July 1, 1930. E. H. KIDDER 1,768,849

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Filed June 23, 1928 8 Sheets-Sheet 1

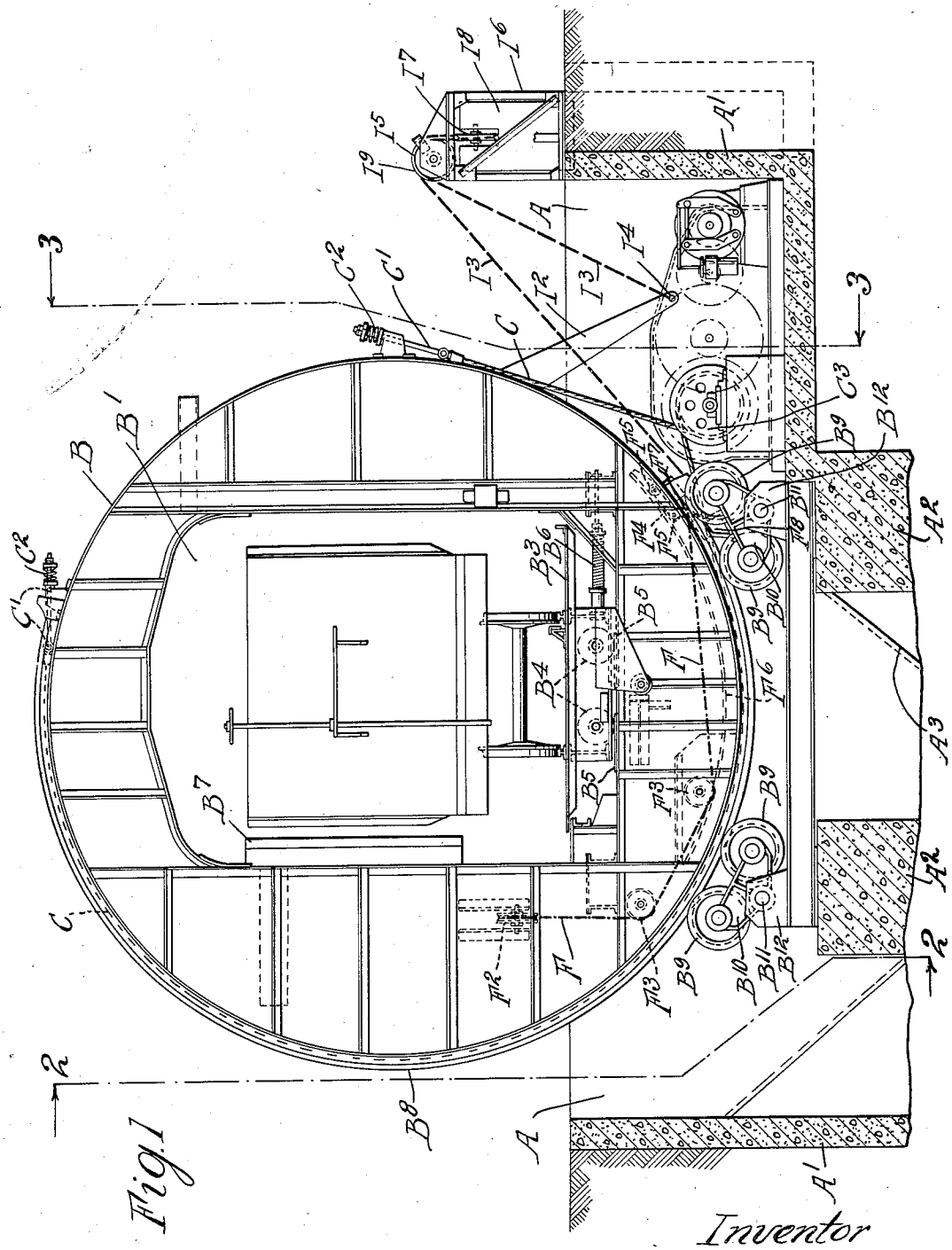


Fig. 1

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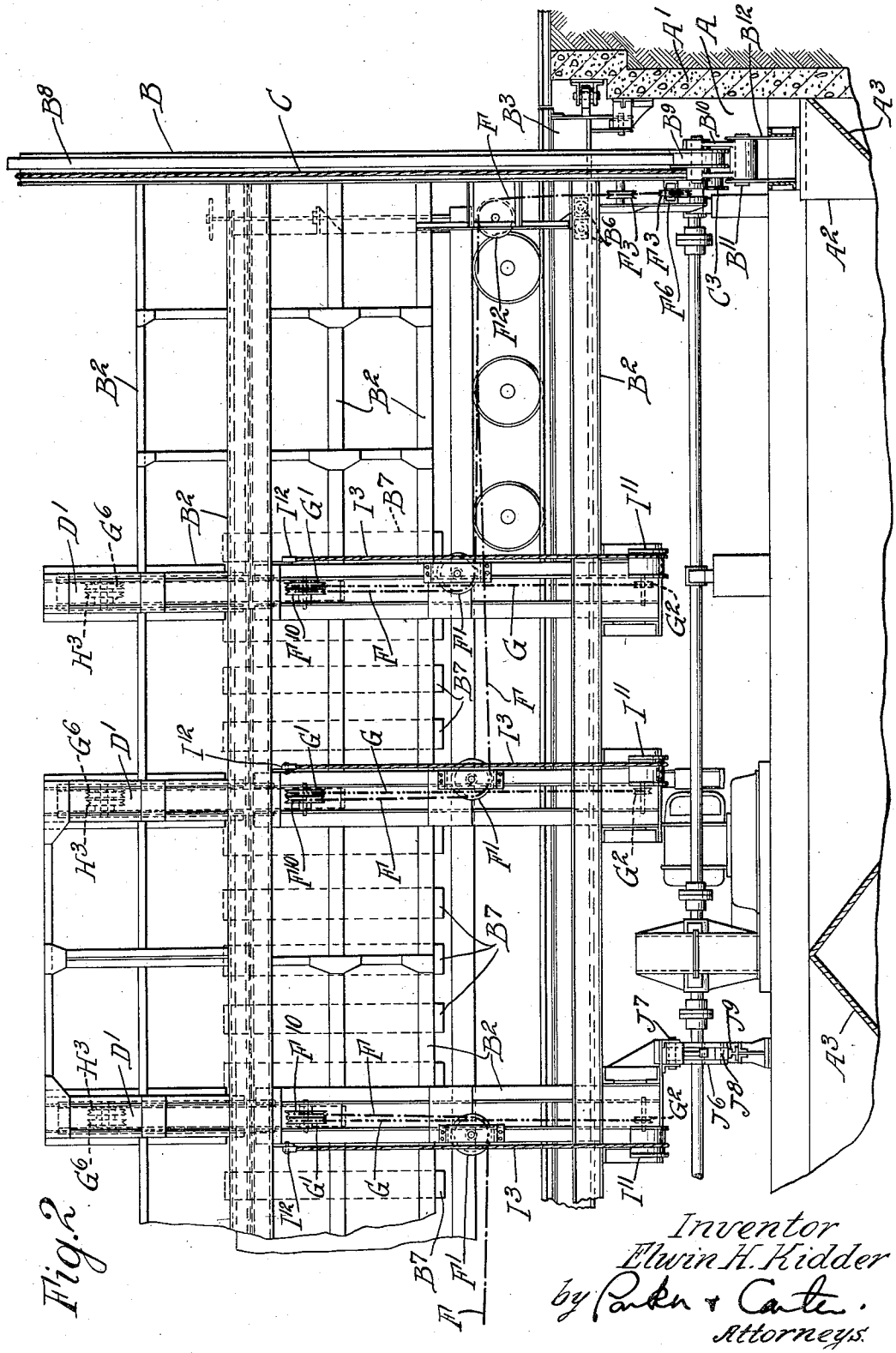


Fig. 2

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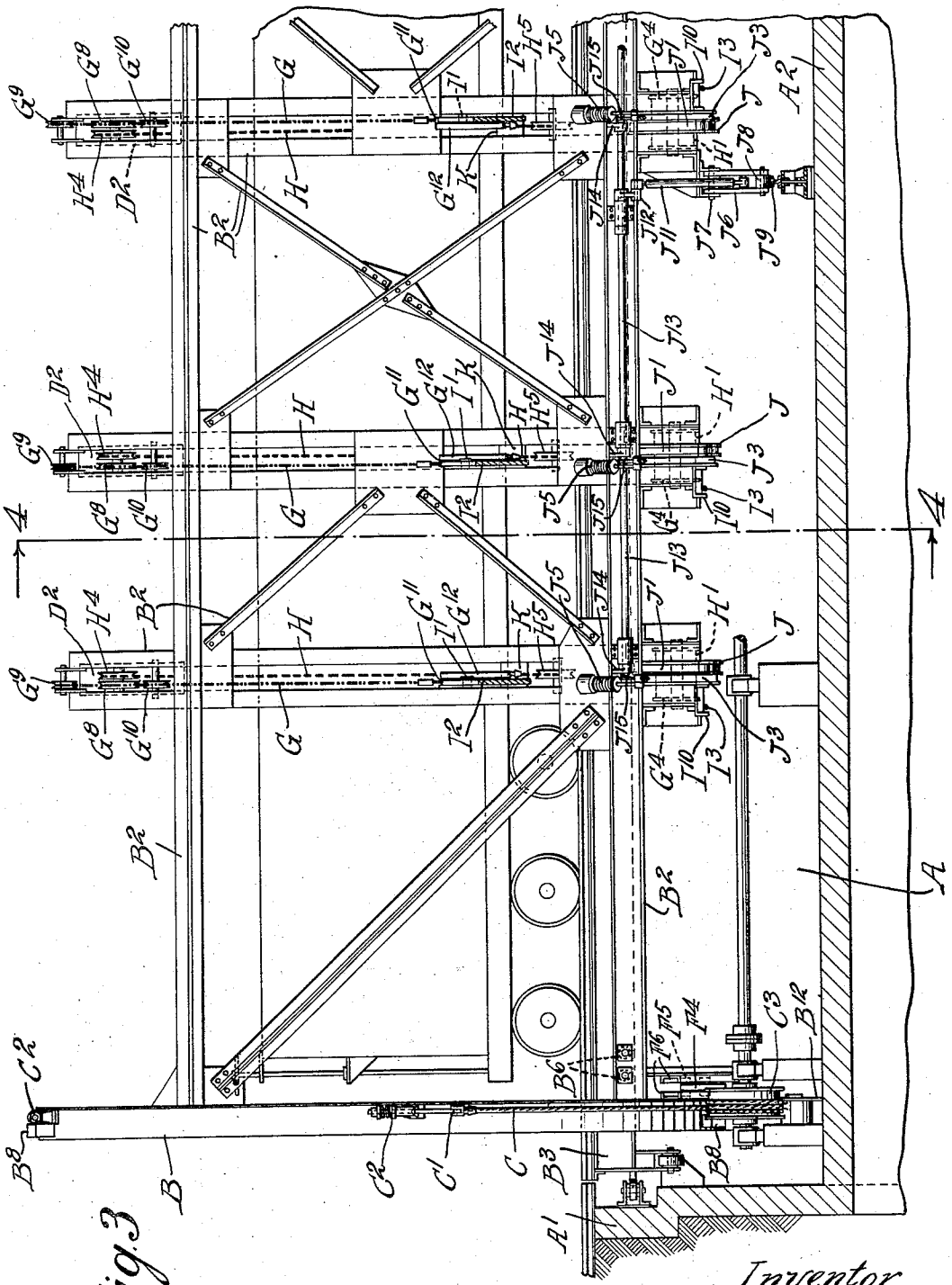


Fig 3

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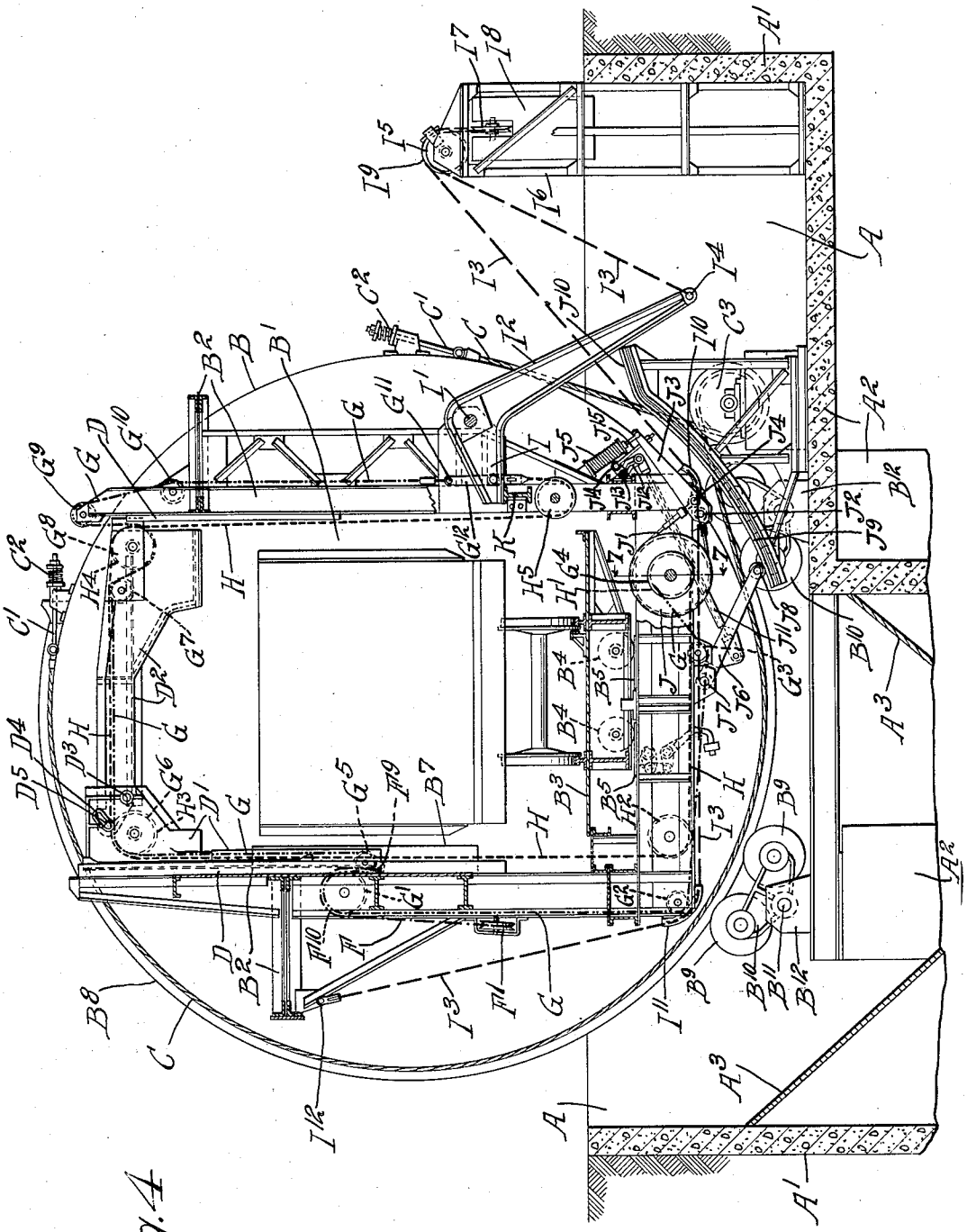


Fig. 4

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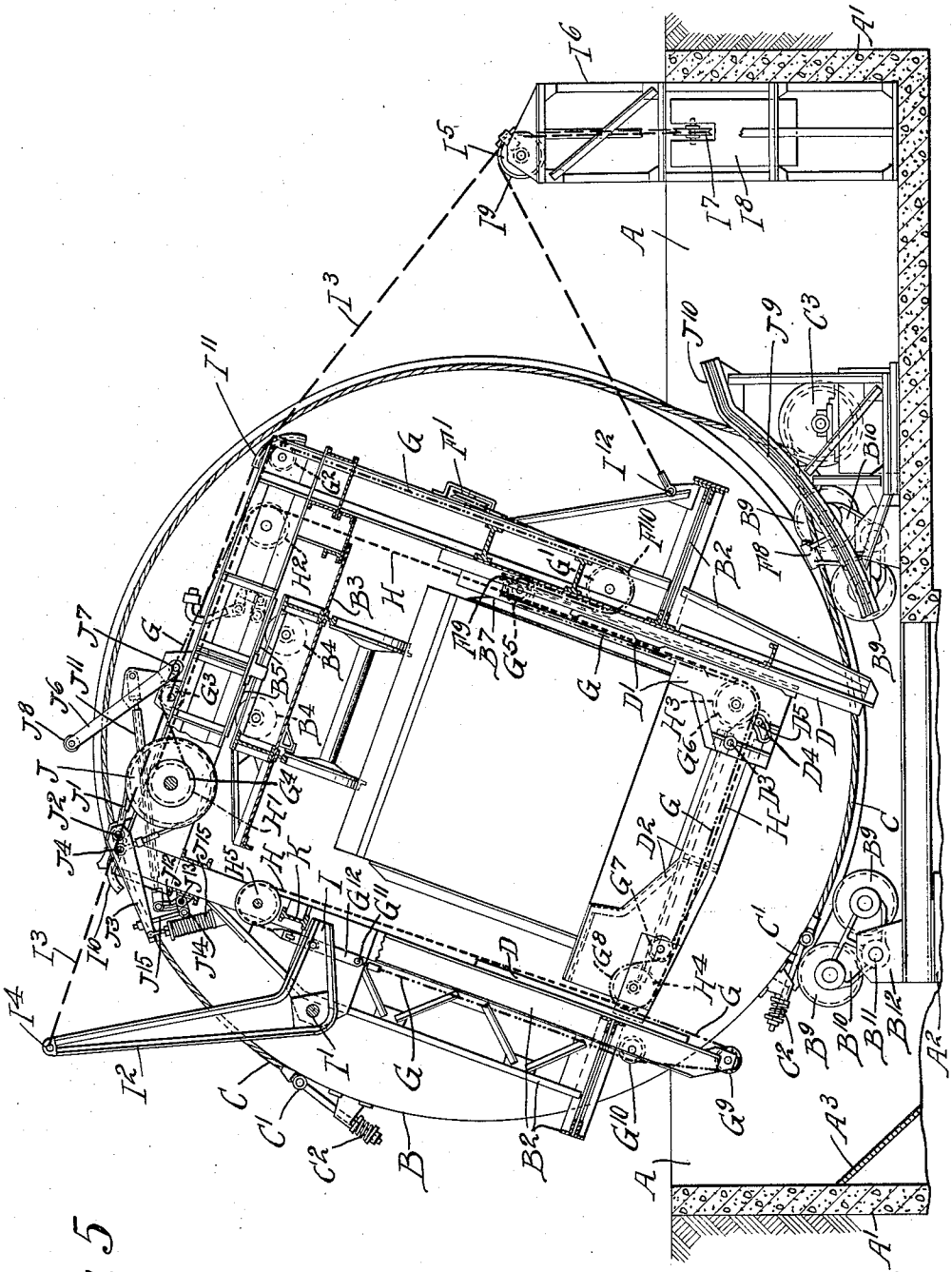


Fig. 5

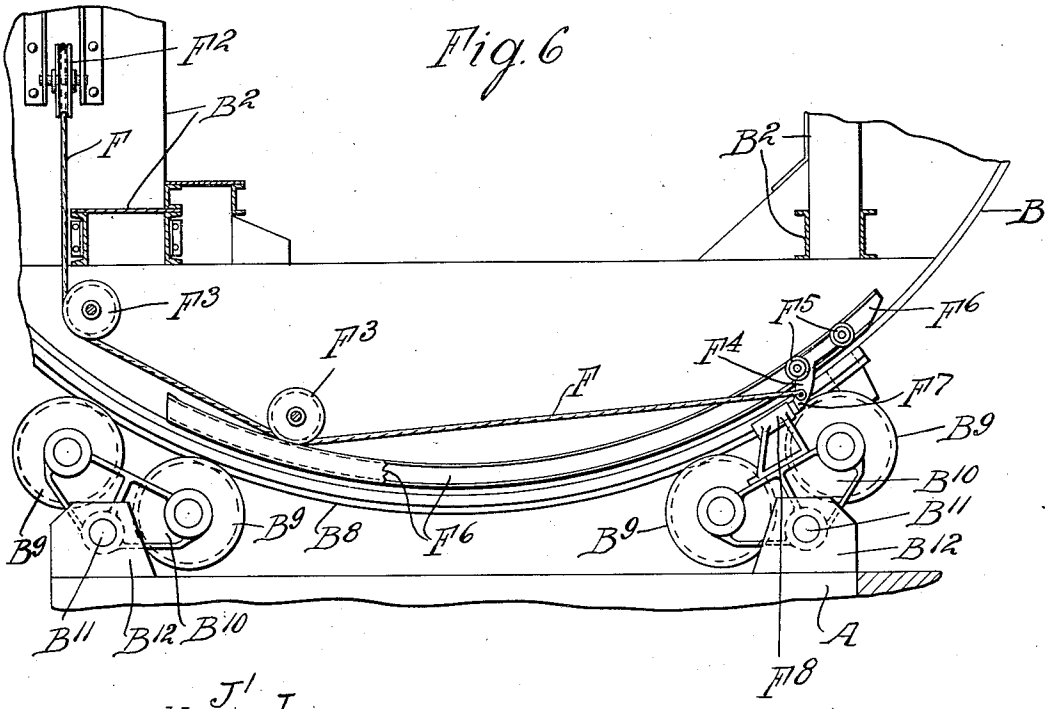
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July 1, 1930. E. H. KIDDER 1,768,849

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Filed June 23, 1928 8 Sheets-Sheet 6

Fig. 6



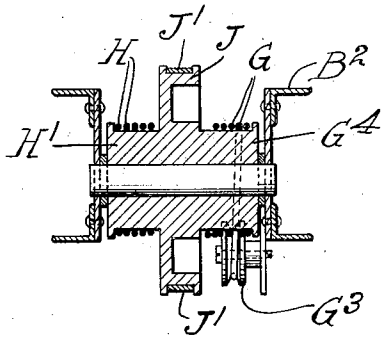


Fig. 7

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July 1, 1930. E. H. KIDDER 1,768,849

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Filed June 23, 1928 8 Sheets-Sheet 7

Fig. 8

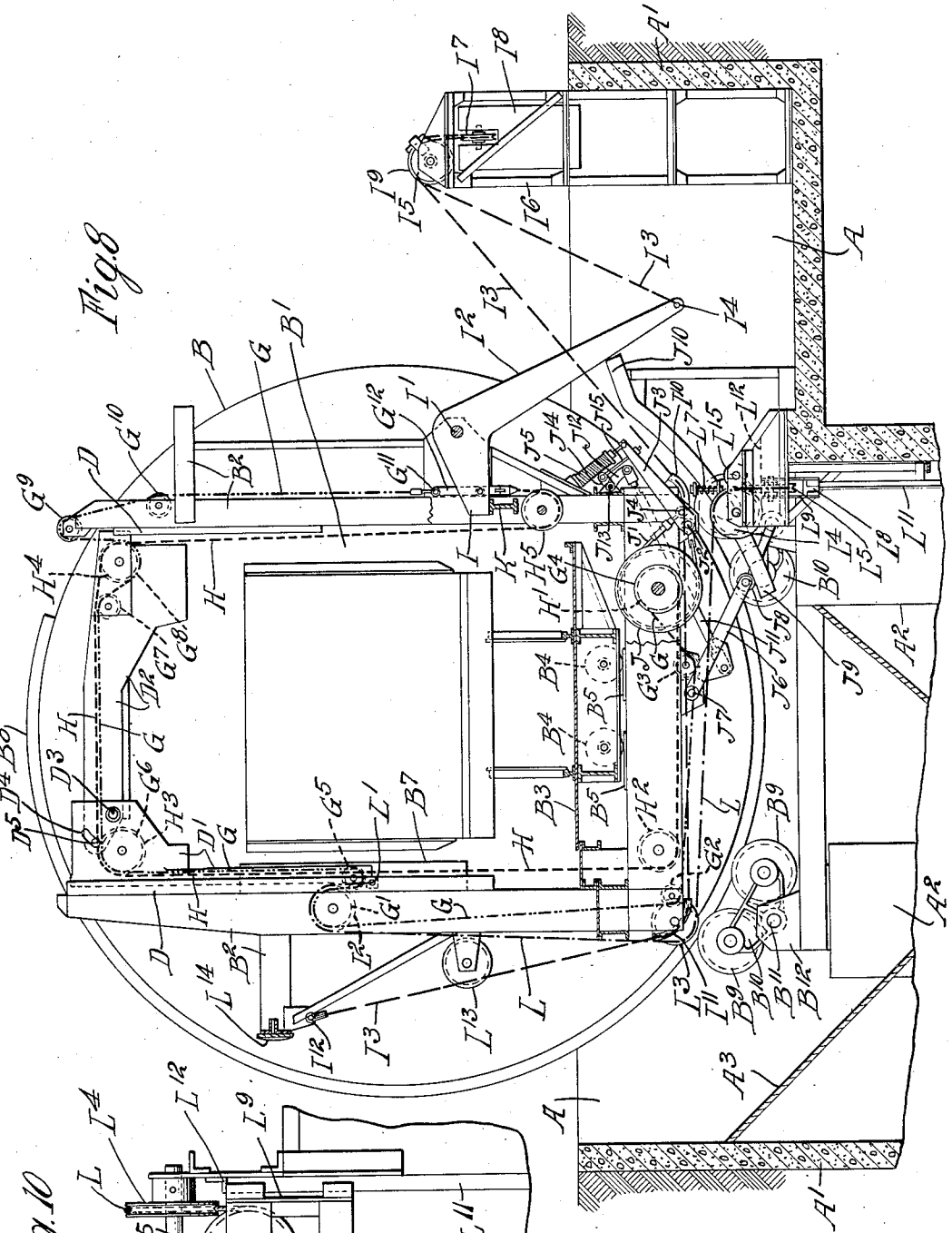
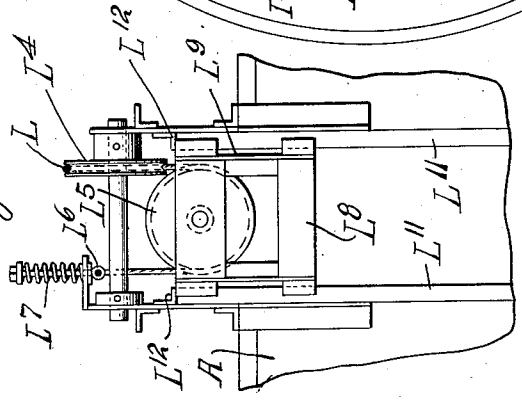


Fig. 10



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July 1, 1930. E. H. KIDDER 1,768,849

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Filed June 23, 1928 8 Sheets-Sheet 8

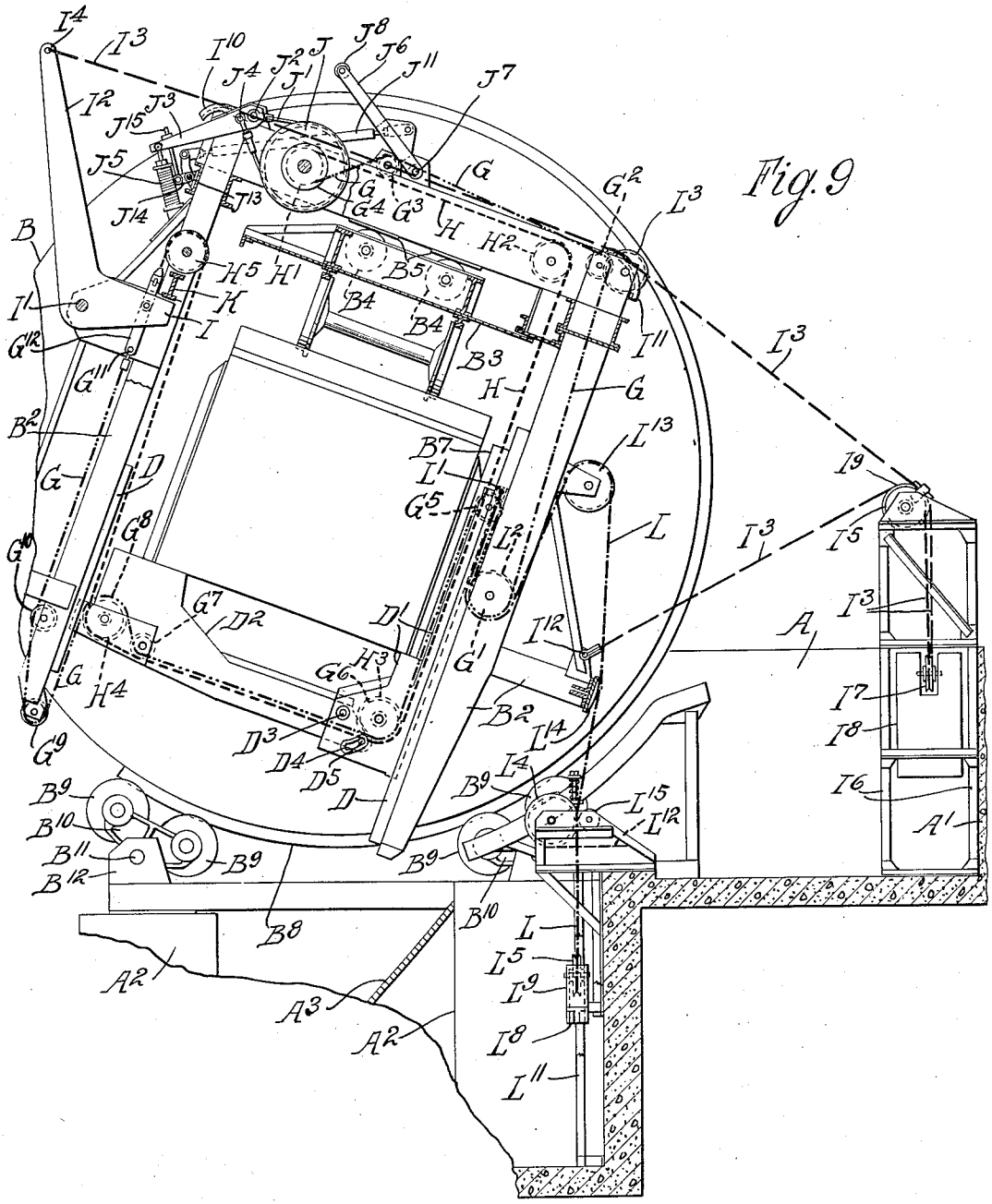


Fig. 9

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Patented July 1, 1930 1,768,849

UNITED STATES PATENT OFFICE

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CAR DUMPER

Application filed June 23, 1928. Serial No. 287,811.

This invention relates to a car dumper. It has for one object to provide a clamping mechanism for holding a car in position on the rotating frame during the dump. Another object is to provide means for operating the clamping mechanism so that it functions automatically in response to the movement of the rotating frame. Another object is to provide, in connection with such operating mechanism, compensating means whereby the clamps in this movement are automatically adjusted to any size of the car. Other objects will appear from time to time in the course of the specification and claims.

The invention is illustrated more or less diagrammatically in the accompanying drawings wherein:

Figure 1 is an end elevation with parts in section and parts broken away, showing one form of the device in its upright position;

Figure 2 is a vertical longitudinal sectional view taken on line 2—2 of Figure 1, looking in the direction of the arrow;

Figure 3 is a view similar to Figure 2, taken on line 3—3 of Figure 1 looking in the direction of the arrow;

Figure 4 is a transverse vertical cross section taken on line 4—4 of Figure 3, showing the dumper in the upright position;

Figure 5 is a view similar to Figure 4, showing the dumper in its extreme dumping position;

Figure 6 is an enlarged detail showing a part of the lifting cable operating mechanism;

Figure 7 is a large sectional view taken approximately on line 7—7 of Figure 4;

Figure 8 is a view generally similar to Figure 4, showing a modified form of cable arrangement;

Figure 9 is a view showing the modified form in the tipped position;

Figure 10 is a detail of the cable mounting for the counter-weight, of the modified form shown in Figure 9.

Like parts are indicated by like characters throughout the specification and drawings.

The car dumper as a whole in the form illustrated herewith is situated partially in an excavation A which is provided with walls A^1, foundation members A^2 which directly support the dumper and it has within it, hopper elements A^3.

The rotating frame work which supports the car includes generally a pair of roller ring members B which are formed of structural members as shown, and have a central opening B^1. They are joined to each other by longitudinal frame members B^2 which are of any suitable arrangement. It is sufficient that they form a strong and rigid frame work which carries the car and the detailed car supporting and clamping mechanism. Located within the frame work is a car transfer platform B^3. It is supported on rollers B^4 which are themselves carried on track members B^5 supported within the structure. This transfer platform is mounted for limited lateral movement within the frame. A spring assembly B^6 serves to assist gravity and tends to limit the movement of the transfer platform. The details of this mounting will not be further described, as they form no part of the present invention, which is not limited to any particular type of platform mounting.

B^7 is an apron extending along one side of the dumper as a whole within the opening B^1. Against it the car rests during the dumping operation. B^8, B^8 are tracks mounted on the ring members B. They are in contact with pairs of flanged supporting rollers B^9 which are carried in yoke members B^{10} which are themselves pivotally supported as at B^{11} in bearing supports B^{12}.

I shall now describe the mechanism by means of which the dumper is rotated for dumping. A cable C is positioned about the end of the dumper, particularly about the members B. It does not extend completely about the ring. It is secured at each end to a fastening member C^1 which is carried in a spring mounting C^2 on the member B. The cable C is positioned about a driving member C^3 which may be rotated by any suitable means. Rotation in one direction will revolve the dumper. Rotation in the opposite direction will return it to its upright position. Two such cables, one at each end, will generally be used.

The operating mechanism will now be described. There are shown in the accompanying drawings four separate clamps and means for operating them. This number might be varied but the clamping members are all similarly operated. They are in the form here shown, operated independently of each other.

Each clamp is supported for movement in guides or tracks D which are mounted on appropriate members of the rotating frame. The clamp itself comprises a carriage member D^1 which slides in the guides D. D^2 is a clamping part pivoted to the member D^1 as at D^3. It is mounted for limited pivotal movement. D^4 is a slot and D^5 is a pin mounted on the clamping part D^2 and projecting through the slot D^5.

When the dumper is in the upright position, for example, as shown in Figure 4, the clamp is held away from the car. For this purpose it is provided with a lifting rope or cable F. It is shown generally in the figures and appears in detail in Figure 6. The lifting cables appear also in Figure 2. As shown there, one such lifting cable is provided for each of the clamps. Each cable passes over a sheave F^1, two cables being carried to the right, as viewed in Figure 2 and two to the left. These pairs of cables are joined to form a single cable passing over a sheave F^2, down about guiding sheaves F^3, F^3. One end of the cable F is attached to a carriage F^4. This carriage is provided with wheels or rollers F^5, F^5 which run in a curved guide track F^6. The carriage F^4 is provided with a contact member F^7 which is adapted to engage the buffer part F^8 on one of the wheel carriages B^{10}. From the sheave F^1 the cable F passes about a sheave F^{10} and is dead-ended to the clamp D^1 as at F^9. When the dumper is in the upright position the carriage F^4 is carried to the position shown in Figure 6. In that position the lifting cable F is drawn out to approximately the limit of its travel and the clamping assembly is thus held in its upper-most position. There are generally carriages for each dumper.

G is a take-up cable which passes about the sheave G^1 downward about sheaves G^2 and G^3 and is dead-ended on a drum portion G^4. From the sheave G^1 the take-up cable passes about a sheave G^5 which is mounted on the clamp carriage D^1. It passes thence upward about a sheave G^6 also mounted on the clamp carriage across the beam D^2, over the sheave G^7 at the opposite side of the member D^2, beneath the sheave G^8, about the sheave G^9 which is fixed on the frame work, and thence over the sheave G^{10} and is dead-ended at G^{11} on one end of the member G^{12}.

H is a holding cable dead-ended on a drum portion H^1. It extends transversely across the frame, passing upwardly about the sheave H^2, over the sheave H^3 on the clamp carriage D^1, across the clamp, over the sheave H^4 on the clamp member D^2 downward and thence upward about a sheave H^5 on the frame and is dead-ended on the lower end of the member G^{12}.

The member G^{12} is pivotally mounted on the short arm I of the bell crank which is itself pivoted at I^1 on the frame and has the longer arm I^2. I^3 is a counter-weight cable pivoted as at I^4 on the outer end of the bell crank arm I^2 and passes over a sheave I^5 which is mounted at the upper end in a counter-weight frame I^6. It passes thence about a sheave I^7 which is mounted on the counter-weight I^8, thence upwardly about the sheave I^9 which is itself also mounted at the upper end of the counter-weight frame I^6. Thence it passes back towards the dumper and in one position of the dumper it is received in a guide I^{10} and also in an oppositely placed guide I^{11}. It is dead-ended as at I^{12} on a part of the frame.

Figure 7 shows the drum construction. This construction has previously been partially described as formed on the drum section G^4 and H^1. Centrally between these drums is located a brake section J. Preferably the winding parts of the brake section and the drums are made integrally, although this is not essential. About the member J is positioned a brake band J^1. One end of the band is fastened as at J^2 to a brake lever J^3 which is itself pivoted at approximately the point J^2. The other end of the brake band J^1 is fastened to the lever J^3 at J^4. J^5 is a compression spring which, when released, moves the lever J^3 outwardly or downwardly, as shown in Figure 4, to apply the brake and lock the drums. J^6 is a cam lever pivoted at J^7, provided in its outer end with a roller J^8 which operates against the curved cam member J^9. This cam member is provided with an outwardly bent or sloping portion J^{10}. The cam J^9, J^{10} is preferably mounted on the foundation. J^{11} is a reach rod pivoted at one end on the cam lever J^6. At its other end it is pivoted on a lever J^{12} which is mounted on the shaft J^{13} carried in bearings secured to the rotating frame. Extending from the lever J^{14}, mounted upon the shaft J^{13}, is a connecting rod J^{15} which is fastened adjacent the outer end to the lever J^3. The shaft J^{13} preferably extends the full distance covered by the four individual clamps; thus one controlling lever J^6, actuated by the cam J^9 is sufficient for controlling the plurality of levers J^{14} which in turn operate the individual brake lever J^3 with their associated brake bands J^1.

There is shown in Figures 8, 9 and 10 a slightly modified form of the device. In operation it is essentially the same as the preceding form except that the lifting rope is modified. As shown in the first seven figures, there are four clamp lifting cables, one for each clamp, and these cables are taken in pairs

to the end of the dumper and then connected with the controlling mechanism, as shown particularly in Figure 6. In the modified form the lifting cables are separate and are not joined together or taken to the carriage F^4. Each lifting cable is led separately down and separately terminated. Therefore, as shown in Figures 8, 9 and 10, the parts remain the same, with the exception of the re-arrangement of the lifting cables. Instead of the lifting cables shown in the earlier figures, a separate cable L is provided for each of the clamping assemblies. It is dead-ended at L^1. The clamp cable passes upwardly over the sheave L^2, downward over the sheave L^3 on the rotating frame and thence over the sheave L^4 which is supported from the foundation. From the sheave L^4 it passes about a sheave L^5 and is dead-ended on a rod L^6 which is spring held by means of the spring L^7 which is supported from brackets mounted on the foundation. L^8 is a counter-weight to which the sheave L^5 is attached and L^9 is a frame member about the sheave and attached to the counter-weight. It is adapted to serve as a guiding member and to engage guides L^{11}, L^{11} in which the counter-weight travels. L^{12}, L^{12} are stops mounted on the supporting frame work of the counter-weight and adapted to limit the upper upward movement of the counter-weight. L^{13} is an idler sheave mounted on the rotating frame work. In the upright position the lifting cable is not in contact with L^{13}. As the rotation occurs, the lifting cable is brought into contact with L^{13}, and as shown in Figure 9, in the extreme dumping position the cable is about this sheave L^{13}. L^{14} is a curved buffer member mounted on an extending portion of the rotating frame. When the dumper is in the extreme dumping position, the lifting cable L, after passing over the idler sheave L^{13} is in contact with the buffer portion L^{14}, as shown in Figure 9. L^{15} is an idler sheave which serves to position and prevent displacement of the cable L.

The lifting cables F serve the dual purpose of lowering and lifting the clamps.

Although I have shown and described an operative device, it will be obvious that many changes might be made in the number, size, relation, proportion and distribution of parts without departing materially from the spirit of my invention, and I wish, therefore, that my description and drawings be considered in a large measure diagrammatic. In particular, the drum construction might be modified in many ways. For convenience two cable winding portions are provided and a brake drum opposite them. This arrangement might be almost infinitely varied. The counter-weight frame of course need not be mounted upon the main foundation of the entire dumping assembly. It is sufficient if it is securely mounted near the rotary frame so that the cable arrangement shown can be conveniently effected.

The use and operation of the invention as shown in the form illustrated in the first seven figures is generally as follows:

The parts, when the car is placed in and removed from the rotating frame and before rotation takes place, and after it has been completed, are normally held in the position shown in Figures 1, 2, 3 and 4. Figure 6 is also a detail of some of the parts at this time. The car is run on to the dumper, being positioned on the tracks which are fastened to the transfer platform. The rotating mechanism is started and by means of the cables C which are fastened about the end rings of the rotating frame, the rotating frame as a whole commences to revolve, rotating as shown in Figures 1 and 4 in a counterclockwise direction. As rotation commences, the transfer platform moves laterally to the left, as viewed in Figures 1 and 4. The lifting cable F is partially released or paid out with respect to the dumper; although it is and remains fixed with relation to the carriage F^4 and the foundation, the rotation of the revolving frame, in effect pays out the cable with relation to the rest of the dumper and the clamp is thus permitted to move downward in response to this rotation of the revolving frame. As this rotation takes place, the holding cable H is wound about the drum portion H^1 because as the clamp descends the take-up cable G is unwound from the drum portion G^4, thus rotating it in a counter-clockwise direction as shown in Figures 1 and 4. Thus the lowering of the clamp in response to movement of the rotating frame causes the lifting cable to pay out the take-up cable from the drum G^4 and rotates the drum H^1 and winds upon the drum H^1 the holding cable H. During this movement of the revolving frame the cam roller J^8 is in contact with the cam and, through the reach rod and brake lever the brake band is released, permitting free rotation of the drum G^4, H^1.

In the form here shown, after about 30° of a revolution has taken place, the clamp will be properly seated on the car, even on the lowest car normally used. Therefore, in the invention as illustrated, the length of the cam is such that at about the time the roller J^8 runs off the cam, the compression spring thus becomes effective, the brake lever is moved so as to lock the brake on the drum and prevent further movement of the cables H and G. The cables are thus anchored. As the revolving continues, the end of the pivoted bell crank lever I, I^2 swings above the sheave on the top of the counterweight frame and thus changes the direction of the pull of the counter-weight and causes the short end of the lever to pull away from its stop K an amount equal to the slight stretch in the holding cable H which is fastened at one end to

the member G^{12} which is itself pivoted on the short end of the bell crank lever I.

Sufficient counter-weight I^8 is provided to hold the heaviest car firmly against the rails under all normal conditions of operation and to provide for immediate follow-up or take-up movement on the holding cable in case a lump of coal or other material which may have been caught under one of the clamps becomes dis-lodged or crushed during the dumping operation.

Under normal circumstances the counter-weight is sufficient of itself to hold the heaviest car without its load in the final over-turned position, but when the contents of the car are solidly frozen into the car, which may happen, the external counter-weight will be overpowdered or raised, permitting the bell crank lever to rotate backward the slight amount of stretch in the holding cable due to the load of the car and its contents. That is to say, permitting the arm I^2 to rotate to the left, as shown in Figure 5. A limited rotation in this direction can take place before the inner end of the arm I again comes in contact with the stop K. The necessary additional force required to hold the car and load from dropping will then be provided by the reaction of the lever against this stop. In this way sufficient emergency holding power is provided to meet any possible condition of frozen loads or other failures of the load for other reasons to be discharged without applying excessive pressure on the cars during normal operating conditions. If a counter-weight were used which alone was sufficient to hold the heaviest car and its load, each car, no matter what its size or weight, would be subjected to the same clamping pressure as that required for the heaviest under the most extreme and unusual conditions of operation, and this would likely result in damage to small or light cars. It is to avoid this that the variable pressure clamping arrangement above described for unusual conditions has been provided.

The use and operation of the modified clamp lifting arrangement shown in Figures 8, 9 and 10 is as follows:

The rotating mechanism and the holding and take-up cables are the same as previously described, thus their description will not be repeated. The lifting cable arrangement is different. When the revolving frame or cradle is in its up-right position, the lifting cable is taut and its counter-weight is drawn up against the stop so that the clamp is raised to its full upper position. As the rotating movement begins the lifting cable is in effect unwound and the clamp assembly moves downwardly, operating as previously described in connection with the main form of the clamping device. As the rotation continues, the lifting cable is reversed in direction, bending about the idler sheave L^{18} as shown in Figure 9. The operation of the clamp parts and the lifting cable is the same in general effect as previously described. As described above, there is in the modified form usually one lifting cable for each clamp, although this number might be modified.

I claim:

1. In combination in a car dumper, a rotary dumping frame mounted for rotation, a car holding clamp, means for raising and lowering the same in response to rotation of the rotary dumper frame and clamping and take-up cables adapted to hold the clamp in position on the car, the clamping cable only being adapted to support the load of the car on the clamp during dumping, the take-up cable adapted to take up slack which may develop during the dumping, and means for operating said cables in response to movement of the dumper, said means including a drum, the clamping and take-up cables being oppositely wound about said drum, said drum provided with a brake and means for locking said drum against rotation in certain positions of the rotary frame.

2. In combination in a car dumper, a rotary dumping frame mounted for rotation, a car holding clamp, means for raising and lowering the same in response to rotation of the rotary frame and clamping and take-up cables adapted to hold the clamp in position on the car, the clamping cable only being adapted to support the load of the car on the clamp during dumping, the take-up cable adapted to take up slack which may develop during the dumping, and means for operating said cables in response to movement of the rotary dumping frame, said means including a drum, the clamping and take-up cables being oppositely wound about said drum, said drum having a brake portion, there being means for locking said drum against rotation in certain positions of the rotary dumping frame, said locking means including a cam track adjacent said dumper, said track diverging away from said rotary dumper frame throughout a portion of its length, a spring to lock the brake mechanism and a lever adapted to contact said track, and an operating connection between said spring and said lever whereby, when said lever is in contact with one portion of said track, the spring is held against movement and the brake is unlocked, permitting rotation of the drum.

3. In combination in a rotary car dumper, a rotary dumping frame, a car supporting member and a clamp, a lifting cable attached to said clamp at one end and at its other end to a shoe, a track along which said shoe is adapted to travel, a buffer against which said shoe strikes and through which, in response to motion of the rotary dumper frame, the lifting cable is moved with relation to the rotary dumper frame as a whole, a drum assembly mounted on said dumper, braking

means adapted, when the dumper is in one position to prevent rotation of the drum and in another position to permit it, a cable receiving portion on said drum, a lever pivoted on said rotary frame, a clamping cable dead-ended at one end upon said drum and dead-ended at the other upon said pivoted lever, a take-up cable dead-ended at one end on the pivoted lever, passing about the dumper, about the clamp and being dead-ended at its other end upon the drum assembly, the two cables being oppositely wound about the drum, the said lever being pivotally mounted on the rotary dumping frame in combination with a cable which has one end attached to the free end of the lever and its other end attached to the frame of the dumper.

4. In combination in a rotary car dumper, a rotary dumping frame, a car supporting member and a clamp, a lifting cable attached to said clamp at one end and at its other end to a shoe, a track along which said shoe is adapted to travel, a buffer mounted apart from said frame against which said shoe strikes and through which, in response to motion of the rotary dumping frame the lifting cable is moved with relation to the rotary dumping frame as a whole, a drum assembly mounted on said dumper, braking means adapted, when the dumper is in one position to prevent rotation of the drum and in another position to permit it, a cable receiving portion on said drum, a lever pivoted on said frame, the clamping cable dead-ended at one end upon said drum and being dead-ended at the other upon said pivoted lever, a take-up cable dead-ended at one end on the pivoted lever, passing about the dumper and about the clamp and being dead-ended at its other end upon the other cable receiving portion of the drum assembly, the two cables being oppositely wound about the drum, the said lever being pivotally mounted on the dumping frame in combination with a cable which has one end attached to the outer end of the lever.

5. In combination in a rotary car dumper, a rotary dumping frame, a car supporting member and a clamp, a lifting cable attached to said clamp at one end and at its other end to a shoe, a track along which said shoe is adapted to travel, a buffer mounted apart from the rotary frame against which said shoe is adapted to strike and through which, in response to motion of the dumper, the lifting cable is moved with relation to the rotary dumper frame as a whole, a drum assembly mounted on said dumper, braking means adapted, when the dumper is in one position to prevent rotation of the drum and in another position to permit it, a cable receiving portion on said drum, a lever pivoted on said frame, a clamping cable dead-ended at one end upon said drum and being dead-ended at the other upon said pivoted lever, a take-up cable dead-ended at one end on the pivoted lever, passing about the rotary dumper frame about the clamp and being dead-ended at its other end upon the other cable receiving portion of the drum assembly, the two cables being oppositely wound about the drum, the said lever being pivotally mounted on the dumping frame in combination with a cable which has one end attached to the outer end of the lever, its other end attached to the frame of the dumper at a point substantially opposite the pivot point of the lever, there being a counter weight supported from a point apart from the rotary frame and engaging the said last mentioned cable, the lever being held in position against a stop by the influence of the counter weight when the frame is in the up-right position and being moved out of contact with this member when the frame is in the dumping position.

6. In combination in a rotary car dumper, a rotary dumping frame, a car supporting member and a clamp, a lifting cable attached to said clamp at one end and at its other end to a shoe, a track concentric with the dumper along which said shoe is adapted to travel, a buffer supported apart from the rotary frame against which said shoe strikes and through which, in response to motion of the rotary dumper frame, the lifting cable is moved with relation to the rotary dumper frame as a whole, a drum assembly mounted on said dumper, breaking means adapted, when the rotary dumper frame is in one position to prevent rotation of the drum and in another position to permit it, a cable receiving portion on said drum, a lever pivoted on said rotary frame, the clamping cable dead-ended at one end upon said drum and passing about the rotary dumper frame, about the clamp, and being dead-ended at the other upon said pivoted lever, a take-up cable dead-ended at one end on the pivoted lever, passing about the rotary dumper frame, about the clamp and being dead-ended at its other end upon said drum, the two cables being oppositely wound about the drum, the said lever being pivotally mounted on the rotary dumping frame in combination with a cable which has one end attached to the outer end of the lever, its other end attached to the rotary frame of the dumper, at a point substantially opposite the pivot point of the lever, there being a counter-weight supported from a point apart from the rotary frame and engaging the said last mentioned cable, the lever being held in position against a stop by the influence of the counter-weight when the rotary frame is in the upright position and being moved out of contact with this member when the rotary frame is in the dumping position.

7. In a rotary car dumping mechanism, a rotary dumping frame, a car supporting plat-

form and a clamp, movably mounted on the rotary dumper frame, means for holding said clamp free from the car, in one position of the rotary frame, means for causing it to move to engage the car when the dumper frame is changed in position, means for holding it positively on the car and means for increasing its pressure upon the car, such means including a hoisting cable adapted in one position of the rotary frame to hold the clamp free from the car and in another position of the rotary frame to cause it to engage the car, a holding cable adapted as the car is dumped, to tighten the engagement of the clamp upon the car and a third cable adapted further to act to increase the tension of the clamp during dumping.

8. In combination in a rotary car dumper, a rotary dumping frame, a car carrying member and a car clamping member in combination with hoisting, lowering and clamping means adapted to move and control said car clamping member, said clamp being formed to inclose said hoisting, controlling and clamping means to protect the same from injury.

9. In combination in a rotary car dumper, a rotary dumping frame, a car carrying member and a car clamping member in combination with hoisting, lowering and clamping means adapted to move and control said car clamping member, said clamp and associated parts being formed to inclose said hoisting, controlling and clamping means to protect the same from injury.

10. In combination in a rotary car dumper, a rotary dumping frame, a car carrying member and a car clamping member in combination with cables adapted to raise and hold the clamp free of the car when the rotary dumping frame is in the upright position and to draw and hold the clamp on the car when the rotary frame is in the dumped position, the clamp being formed to inclose the said cable, whereby the same are protected from injury.

11. In a car dumper, a rotatable cradle, a clamp movable thereon toward and from a car, sheaves on the cradle and the clamp, a lever pivoted on the cradle, a drum rotatable on the cradle, means operative only when the cradle has reached an intermediate tilted position for locking the drum against rotation, a holding cable and a take-up cable arranged generally in parallel and encircling the clamp, each being dead-ended on and wound in opposite directions about the drum and dead-ended on and leading in opposite directions from the lever, both cables travelling over the sheaves on the clamp and the cradle so that movement of the clamp shortens one and lengthens the other cable, to cause one to be wound upon and the other to be paid off of the drum.

12. In a car dumper, a rotatable cradle, a clamp movable thereon toward and from a car, sheaves on the cradle and the clamp, a lever pivoted on the cradle, a drum rotatable on the cradle, means operative only when the cradle has reached an intermediate tilted position for locking the drum against rotation, a holding cable and a take-up cable arranged generally in parallel and encircling the clamp, each being dead-ended on and wound in opposite directions about the drum and dead-ended on and leading in opposite directions from the lever, both cables travelling over the sheaves on the clamp and the cradle so that movement of the clamp shortens one and lengthens the other cable, to cause one to be wound upon and the other to be paid off the drum, a counterweight, a supporting structure therefor separate from the cradle and a connection between the counterweight and the lever.

13. In a car dumper, a rotatable cradle, a clamp movable thereon toward and from a car, sheaves on the cradle and the clamp, a lever pivoted on the cradle, a drum rotatable on the cradle, means operative only when the cradle has reached an intermediate tilted position for locking the drum against rotation, a holding cable and a take-up cable arranged generally in parallel and encircling the clamp, each being dead-ended on and wound in opposite directions about the drum and dead-ended on and leading in opposite directions from the lever, both cables travelling over the sheaves on the clamp and the cradle so that movement of the clamp shortens one and lengthens the other cable, to cause one to be wound upon and the other to be paid off the drum, a counterweight, a supporting structure therefor separate from the cradle and a connection between the counterweight and the lever, a stop for the lever against which it is held by the tension of the holding cable, the counterweight being adapted as the cradle approaches the dumping position to tend to move the lever away from the stop to exert an increased tension on the holding cable.

14. In a car dumper a clamp, guides along which it is adapted to travel toward and from a car, sheaves on the clamp and on the guides, a holding rope dead-ended at one side of the car extending upwardly to and passing over a sheave on the clamp extending across the clamp and thence downwardly along the opposite side of the car, a drum about which the end of such holding rope is wound, a take-up rope wound about such drum in opposite direction extending generally parallel with the holding rope and upwardly along the car about a sheave and thence downwardly toward the car about a sheave on the clamp, thence extending upwardly to a sheave on the clamp thence across to a second sheave on the clamp and thence upwardly to a sheave on the guide and thence downwardly to the anchorage for the holding rope.

15. In a car dumper a clamp, guides along which it is adapted to travel toward and from a car, sheaves on the clamp and on the guides, a holding rope dead-ended at one side of the car extending upwardly to and passing over a sheave on the clamp extending across the clamp and thence downwardly along the opposite side of the car, a drum about which the end of such holding rope is wound, a take-up rope wound about such drum in opposite direction extending generally parallel with the holding rope and upwardly along the car about a sheave and thence downwardly toward the car about a sheave on the clamp, thence extending upwardly to a sheave on the clamp thence across to a second sheave on the clamp and thence upwardly to a sheave on the guide and thence downwardly to the anchorage for the holding rope, the anchorage for holding and take-up rope comprising a pivoted lever, the drum about which the ropes are wound being free to rotate when the cradle is in generally upright position, means for locking it against rotation as the cradle approaches the dumping position, and means for rotating the lever at such time to take up on the holding rope and pay out on the take-up rope.

16. In a car dumper, a clamp movable toward and from a car, a holding rope encircling the car and clamp, a take-up rope encircling the car and clamp, a working lever upon which both said ropes are dead ended, a drum about which said ropes are wound at their ends furthest removed from the lever, the ropes being wound about the drum in opposite directions and leading away from their dead end points on the lever in opposite directions.

17. In a car dumper, a clamp movable toward and from a car, a holding rope encircling the car and clamp, a take-up rope encircling the car and clamp, a working lever upon which both said ropes are dead ended, a drum about which said ropes are wound at their ends furthest removed from the lever, the ropes being wound about the drum in opposite directions and leading away from their dead end points on the lever in opposite directions, sheaves on the clamp and on the supporting structure about which said ropes travel in opposition so that movement of the clamp causes one rope to wind on and the other wind off the drum.

18. In a car dumper, a clamp movable toward and from a car, a holding rope encircling the car and clamp, a take-up rope encircling the car and clamp, a working lever upon which both said ropes are dead ended, a drum about which said ropes are wound at their ends furthest removed from the lever, the ropes being wound about the drum in opposite directions and leading away from their dead end points on the lever in opposite directions, a brake and means to operate it to lock the drum against rotation after the cradle has made a predetermined excursion toward the dumping position.

19. In a car dumper, a clamp movable toward and from a car, a holding rope encircling the car and clamp, a take-up rope encircling the car and clamp, a working lever upon which both said ropes are dead ended, a drum about which said ropes are wound at their ends furthest removed from the lever, the ropes being wound about the drum in opposite directions and leading away from their dead end points on the lever in opposite directions, a brake and means to operate it to lock the drum against rotation after the cradle has made a predetermined excursion toward the dumping position, and means associated with the lever adopted to rotate it when the cradle has made a predetermined excursion toward the dumping position to exert an increased tension on the holding rope.

20. In a car dumper, a clamp movable toward and from a car, a holding rope encircling the car and clamp, a take-up rope encircling the car and clamp, a working lever upon which both said ropes are dead ended, a drum about which said ropes are wound at their ends furthest removed from the lever, the ropes being wound about the drum in opposite directions and leading away from their dead end points on the lever in opposite directions, sheaves on the clamp and on the supporting structure about which said ropes travel in opposition so that movement of the clamp causes one rope to wind on and the other wind off the drum, a brake and means to operate it to lock the drum against rotation after the cradle has made a predetermined excursion toward the dumping position and means associated with the lever adopted to rotate it when the cradle has made a predetermined excursion toward the dumping position to exert an increased tension on the holding rope.

Signed at Chicago, county of Cook, and State of Illinois, this 5th day of June, 1928.

ELWIN H. KIDDER.