

Aug. 20, 1935.

V. WILLOUGHBY

2,012,114

DROP BOTTOM MINE CAR

Filed Oct. 12, 1933

4 Sheets-Sheet 1

Fig. 2.

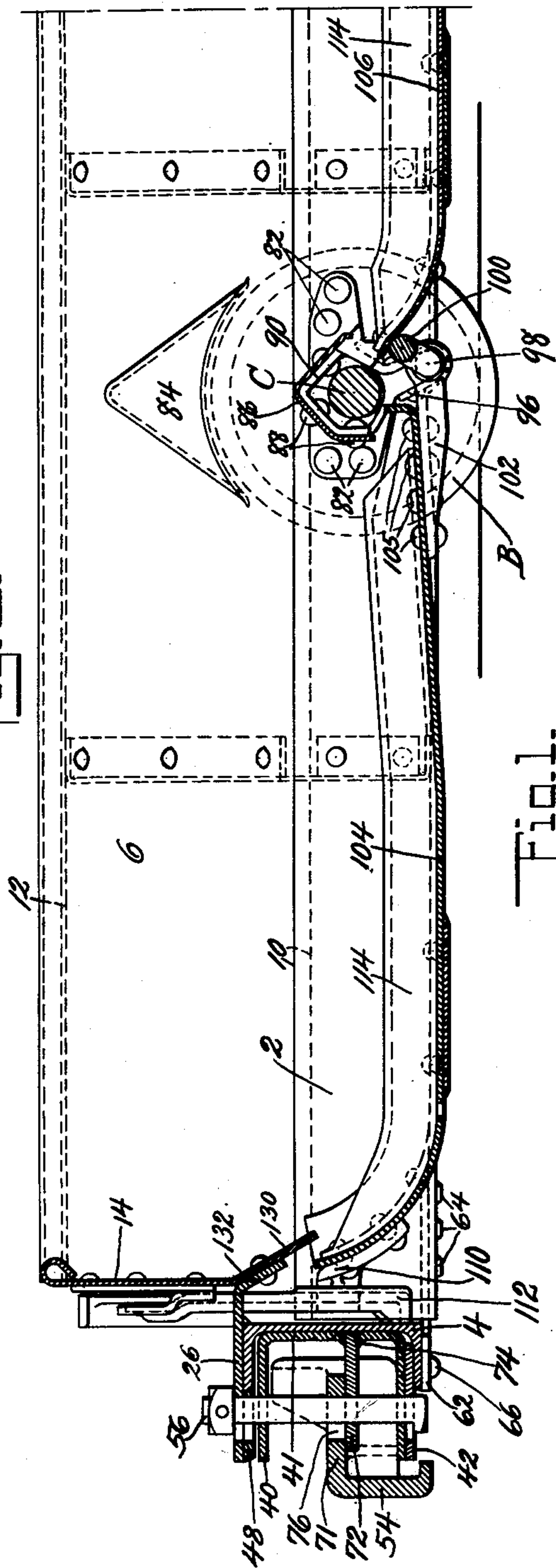
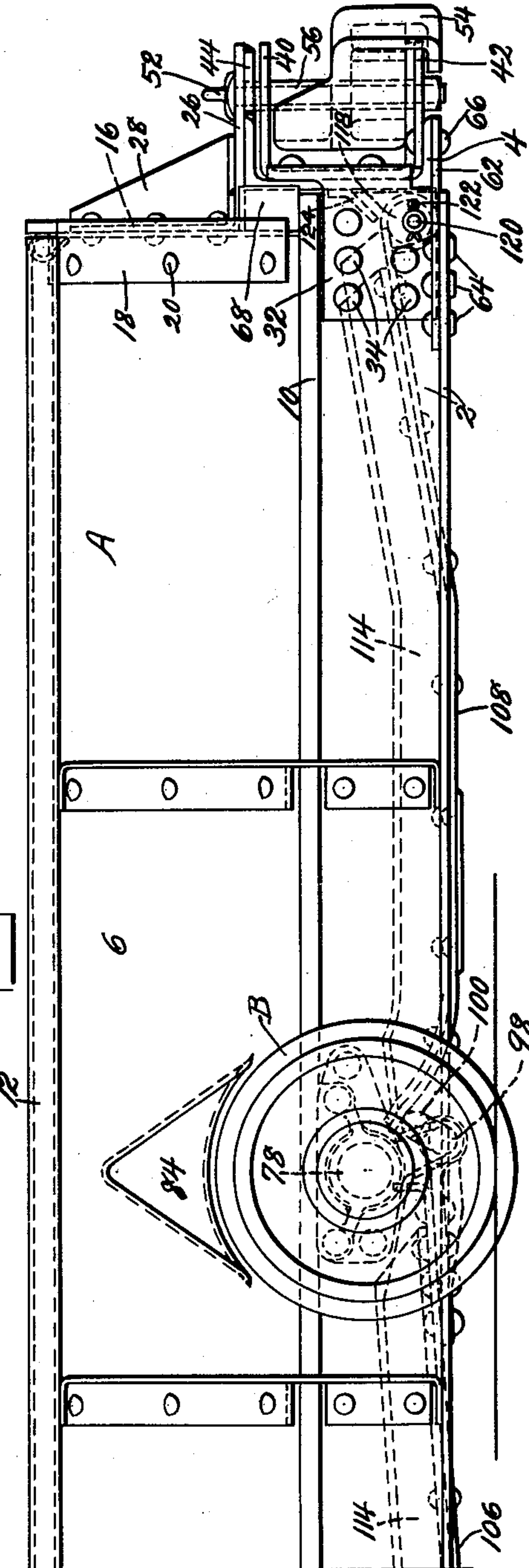


Fig. 1.



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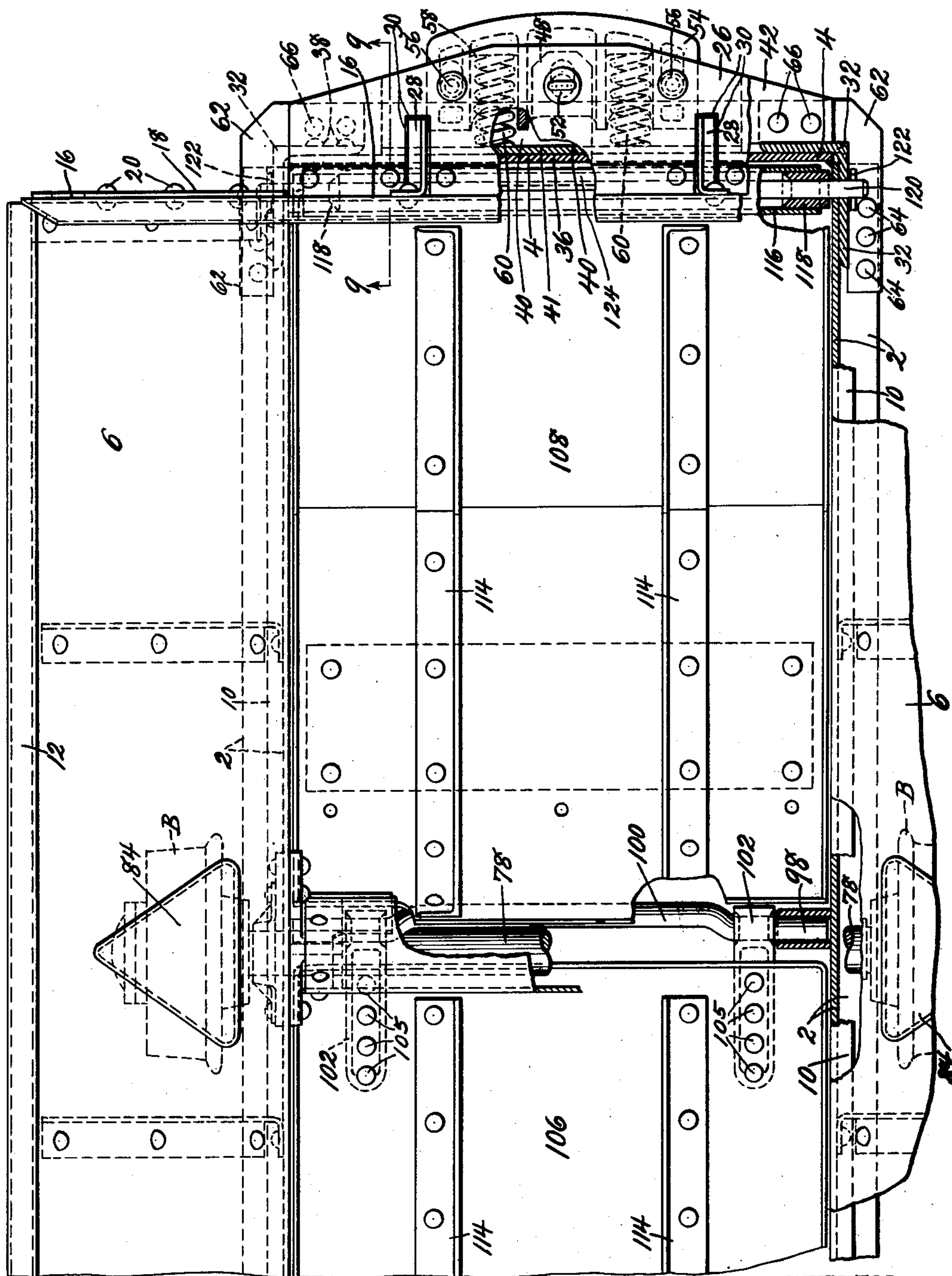
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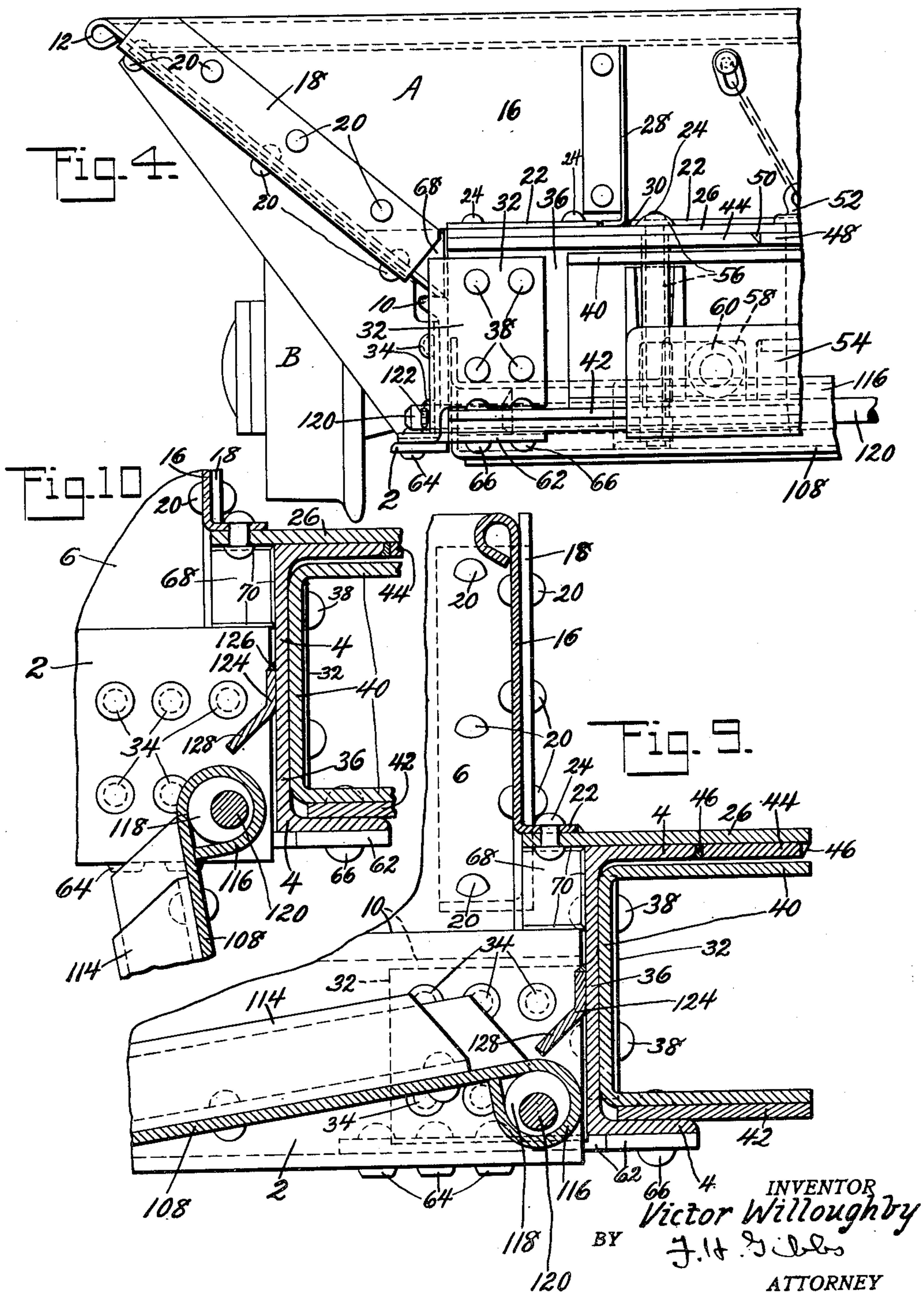
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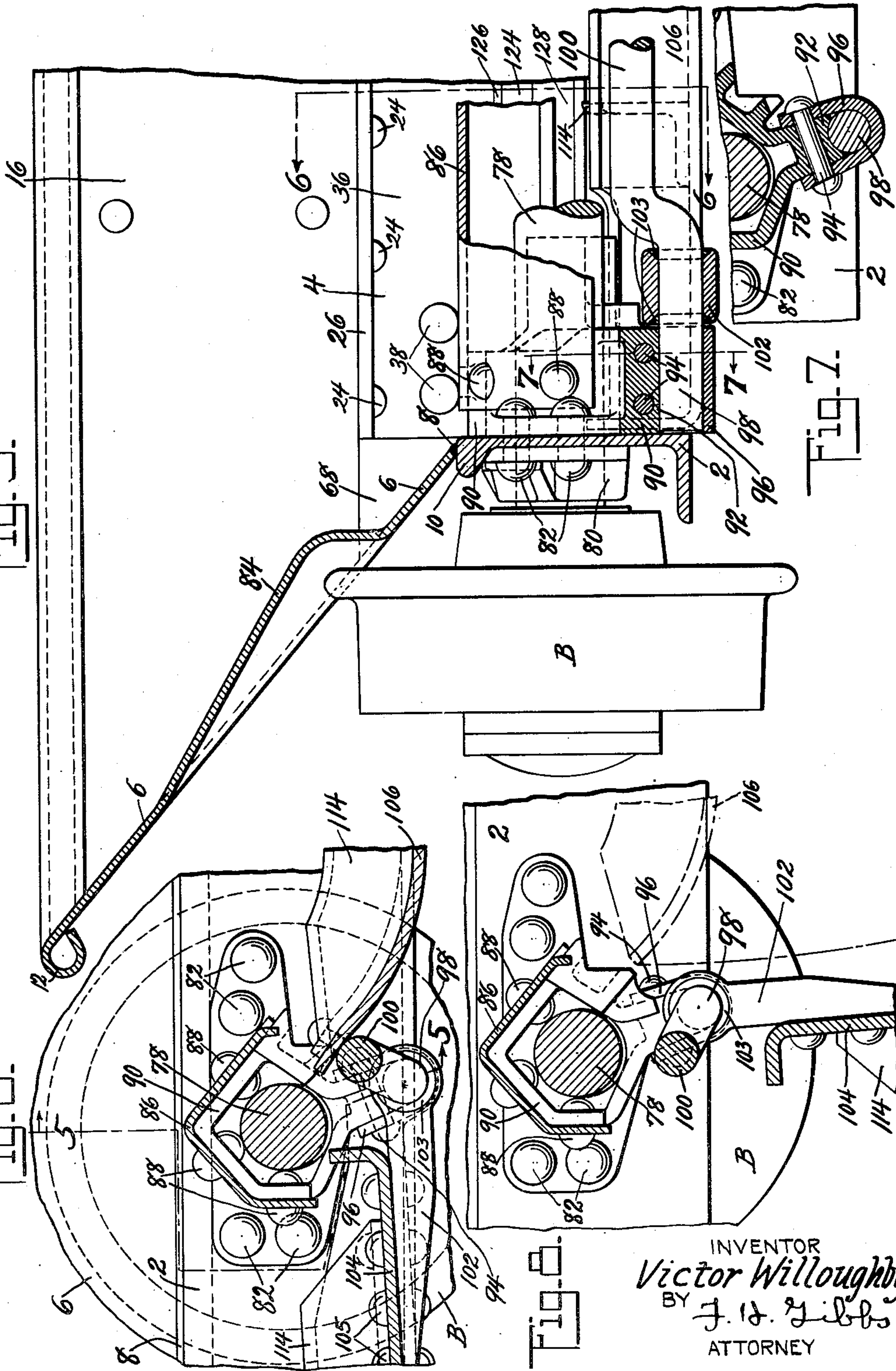
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Fig. 5.

Fig. 6.



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## UNITED STATES PATENT OFFICE

2,012,114

## DROP BOTTOM MINE CAR

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16 Claims. (Cl. 105—253)

This invention relates generally to mine cars and more particularly to mine cars of the type in which the lading supporting bottom is formed with a plurality of hingedly supported doors, such cars being known generally in the art as drop bottom mine cars.

One object of this invention is the provision of a new and improved means for supporting the free end portions of the doors of drop bottom mine cars.

Another object of this invention is the provision of a drop bottom mine car of maximum lading capacity.

Still another object of this invention is the provision of a new and improved end construction for drop bottom mine cars.

Other objects and advantages of this invention will be apparent from the following description taken into conjunction with the accompanying drawings in which

Figure 1 is a side elevation of one end portion of a mine car of the present invention;

Fig. 2 is a sectional view through the opposite end portion of a mine car of the present invention;

Fig. 3 is a top plan view of the portion of the car shown in Fig. 1, certain parts being broken away to disclose other parts in section;

Fig. 4 is an end elevation of a portion of the forward end of the car shown in Fig. 1;

Fig. 5 is a sectional view taken on the line 5—5, Fig. 6;

Fig. 6 is an enlarged detail view, in section, showing the door supporting means, the view being taken on the line 6—6, Fig. 5;

Fig. 7 is a sectional view on the line 7—7, Fig. 5;

Fig. 8 is an enlarged detail sectional view of the parts shown in Fig. 6 with the door in open position;

Fig. 9 is an enlarged sectional view taken on the line 9—9, Fig. 3, and

Fig. 10 is a fragmentary sectional view of the parts shown in Fig. 9 with the forward door in open position.

Referring now more particularly to the drawings in which similar characters of reference designate similar parts in the several views the car of the present invention comprises generally a body indicated at "A" supported by wheels "B" mounted on axles "C", the body including side sills 2 which, in the instance shown, are outwardly facing bulb angles (see Fig. 5) extending between and connected with outwardly facing channel-shaped end sills 4. The specific connecting means for the side and end sills will be more clearly

described hereinafter. The body "A" also includes side walls 6 which extend upwardly and outwardly from and are secured to the side sills. As more clearly shown in Fig. 5 the side walls 6 are welded as at 8 to the bulbs 10 of the side sills and the upper edge portions of said side walls are each provided with a rolled bead 12 for stiffening said side walls as will be apparent.

Extending between the side walls 6 at their end portions are end walls indicated at 14 and 16 respectively, the latter, for convenience, being termed the forward end wall. For connecting the side and end walls angle-shaped plates 18 riveted as at 20 to the side and end walls are provided as clearly shown in Fig. 4.

As clearly shown in Figs. 2 and 9 the end walls 14 and 16 are inset slightly from the adjacent end sills 4, and the end wall 16 has its lower edge portion outwardly flanged as shown at 22 and secured by fasteners 24 to an end sill cover plate 26 which extends substantially the full length of the end sill 4 as shown clearly in Fig. 3. For stiffening the end wall 16 suitable braces 28 are provided which are secured to said end wall and have portions resting upon and preferably welded to the end sill cover plate 26 as shown at 30, the flange 22 of the end wall 16 being interrupted at intervals so that the stiffeners 28 may rest directly upon the cover plate 26. This specific construction, however, is merely by way of example as, obviously, if desired, the lower end portions of stiffeners 28 may rest directly upon the flange 22 and be secured thereto and to the cover plate 26 by welding or by other suitable fastening means.

For connecting the side and end sills, angle-shaped connecting members 32 are provided which are riveted as at 34 to the side sills and have portions lapping the webs 36 of the end sills 4, said lapping portions being riveted as at 38 to the webs of the end sills as shown in Figs. 4 and 9. Positioned within the end sills are substantially U-shaped fillers 40 which are secured to supporting plates 42 mounted on the lower flanges of the end sills 4, the fillers 40 constituting parts of the end constructions of the car and also parts cooperating with the bumper construction which is more clearly described hereinafter.

The end sill cover plate 26 extends rearwardly beyond the end sill 4 and has secured to its under surface a stiffener 44 which is welded as at 46 to said cover plate and to the upper flange of the end sill 4, (see Fig. 9). This stiffener 44 is formed of portions arranged in transversely spaced relation relative to the end sill and, in the space between said portions a plate 48 is provided which



is welded to the stiffener 44 as shown at 50 and is provided with an aperture through which a coupling pin 52 extends, the latter being supported by the end sill cover plate 26 as shown clearly in Figs. 3 and 4.

Arranged within the filler 40 is a bumper member 54 retained by bolts 56 which extend through the end sill cover plate 26 (see Fig. 3). In the instance shown in the drawings the bumper 54 comprises a casting having spring pockets 58 receiving springs 60 which bear against the web 41 of the U-shaped end sill filler and normally urge the bumper outwardly.

For further connecting the side and end sills angle-shaped corner connectors are provided as indicated at 62, said connectors being riveted at 64 to the horizontal flanges of the bulb angle sills 2 and having other portions underlying the lower flanges of the end sills 4 and riveted to said flanges as shown at 66. For closing the spaces between the end portions of the end sills and the adjacent side walls, closure members in the form of plates 68 are provided which are welded as shown at 70 to adjacent car parts, all as clearly shown in Figs. 4 and 9.

Fig. 2 discloses more in detail the specific construction of the bumper member 54 and it can be seen that said member 54 is mounted for sliding movement on the lower flange of the filler 40 and is provided with a horizontally arranged upper surface 71 bearing on a supporting element 72 welded as at 74 to the web 41 of the end sill filler member, said upper surface 71 being provided with a slot 76 through which pin 52 extends.

The axles "C" are preferably in the form of solid shafts 78 and they extend through the side sills 2 and are arranged in bearings 80 secured by fasteners 82 to the outer surfaces of said sills, the axles being supported by the wheels "B". As clearly shown in the drawings the wheels intersect the plane of the side wall 6 of the car body and said side walls are provided with wheel housings 84 pressed in said walls and preferably substantially triangular in plan as shown clearly in Fig. 3. Obviously, if desired, these housings 84 may be separate members suitably attached to the side walls in a position such as to cover the wheels "B".

The axles are covered by axle housings 86 of a cross-sectional form such as is clearly shown in Figs. 6 and 8, said housings 86 being secured by rivets 88 or other suitable fasteners to brackets 90 secured to the inner surfaces of the vertical legs of the angle sills 2 by the beforementioned fasteners 82, the axle housings 86 constituting internally arranged transverse stiffeners for the car body as will be apparent. The brackets 90 are formed to provide at their lower portions bearing members 92 to which are attached by means of rivets 94 or the like U-shaped straps 96 for supporting the end portions of hinge rods 98; the bearing portions 92 and the straps 96 cooperating to provide bearings for supporting said rods 98 in a manner such as to permit rotation of said rods as hereinafter more clearly described.

The hinge rods 98 constitute means for pivotally supporting the rear and intermediate doors 104 and 106 respectively of the car bottom and have hinge elements 102 welded at 103 to their end portions, said hinge elements being connected to said rear and intermediate doors 104 and 106 by rivets 105 or other suitable fasteners. The hinge rods 98 also are adapted to support the

free edge portions of adjacent doors and to effect this, said rods, intermediate their end portions are offset as shown at 100. As clearly shown in the drawings the offset portions 100 of the hinge rods 98 are so arranged that when the doors are in closed position they are supported in such position by the hinge rods and, it can also be seen, that upon rotation of the hinge rods 98 the offset portions 100 will be rotated in an arc free or clear of the free edge portions of the doors supported thereby to permit movement of the doors to open position. The rods 98, in view of their particular formation are, in effect, snake rods each adapted to hingedly support one door of the car bottom and to support an adjacent door in closed position.

The lading supporting bottom of the car of the present invention is formed of the beforementioned doors 104 and 106 and a forward door indicated at 108. The rear door 104 is provided at its free end with a suitable latch member 110 adapted to be engaged by a suitably formed and cooperating latch member 112 to normally retain said door 104 in lading supporting position. The free edge portion of the intermediate door 106 is so arranged that when door 104 is in its closed position as shown in Fig. 2, it will rest upon the offset portion 100 of the snake rod 98 and, with the door 106 in closed position as shown in Fig. 2, the offset portion 100 of the snake rod 98 to which door 106 is connected is adapted to support the free edge portion of the forward door 108 as more clearly shown in plan in Fig. 3. Each of the doors 104, 106 and 108 is provided with suitable stiffeners 114 which extend longitudinally of said doors and the forward door 108 has its forward edge downturned to provide a hinge loop 116 which is engaged over eccentrics 118 carried by a hinge shaft 120 extending transversely of the car adjacent the forward end sill 4 and projecting through the side sills and provided with suitable retainers 122 in the form of pins or cotters. Due to the eccentrics 118 it will be apparent that when the door 108 is moved from closed to open position the door will assume the position shown more clearly in Fig. 10.

At the forward end portion of the car a shedder member 124 is provided which is secured to the inner surface of the web of the end sill 4 by welding as at 126, said member 124 having a portion 128 deflected inwardly (see Figs. 9 and 10) to over-lie the forward end portion of the door 108 and thus prevent leakage of lading around the hinge mounting for the door.

The rear end wall 14 of the car body has its lower end portion deflected inwardly as shown at 130 to over-lie the free edge portion of door 104 as clearly shown in Fig. 2, said deflected portion resting upon and being secured to a downwardly extending flange 132 formed with the adjacent sill cover plate 26.

In service the doors 104, 106 and 108 are normally retained in lading supporting position such as shown in Figs. 1 and 2. When it is desired to dump the lading, with the car of Figs. 1 and 2 moving toward the right, release of the latching member 112 will free the forward edge portion of door 104 and permit the door to swing on its hinge 102 from the position shown in Fig. 6 to the position shown in Fig. 8, downward swinging of the door 104 causing the snake rod 98 to rotate in its bearings 92 and 96 so that the offset portion 100 of said snake rod will be moved out of door-supporting position as shown in Fig. 8 to permit opening movement of door



106 in the direction of the broken line shown in Fig. 8. Opening movement of door 106 obviously causes movement of the snake rod 98 to which it is connected so that the offset portion 100 will be freed from its supporting relation with door 108 and permit said door 108 to move to open position.

Cars of the drop bottom type such as shown herein are adapted to have their doors moved to closed position by suitable ramp means arranged between track rails so that movement of the car over the ramp will force the doors to closed position and, it can be seen, that as the car continues to move over a ramp or the like between track rails, the door 108 will be swung from open position upwardly, said door swinging on its eccentric hinged mounting and being held in its upward position by the ramp so that when the intermediate door 106 is moved toward closed position the snake rod 98 to which said door 106 is connected will be swung so that the offset portion 100 will be positioned beneath the free edge of the door 108 to support said door 108 in closed position. Obviously, continued movement of the car will cause the door 104 to be moved to closed position such that the offset portion 100 of the snake rod 98 will engage beneath the free edge portion of door 106 and thus support the latter. At this time the door 104 has assumed closed position to again place the latch elements 110 and 112 in cooperating latch position to support the door 104.

The drawings herein illustrate one embodiment of the invention but it is to be understood that they are for illustrative purposes only and various changes in the form and proportions of the construction may be made within the scope of the appended claims without departing from the spirit of the invention.

What is claimed is:

1. In a mine car, the combination with an axle and a drop door adjacent thereto, of a housing covering the axle, a bracket for supporting the housing and having a bearing at its lower end portion, and a hinge rod rotatably mounted in the bearing, and provided with an offset portion intermediate its ends arranged in a plane above the ends, said hinge rod being rigidly secured to the drop door.

2. In a mine car, the combination with a pair of axles and drop doors arranged adjacent thereto, of housings covering the axles, brackets for supporting the housings and each provided with bearings at the lower end portions thereof, and hinge rods rigidly connected respectively with said doors and rotatably mounted in the bearings, said hinge rods being provided with offset portions intermediate their ends so arranged as to engage the free end portions of adjacent doors to support the latter in closed position.

3. In a mine car, a drop door, releasable latch mechanism engaging one end portion of said door to support the latter in closed position, a second door mounted independently of said first named door, and a hinge rod to which said first named door is rigidly connected having means cooperating directly with the free edge portion of the second named door to support the latter in closed position, said means being so arranged as to be rotatable out of engagement with the second named door in response to swinging movement of the first drop door to open position.

4. In a mine car, side sills, side walls connected to the upper portions of said side sills, axles extending through the sills, housings covering

said axles, brackets secured to the sills and supporting the axle housings and having bearings at their lower end portions, snake rods rotatably mounted in the bearings with their offset portions normally arranged in a plane above the end portions thereof, and drop doors rigidly connected to the end portions of said snake rods and having their free end portions supported on the offset portions of adjacent snake rods.

5. In a mine car, a body comprising side walls, end walls, and a bottom formed of a plurality of drop bottom doors arranged substantially end to end longitudinally of the car body, means for supporting the doors in closed position comprising hinge rods to which the doors are secured, said hinge rods having offset portions with which the free edge portions of adjacent doors are adapted to directly engage whereby to be supported.

6. In a mine car comprising a lading supporting bottom formed of a plurality of drop doors, and rotatably supported hinge rods to which said doors are connected, said hinge rods each being provided with an upwardly offset portion intermediate its ends arranged in such a manner as to engage beneath the free edge portions of adjacent doors.

7. In a mine car, a body comprising side walls, end walls, and a bottom formed of a plurality of longitudinally arranged drop doors, an eccentric hinge mounting for the forward door, a snake rod to which the next adjacent door is rigidly connected, bearings in which said snake rod is rotatably mounted, the offset portion of said snake rod being arranged in a plane above the bearings and being adapted to support the free edge portion of said forward door, and means for supporting the free edge portion of said next adjacent door releasable to permit swinging movement of said door to open position whereby to release said snake rod from its supporting engagement with the forward door.

8. In a mine car, a body comprising side sills, end sills extending between and connected to the side sills, the upper portions of said end sills being arranged in a plane above the side sills, cover plates secured to the end sills and projecting rearwardly therebeyond, end walls having their lower end portions secured to the projecting portions of the end sill cover plates, a lading bottom comprising a plurality of hingedly mounted drop doors, the lower end portion of one of said end walls being inwardly and downwardly deflected towards the adjacent drop door, and a shedder member secured to the end sill at the opposite end of the car extended downwardly toward the adjacent drop door.

9. In a mine car, a pair of axles, housings for the axles, brackets supporting the housings and provided with bearings at their lower end portions, hinge rods rotatably mounted in the bearings and provided with upwardly extended supporting portions, doors rigidly secured to the rods having their free edge portions supported on the supporting portions of adjacent hinge rods whereby said doors are retained in closed position, and latch mechanism for supporting one end door, said mechanism being releasable to permit said door to swing to open position and cause rotation of its hinge rod to release the adjacent door.

10. In a mine car, a drop door, a latch mechanism for holding the door in closed position, a second drop door pivotally connected to the car, and hinge means rigidly connected with the first named door and including a hinge rod extend-



ing transversely of the car and having its end portions rotatably supported on the car, said rod being formed to provide a supporting portion intermediate its ends adapted to engage the free edge portion of the second named door to support the latter in closed position and rotatable out of supporting relation with the second named door upon movement of the first named door to open position.

11. In a mine car, in combination, spaced side sills, an axle, a drop door adjacent the axle, a second drop door, a housing covering the axle, brackets secured to the side sills and supporting the housing and each having a bearing at its lower end portion, and a hinge rod extending between the side sills and rotatably mounted in the bearings, said rod being provided with an offset portion intermediate its ends and being rigidly connected at its end portions to said first named drop door in such a manner that when said first named drop door is in closed position the offset portion of said rod is arranged in a plane above the end portions and supports the free edge portion of said second drop door.

12. In a mine car, a drop door, latch mechanism for holding the door in closed position, a second drop door pivotally connected to the car, bearings secured to car parts, and a hinge rod rotatably mounted in the bearings and provided with an offset portion intermediate its ends so arranged that the free edge portion of said second drop door is normally supported thereby, said first-named drop door being rigidly secured to said hinge rod.

13. In a mine car, a drop door, latch mechanism for holding the door in closed position, a second drop door pivotally connected to the car, bearings secured to car parts, and a hinge rod rotatably mounted in the bearings and provided with an offset portion intermediate its ends so arranged that the free edge portion of said second drop door is normally supported thereby,

said first-named drop door being rigidly secured to said hinge rod at the end portions thereof whereby movement of said door is on a substantially fixed axis.

14. In a mine car, a plurality of drop doors, latch mechanism for holding one of said doors in closed position, and means for hingedly connecting said doors to the car including hinge rods to which said doors are rigidly connected, said rods having offset portions intermediate the connections of the doors therewith so arranged as to provide supporting portions upon which the free edge portions of adjacent doors rest to retain said doors in closed position.

15. In a mine car, a plurality of drop doors, latch mechanism for holding one of said doors in closed position, and means for hingedly connecting said doors to the car including hinge rods to which said doors are rigidly connected, said rods having offset portions intermediate the connections of the doors therewith so arranged as to provide supporting portions upon which the free edge portions of adjacent doors rest to retain said doors in closed position, said supporting portions being rotatable out of engagement with adjacent doors in response to swinging movement of the doors connected thereto.

16. In a mine car, frame members, wheels and axles supporting the frame members, a drop door, latch mechanism for holding the door in closed position, a second drop door pivotally connected to the car, and hinge means including a part rigidly connected with the first named door and pivotally supported by said frame members, said part being formed to provide a supporting portion on which the free edge portion of the second drop door is adapted to rest whereby said second drop door is supported in closed position and said part being rotatable out of supporting relation with the second drop door upon movement of the first drop door to open position.

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