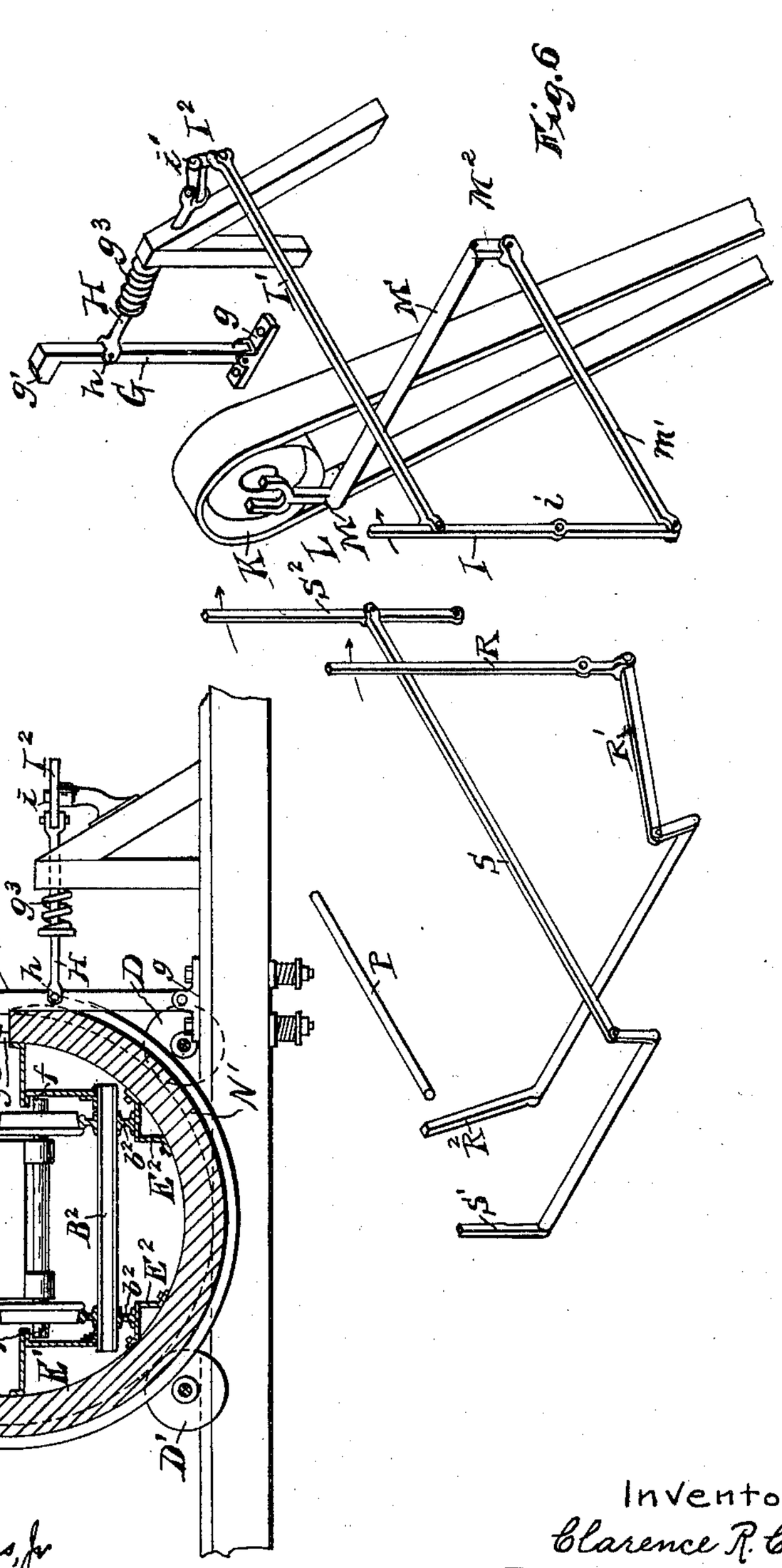
NO MODEL. 4 SHEETS—SHEET 4.



Witnesses
Albert K. Williams, Jr
E. P. Allyand

Inventor
Clarence R. Claghorn,
By H. H. Bliss
Attorney.

No. 736,690. Patented August 18, 1903.

UNITED STATES PATENT OFFICE.

CLARENCE R. CLAGHORN, OF VINTONDALE, PENNSYLVANIA.

CAR-UNLOADING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 736,690, dated August 18, 1903.

Application filed November 22, 1901. Serial No. 83,303. (No model.)

To all whom it may concern:

Be it known that I, CLARENCE R. CLAGHORN, a citizen of the United States, residing at Vintondale, in the county of Cambria and State of Pennsylvania, have invented certain new and useful Improvements in Car-Unloading Apparatus, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements in mechanism for emptying cars.

My improved mechanism considered as an entirety is particularly intended and is especially well adapted for the unloading of the coal-cars that are used for bringing coal from the mines to the screening apparatus; but more or less thereof can be also used under other circumstances and for other purposes.

Figure 1 is a side elevation of a mechanism embodying my improvements. Fig. 2 is a top plan view. Fig. 3 is a side elevation of part of Fig. 1 on a larger scale. Fig. 4 is a sectional end elevation of the dumping apparatus, parts of the track system being shown in section. Fig. 5 is a vertical transverse section on the line $x\,x$, Fig. 3. Fig. 6 is a perspective more or less conventionally illustrating the relations of some of the lower parts. Fig. 7 shows the means for clutching together the driving parts and the shafting connected with the tippling mechanism. Fig. 8 is a detail view of the stop mechanism.

In the drawings I have shown a tippling mechanism such as is adapted for use at or near the mouth of a coal-mine that is adapted to receive the cars loaded with the coal as they come from the mine and empty them upon or over the screening mechanism and the chutes which conduct the coal to the cars or other receptacles below. As illustrated, there is a trestle-like framework at A, which supports the several sections of car-track and also the tippling and screening mechanism. The sections of car-tracks are respectively indicated by B, B′, B^2, and B^3. That at B is the main track, which initially receives the trains of loaded cars as they come from the mine. That at B′ is the section where the loaded train is temporarily arrested and stands while the cars composing it are gradually advanced from the front end for emptying, that at B^3 being the movable section upon which the cars are held while they are being tipped and unloaded, and that at B^3 being the section which receives the emptied cars and guides them forward to the place whence they are returned over a return-track to be taken back to the mine.

I will first describe the track-section at B^2 and the parts immediately connected therewith. It comprises the rails $b\ b$ and the ties $b'\ b'$, which are joined together by the beams b^2. The track-frame thus formed is capable of being revolved on an axis which is substantially horizontal and longitudinal of the track. The track-frame just described is secured to a rotating frame, which comprises the end rings C C′ and the intermediate or central ring C^2. These rings are mounted upon rollers or wheels D D′, and said wheels are carried on suitable shafts, one of which is indicated by J. These shafts have bearings in or on the frame A. The wheels D′ are idlers and serve as antifriction-supports upon which the rings can roll. The wheels D are connected, through shaft J, to the power-transmitting parts and are adapted to transmit rotary motion to the frame, drum, or cage which carries the track-section B^2. The rings C C′ C^2 can each be formed with flanges c and a suitably large intervening groove or channel c', though I have found that it is sufficient that the rings C′ C^2 should be thus constructed with such flanges and groove. The ring at C can have a single flange c^2 and a horizontal flange c^3 and meet what is required of it. These rings are connected together by bars or sill-pieces E E′ E^2.

The above-described track-frame $b\ b'\ b^2$ rests upon and is secured to the longitudinal rails or sills E^2. The cars F are adapted to run into the cage or drum now being described and rest upon the track-rails b. The longitudinal sills or beams E are placed so as to lie directly above the cars, and when they are inverted said sills or beams prevent them from being displaced from the track-rails. The bars or beams E′ not only connect together the rings of the cage or drum, but also assist in binding together the ties or sleepers b' of the track-frame and preferably comprise angle-bars with flanges turned, as indicated at e, to lie directly over the outer ends of the axles f of the car, and consequently they pro-

vide a supplemental holder to prevent displacement of the cars from the track during the tippling operation. The tippling-drum is locked in position by means of the arm G, which is pivoted upon the main framework at g and has the catch g', adapted to enter a socket at g^2 in the metal at the bottom of the groove c' in the center ring structure C^2. If this locking arm and latch G g' be withdrawn from the socket g^2 and if power be applied to the cylinder or cage, it will move through one revolution until the latch again enters the socket g^2, which entering is caused by a spring g^3 bearing against a suitable abutment and also against a collar on the link-rod H, which is pivoted at h to the arm G. To withdraw the arm and latch, use is made of a lever I, pivoted at i in a suitable bearing on the main frame, a link or thrust-bar I', and a bell-crank lever I^2, pivoted at i' to the frame and also pivoted to the aforesaid link H. Said thrust-bar I' is pivotally connected with the lever I at i^4 and with said bell-crank lever at i^5, Fig. 6. When the lever I is moved in the proper direction, it through the said intervening parts draws the arm G and its latch g' away from the socket in the cage or drum and the latter is free to revolve.

I prefer to so construct and arrange the parts of the apparatus that the same lever I can be utilized to start the rotation of the drum or cage, and this is done as follows: J is the line-shaft, which carries the supporting and driving wheels D D. This shaft is intermittently rotated from a motor or engine properly arranged to be belted to the driving-pulley K, which is mounted loosely on the shaft J. The wheel or pulley K can be constantly rotating and be intermittently connected to the line-shaft J at such time as the operator likes. The connection is effected by means of a friction-clutch, (indicated as a whole by L,) part thereof being splined to the line-shaft J and the other part formed with or attached to the wheel K. The sliding element of the clutch L is moved by the shipping-lever M, pivoted at m on the framework and connected to the main lever I by a rock-shaft M', arm M^2, and a link m'. The parts of the clutch or clutch mechanism are so related to the devices which effect the locking of the cage or drum and to the lever I that when the operator moves the latter he can both effect the unlocking of the cage and the connecting of the clutch elements.

I prefer to have the train of devices which connect the operator's lever I with the cage-lock so constructed and related to the other parts that the only duty required of the operator is merely a brief drawing backward of the arm G and the latch, after which he can disregard these parts and give attention to other matters, even while the cage is revolving, the clutch parts being in turn so related to the lock that the clutch elements will remain in engagement until one revolution has been imparted to the cage, whereupon the clutch will be automatically opened. All of these several movements and results are attained by the lever I at one end of the two trains of devices and the arm G at the other end.

In the groove c' between the flanges $c\,c$ of the center ring C^2 there is a bent bar or plate or series of such bars, as shown at N. These may be made adjustable around the periphery or one or more may be attached or removed. They provide a support for the end of the latch-bar, but terminate at n. Between the end at n and the notch or orifice g^2 in the ring there is a short arc of the surface of the periphery which is radial nearer the axis, and this can be lengthened or shortened by means of the detachable or adjustable plates. The construction and relations of these several parts are such that when the operator moves the lever I he first draws the arm G out far enough to release the latch g' from the drum, and just as the latch escapes the simultaneous movement of the sliding element of the clutch has brought it into engagement with the continuously-rotating drive-pulley K and the latter commences at once to rotate the line-shaft J and the drive-wheels D D, which in turn start the cage or drum and the rotary track-section B^2 to revolving. The instant after the revolution thereof commences the operator can, if he sees fit, release his hand from the lever I without stopping the revolution of the drum, for by that time the nose of the latch g' under the pressure of spring g^3 bears against the curved plate or surface N' in the groove c' and subsequently against the adjustable plate N, and this prevents the rod H, the lever I, the link I', and the bell-crank lever I^2 from moving in the reverse direction far enough to release the clutch, and consequently the latter is held in action during the greater part of the revolution of the drum; but as soon as the drum has turned far enough to bring the shoulder or drop at n to the nose g' of the latch-arm the latter moves a step toward the center of the drum, this step being long enough to effect the disengagement of the clutch elements, and thereafter during the remainder of the revolution the drum is carried around by momentum. As soon as the recess or socket at g^2 reaches the latch the latter is forced into it by the spring g^3 and the drum is stopped again at its initial position. If during the above-described operation one or more cars loaded with coal or other material were being carried by the drum, they would be emptied of their contents by the time a half of a revolution had been made, and during the other half of the revolution the empty cars would be brought up to their initial position ready to be removed from the drum or cage and be replaced by others with loads. It is desirable that the parts should be so related that by the time the drum completes its rotation it shall have lost its inertia to as great an extent as possible, so that it

can be stopped without any shock or danger at the instant when the lock or latch g' enters the notch or recess g^2. To attain this, it is necessary under some circumstances to have the instant of the release of the clutch variable, and this can be accomplished in either of several ways. At present I prefer to utilize the above-described grooved bar or plate N for this purpose and attach it in such way that the shoulder or drop at n can be placed nearer to or farther from the notch or recess g^2. The plate can be adjusted around the circle. In this way the clutch can be disengaged at any time desired and the drum can be carried by momentum through a longer or shorter arc as occasion demands in order to rob it of momentum just as it reaches its initial position.

I have applied to the rotating track-section a stop of such nature that it will hold one or more cars in position on the track during the above-described steps and at the same time will permit the ready removal thereof, this stop being under the control of the operator and being of such nature that it will automatically permit the escape of a single car or of two or more cars according to adjustment. In the mechanism illustrated two cars are shown in place upon the rotary track and the rails of the latter are inclined somewhat downward from the receiving to the delivering end, this permitting the cars to be held on the track by their gravity while they are resting on their wheels. During the intermediate portion of their revolution they rest upon the longitudinally-arranged bars, beams, or sills at E E' and of course have no tendency to longitudinal movement. The stop which I refer to is indicated as a whole by O. It can be made in either of several ways. As shown, it consists of four stop-arms $o\ o'\ o^2\ o^3$, a lug o^4, and a stop or lock bar O'. The arms $o\ o'\ o^2\ o^3$ and lug o^4 rotate together on an axis at o^5, and lock-arm O' is mounted on an axis at o^6. This lock or swinging stop moves toward and from the lug o^4 or into and out from its path. When in its path, the lug bears upon the lock-arm and rotation of the stop-arms $o\ o'\ o^2\ o^3$ is prevented, and at such times the stop mechanism provides a rigid stop for the car or cars bearing against it. The operator can, however, open the stop or lock by means of a rod or link P, which is pivoted at p to the lock-arm O'. A spring at Q tends to push the link P in the opposite direction and to hold the lock-arm in its active position.

R is a lever pivoted at r and adapted to push the lock-arm O' out of the path of the lug o^4. For this purpose to the lever is pivoted a link R', which moves an arm R^2, adapted to bear against the end of the link or rod P, but not rigidly connected to it, the two being independent of each other except as to the longitudinal motion, and consequently when the cage or drum is rotating the link P and the several parts of the stop and lock mechanism are properly held. When the rotary track returns to its normal position, it brings the parts at P and R^2 again into line with each other and operative relation.

The stop O, as illustrated, has four arms $o\ o'\ o^2\ o^3$ and one stop-lug o^4, and consequently acts as follows: Assuming that two cars are pressing against the stop, each with two axles or with two stop elements adapted to successively engage with the rotary stop. The front axle of the forward car bears against arm o and the parts o^4 and O' hold the car from motion; but when the operator by lever R moves the lock-arm O' out of the path of the lug o^4 the said car-axle pushes the arm o forward to its horizontal position, bringing the arm o' to the vertical, and immediately thereafter the second axle impinges on the arm o' and gives another quarter of a revolution. Then the axles of the second car successively impinge on the stop-arms o^2 and o^3, and thereby complete one rotation of the stop and bring the lug o^4 again into engagement with the lock-arm O', which has been returned into the path of the lug o^4 by the spring Q. Then the stop devices are ready to receive the next pair of cars. The loaded cars of the advancing train are indicated by F' F^2, those at F' being the two which will next advance to the cage. These cars are held a short distance back from the rotary track-section by a stopping mechanism similar to that above described and which will not require detailed description, it being sufficient to note that it is indicated as a whole by S, there being a rotary armed part, a stop-lug rotating therewith, a movable lock-arm S', and a lever S^2, connected with the stop-arm. When the operator desires that the two cars F' F' shall advance to the cage, he releases the lock-arm S' and its four arms permit such advance, they being in turn rotatable step by step by the axles; but when the third car of the train reaches the stop S it automatically arrests it and holds it until it is again released.

It will be seen that a stopping mechanism constructed and arranged on the same principle can be employed if it is desired to empty one car at a time, three, four, or more, it being merely necessary to properly vary the number of the stop-arms.

Devices of this sort provide a safeguard against the escape of a car or cars—that is, against the accidental advance of a car either on the cage or prior to reaching it—and are much superior to stop mechanisms heretofore used, which depended upon the operator to effect their movements both to the open position and to the closed. Here the operator can throw either the lever R or the lever S^2 without danger of accident. If he throws the lever S^2 before releasing the cars F F from the cage, the cars F' will be stopped by the cars F thereon, and if he then releases the latter the stopping mechanism automatically closes upon the entrance of the first loaded car. On the other hand, if he first releases the cars F from the cage their stop

mechanism O becomes automatically reset in locking position before the loaded cars F′ F′ are released.

The advantages which are incident to a mechanism of this sort for emptying cars, delivering them to the tipple, and allowing them to escape therefrom will be readily understood by those acquainted with such matters. The ordinary plan commonly in practice is to tilt the cars on a transverse axis in order to empty them at the front end, the front car-wall being a door hinged at its upper edge and latched at the bottom. This earlier plan depends upon the difference between the weight of a loaded car and its weight when emptied and also upon the difference in the positions of the center of gravity; but the cars vary one from the other largely with respect to the weight of the load, some being more completely filled than others. These variations in load cause variations in the tilting and emptying, those more lightly loaded often requiring assistance from the operator in starting them to dump and the heavily-loaded cars, on the other hand, tending to dump too quickly and rapidly, with a consequent jarring and shocking of the supporting devices and various adjuncts. Again, but one car at a time can be emptied when the "end-dump" system is employed; but with a mechanism such as that herein I can tipple or empty two, three, or more cars at once, proportionately reducing the number of dumping operations for a given tonnage. I can tipple or cause the emptying operation to occur with uniform speed in all cases, whether the cars be heavily or lightly loaded, and can therefore provide against breakage of coal. A single attendant can accomplish proportionately a much larger amount of work.

Above I have given a description in full of the apparatus, which is illustrated in order that one way of carrying out the invention can be readily understood; but of course it will be seen that the essential features of the invention can be retained even if a modification be made in any of many respects.

I refer to the parts which carry the movable track-section as a "cage," "drum," or "cylinder;" but it will be understood that these are merely terms of convenience, the essential elements being the laterally movable or rotary track or car-support, the means for retaining the car upon its support even when inverted, the means for imparting rotary motion to the car-support, the means for applying power to the car-support, the means for disconnecting the power, the means for regulating the times at which the disconnecting and the connecting of the power devices shall be accomplished, and the means for retaining the cars properly in or upon their movable supports, some or all of which may be used in one apparatus and others in others.

What I claim is—

1. The combination of the rotary track or car-support, means for holding a car thereon, power devices for rotating the support, means moving with the rotary car-support for positively maintaining the connection of the power mechanism with the said support, and arranged to automatically release the power mechanism at a predetermined point in the travel of the car-support, substantially as set forth.

2. The combination of the rotary track or car-support, means for holding the car thereon, power devices for rotating the support, a clutch for connecting and disconnecting the power devices, and means interposed between the rotary car-support and the clutch for positively maintaining the connection of the power devices, substantially as set forth.

3. The combination of the rotary track or car-support, means for holding a car thereon, power devices for rotating the car-support, a clutch for connecting the power devices, a rotary cam moving with the car-support, and positively imparting power to the clutching mechanism, and devices for automatically releasing the clutching mechanism when the cam is out of action, substantially as set forth.

4. The combination of the rotary track or car-support, means for holding the car thereon, power devices for rotating the support, means actuated by the rotary car-support for positively maintaining the connection of the power mechanism, and means for varying the length of time, during which the said connection of the power mechanism is maintained, substantially as set forth.

5. In a car-emptying apparatus the combination of the laterally-rotary track or car-support arranged to incline downward and forward, means for holding the car upon the support when rotating, power devices for rotating the car-support, a lock for holding the car-support and means for simultaneously moving the lock connecting the power devices to the car-support, and a stop against which the car presses downward when on said inclined support, said stop being, when released, movable by the car, substantially as set forth.

6. In a car-emptying apparatus, the combination of a rotary car support and holder mounted on a longitudinal downwardly and forwardly inclined axis, a stop in said car-support against which the car is adapted to rest by gravity in all of its partly-inverted or inverted positions, means for actuating said stop to hold and release the car, and mechanism for turning said support on said axis, substantially as set forth.

7. The combination of the rotary track or car-support, means for holding the car on the support while rotating, power devices for rotating the car-support, the lock or holder for holding the car against rotation, the connecting devices for connecting the power mechanism to the car-support, means for moving the car lock or holder and for moving the

power-connecting mechanism and arranged substantially as set forth to commence the movement of the lock or holder prior to the connecting of the power devices, and a groove or guide on the car-support for maintaining the connection of the power devices, substantially as set forth.

8. The combination of the rotary track or car-support, means for holding the car thereon while rotating, the power devices for rotating the car, the lock or holder arranged to bear on a substantially cylindrical surface of the car-support during the rotation of the latter, and adapted to lock the same against rotation, the clutch for the power devices, and means connecting said clutch and lock for simultaneous operation, substantially as set forth.

9. The combination of the rotary track or car-support, means for holding a car thereon while rotating, the holder or lock for holding the car against rotation, the spring g^3 actuating said lock, the power devices for rotating the car-support, and the means connecting the said lock or holder with the clutch, substantially as set forth.

10. The combination of the track or car-support, the means for holding the car thereon while rotating, the holder or lock to prevent the car from rotating, adjustable means for automatically holding the lock open while the car is rotating, the power devices for rotating the car-support and the clutch connected to the said lock or holder, substantially as set forth.

11. The combination of the rotary car-support, means for retaining the car upon the support while rotating, the holder or lock to prevent the car-support from rotating, the lever whereby the holder or lock can be opened at will and means for automatically holding open the lock while the car is rotating, comprising an adjustable guide for the lock, substantially as set forth.

12. The combination of the rotary track or car-support, the holder or lock for holding the car against rotating, means for opening the lock or holder at will, power devices for rotating the car, adjustable automatically-acting throw-off devices for disconnecting the power devices from the car, and a curved track or bearing-surface adjustable on the car-support arranged to maintain the connection of the power devices, substantially as set forth.

13. The combination of the rotary track or car-support and a car-stop thereon having a movable stop element adapted when released to be reset by a companion stop element on the car, substantially as set forth.

14. The combination of the rotary track on a longitudinal axis and the car-stop rotating with the said car-track, said car-stop being movable by the car, substantially as set forth.

15. The combination of the moving track-section or car-support, turning on a line parallel with the truck, a car-stop thereon, movable bodily therewith, and also adapted to be moved by the car independently of the track or support, substantially as set forth.

16. The combination of the track or car-support and the car-stop movable therewith and adapted to rotate intermittently in the same direction in the plane of advance of the car independently of the car-support, substantially as set forth.

17. The combination of the movable track or car-support, the car-stop thereon, movable therewith, and also movable by the pressure of the car engaging the stop in the planes of advance of the cars, substantially as set forth.

18. The combination of the movable track or car-support, the car-stop, the lock for the stop and means movable with the car-support for releasing the lock, substantially as set forth.

19. In a car-emptying apparatus the combination of a track or car-support rotating on a longitudinal axis whereby the cars are emptied laterally, a car-stop rotatable with the car-support, a lock for said stop and means for opening the lock rotatable with the car-support, substantially as set forth.

20. The combination of the track or car-support rotating on a longitudinal axis, the car-stop rotating with the car-support, the lock for the car, the stop and the two-part lock-opening mechanism having one part on and rotating with the car-support and the other part held stationarily relatively thereto, substantially as set forth.

21. The combination of the movable track or car-support, the car-stopping mechanism actuated by the cars and adapted to permit the advance of a predetermined number of cars and arrest the next in rear of said predetermined number, substantially as set forth.

22. In a car-emptying apparatus the combination of the movable track or car-support, the stationary track or car-support leading to the movable track, an automatically-acting car-stopping mechanism on the movable car-support, and the supplemental automatically-acting car-stopping mechanism on the stationary car-support, said stopping mechanisms acting automatically to permit the passage of certain cars and arrest other cars, substantially as set forth.

23. In a car-emptying apparatus the combination of a stationary track-section for delivering the loaded cars, the stationary track-section for receiving the emptied cars, and the intermediate laterally-rotating track-section adapted to receive the loaded cars from the first-aforesaid section, means for holding a car properly, transversely of the track while the car is emptying, and a stop in the longitudinal path of a portion of the car for holding the car longitudinally of the rotating section, said stop being arranged and normally remaining in said path during the entrance of the car on said rotating section, substantially as set forth.

24. The combination of a rotary car-tipple or dump adapted to receive and tip a car, a

movable car-stop having several stop elements corresponding in number with the stop elements on the car or cars on said tipple, and means for automatically arresting said movable stop when all of its said elements have been actuated by the dumped car.

25. The combination of a rotary car-tipple, mechanism for turning the same, means for disconnecting said turning means from the tipple, and a peripherally-adjustable bearing-piece on the tipple for varying the time in the period of such turning of the tipple, of the action of such disconnecting means.

26. The combination of a rotary car-tipple having a car-receiving track arranged on a downward incline from the receiving to the delivery end of the tipple, and a movable car-stop on said tipple.

27. The combination of a rotary car-tipple, a lock for holding the same in position, a curved bearing-surface on the tipple adapted to engage said lock during the turning of the tipple and means for turning the tipple, said lock acting when in unlocking position to maintain the connection of said turning means with the tipple.

28. The combination of a rotary car-tipple, a rotary car-stop thereon, a lock for said stop, and means independent of the tipple for actuating said lock.

29. The combination of a rotary car-tipple, a movable stop element thereon, means for locking the same in position to arrest a car, and devices for actuating said locking means, said car having means for actuating the stop to reset the same in arresting position for the succeeding car, substantially as set forth.

30. The combination of a rotary car-tipple, a track leading to the same, a movable car-stop on the tipple adapted to be successively actuated by different parts of the car, a movable car-stop on the said track corresponding with the first-mentioned stop, for arresting cars on the track during the operation of the tipple, and means for controlling said stops, whereby the stop on the tipple is reset by the same number of cars or stop-actuating elements thereon as will be permitted to pass by said stop on the track, substantially as set forth.

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

CLARENCE R. CLAGHORN.

Witnesses:

H. G. BROWNING,

H. L. VAUGHAN.