

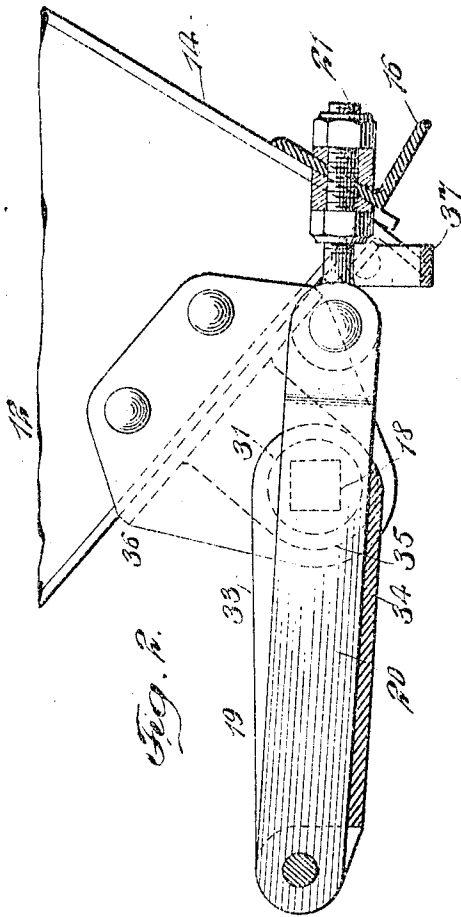
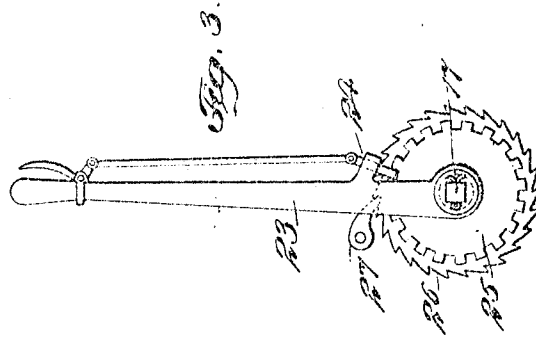
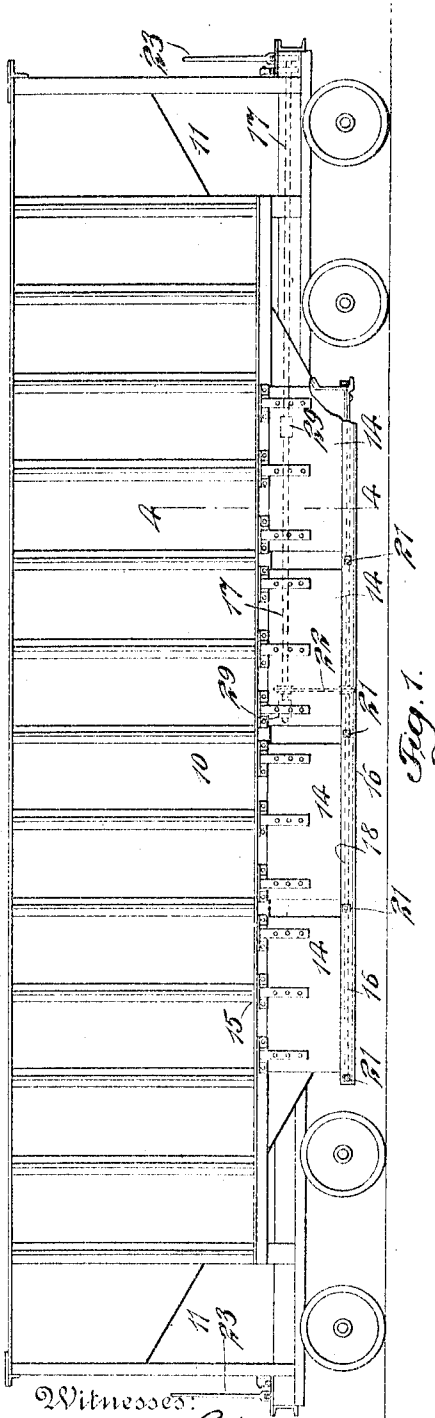
E. D. HILLMAN.  
TRANSPORTATION CAR.

APPLICATION FILED APR. 11, 1911.

Patented Aug. 13, 1912.

3 SHEETS-SHEET 1.

1,035,439.



Witnesses:  
*Julius H. Hill*  
*Arthur Marion*

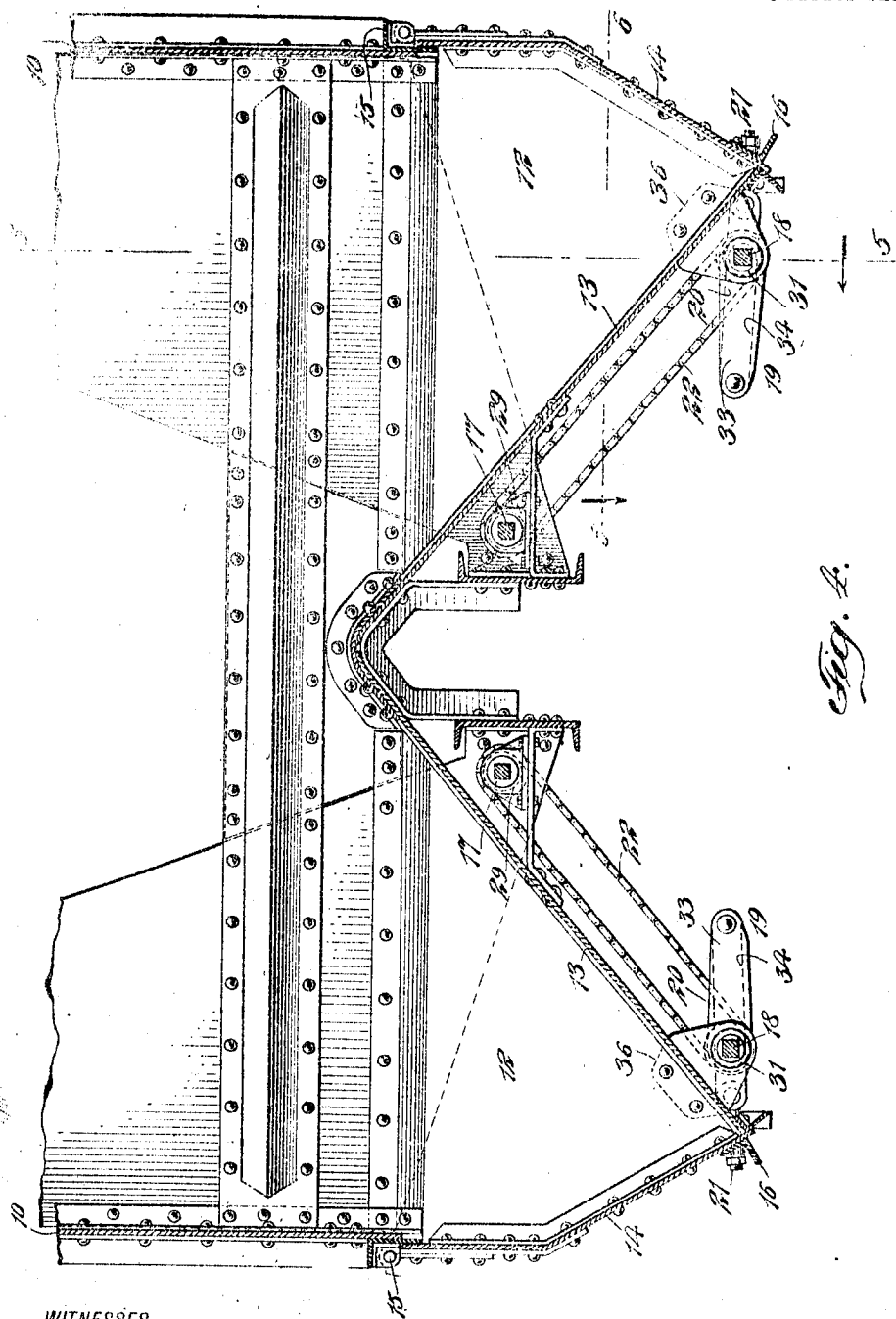
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By his Attorney *Chas. C. Hill*

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3 SHEETS SHEET 2.



*Fig. 2.*

WITNESSES

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INVENTOR

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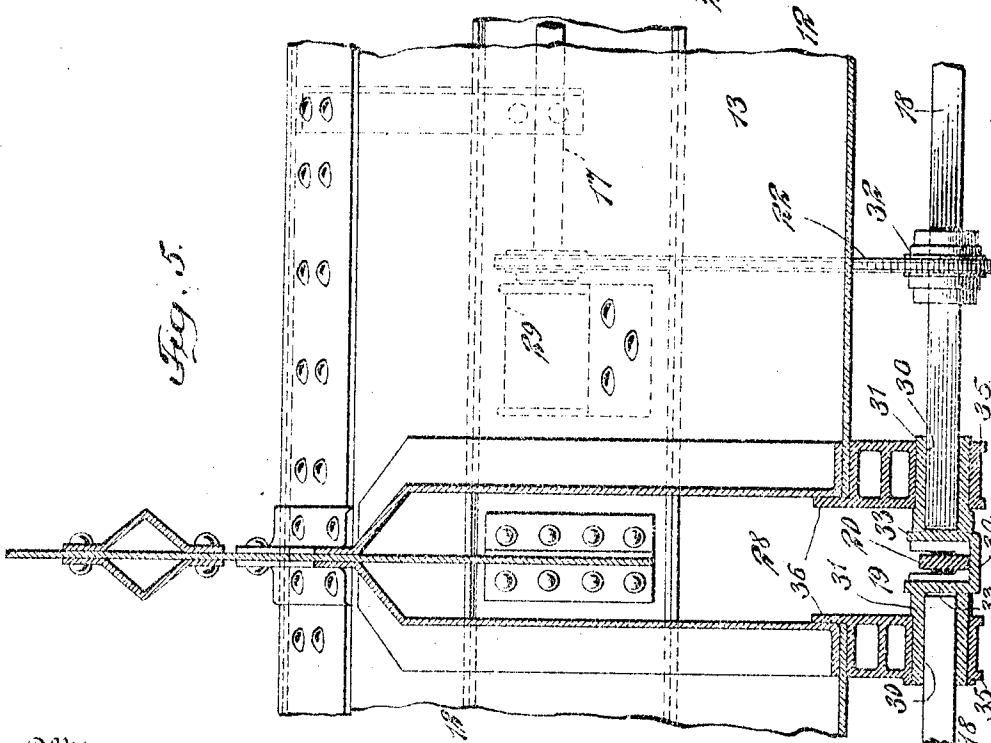
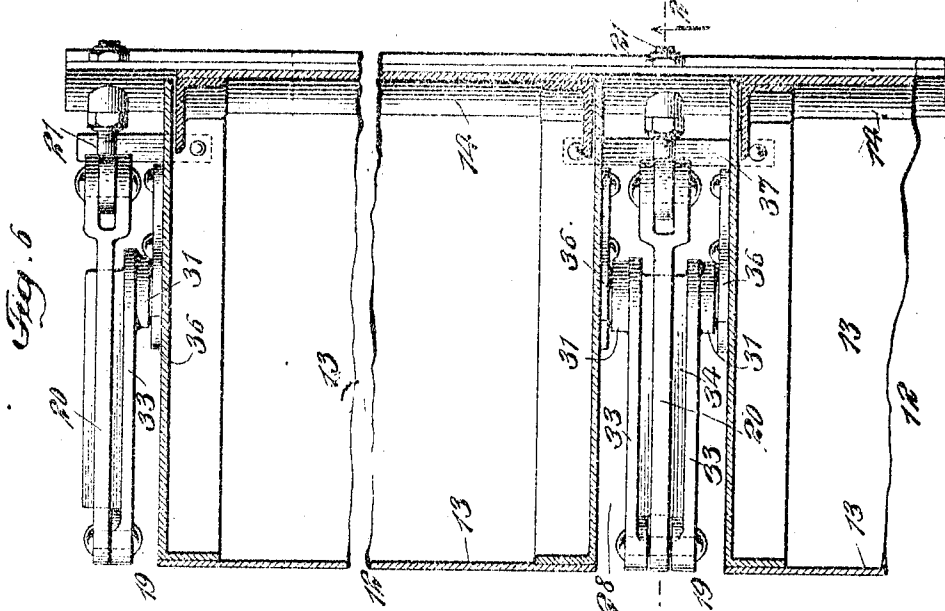
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3 SHEETS-SHEET 3.



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By his Attorney *Chas. C. Gill*

# UNITED STATES PATENT OFFICE.

EDWARD D. HILLMAN, OF MOUNT VERNON, NEW YORK, ASSIGNOR TO BENJAMIN A. HEGEMAN, JR., OF NORTH PLAINFIELD, NEW JERSEY.

## TRANSPORTATION-CAR.

1,035,439.

Specification of Letters Patent.

Patented Aug. 13, 1912.

Application filed April 11, 1911. Serial No. 620,410.

*To all whom it may concern.*

Be it known that I, EDWARD D. HILLMAN, a citizen of the United States, and a resident of Mount Vernon, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Transportation-Cars, of which the following is a specification.

The invention relates to improvements in transportation cars, and it consists in the novel features, arrangements and construction of parts hereinafter described, and particularly pointed out in the claim.

The invention pertains more particularly to metal cars having discharge-doors at the sides thereof, said doors being hinged at about the line of the side sills of the car and extending downwardly and then inwardly to meet the lower edges of the inner hopper sheets, whose upper ends are secured to the center framing of the car.

The car may be provided with any suitable number of doors at each side thereof, but in the illustration herein presented I provide each side of the car with four doors, one for each hopper, and connect these doors at each side of the car so that each set of doors may be operated from one main shaft actuated from the end of the car. Between the adjacent ends of the hoppers I provide spaces for the movement of portions of the door operating mechanism, and this mechanism which is partly below said spaces and partly below the hoppers, comprises an auxiliary operating shaft connected by a chain with the main operating shaft and with the doors by means of suitable links pivoted to the outer ends of specially constructed crank-frames whose inner ends are rigid with said auxiliary shaft. The said links and frames control the movement of the doors, and when the latter are in closed position the center of the links is below the center of the said auxiliary shaft or beyond the dead center of the door operating mechanism and said mechanism is thereby enabled to lock the doors in closed position.

My invention resides in a novel construction and arrangement of door operating mechanism and will be fully understood from the detailed description hereinafter presented, reference being had to the accompanying drawings, in which:

Figure 1 is a side elevation, partly broken away, of a transportation car, equipped with

doors and door-operating mechanism embodying the invention; Fig. 2 is a vertical transverse section, on a larger scale, through a portion of the car, the section being taken between two adjoining hoppers and on the dotted line 2—2 of Fig. 6; Fig. 3 is an enlarged detached view, taken from the end of the car, of the means provided for actuating the operating shaft in its movement to open and close the doors and also to lock said shaft in rigid position; Fig. 4 is an enlarged transverse section through the lower portion of the car, on the dotted line 4—4 of Fig. 1; Fig. 5 is a vertical longitudinal section through a portion of the car, on the dotted line 5—5 of Fig. 4; and Fig. 6 is a horizontal section, partly broken away, through a portion of the car, on the dotted line 6—6 of Fig. 4.

In the drawings, 10 designates the usual sides of the car, 11 the downwardly and inwardly inclined end hopper sheets, 12 the series of hoppers at each side of the longitudinal center of the car, 13 the inner downwardly and outwardly inclined sheets of said hoppers, 14 the discharge doors secured by hinges 15 at their upper ends and connected in series by an angle bar 16 at their lower edges, 17 the main operating shafts, one being at each side of the center of the car, 18 the auxiliary operating shafts, 19 rigidly-mounted crank frames on said auxiliary shaft, and 20 links connected at their outer ends by eye-bolts 21 to the lower edges of the doors and at their inner ends pivotally secured between the sides of said crank frames 19. The doors and door operating mechanisms are duplicated at each side of the center of the car, and the main operating shaft 17 for one set of doors, say the set shown in Fig. 1, extends to the right hand end of the car, looking at Fig. 1, while the operating shaft 17 for the doors on the other side of the car extends to the other or left hand end of the car in convenient position for operation from the end of the car.

The main operating shaft 17 and auxiliary operating shaft 18, are, at each side of the car, connected by a sprocket chain 22, through which power is communicated from the shaft 17 to the shaft 18, and this power is transmitted from the shaft 18 through the crank frames 19 and links 20 to the doors 14. At one end of the car one shaft 17 and at the other end of the car the other shaft

17 is provided with an operating lever 23 of known character and shown in detail in Fig. 3 for actuating the shaft. The lever 23 is equipped with a locking dog 24 to coact with a locking wheel 25, adjacent to which a ratchet wheel 26 is provided on the shaft, and it receives or coöperates with a pawl 27 fastened on the end of the car. The ratchet wheel 26 and pawl 27 serve to prevent reverse rotation of the operating shaft 17 during the opening of the doors, and said pawl may be disconnected from said wheel when reverse rotation of the said shaft is desired. The operating mechanism shown in Fig. 3 is not of unusual character and may, of course, be varied if desired.

In the drawings I illustrate a car having four hoppers 12 at each side of its longitudinal center, and four doors 14 at each side of the car for said hoppers, the doors and hoppers all being alike and said hoppers being separated at their adjoining ends by spaces 28 within which the links 20 and crank frames 19 may perform their movements during the opening and closing of the doors.

Each shaft 17 is mounted in bearings 29 and has adjacent to its inner end a sprocket wheel for the chain 22, one chain being sufficient for each set of connected doors. The shafts 17 extend longitudinally below the upper portions of the hopper sheets 13, and the auxiliary shafts 18 extend longitudinally below the lower ends of said hopper sheets and each is in sections and polygonal in cross-section, the sections of the shaft 18 at their adjoining ends at the spaces 28 entering sockets 30 formed in tubular members 31 of the crank frame 19, as clearly illustrated in Fig. 5. The sections comprising the auxiliary shaft 18 all have simultaneous operation and are in line with one another and connected together at their adjoining ends by the interposed crank frames 19, and hence I have referred to the shaft as an auxiliary operating shaft without separately designating the sections thereof. The shaft 18 carries a sprocket wheel 32 for the chain 22, hereinbefore mentioned.

The crank frame 19 comprises two side members 33 connected at their lower edges by a bottom or back 34 and having projecting laterally from the outer sides of their front ends the tubular members 31, which are mounted in bearings 35 formed in castings 36 riveted to the ends of the hoppers 12. The crank frames 19 are intended to turn through substantially the arc of a half-circle or from their initial position shown in Fig. 2, in the closed position of the doors, to a position at which said frames will project outwardly from the auxiliary shaft 18 instead of inwardly therefrom, said crank frame when extended outwardly in the open position of the doors being caught upon a

rest 37 (Figs. 2 and 6), which is simply a bar extended across each space 28 and fastened to the bottoms of the hoppers, said bars serving as saddles or rests to receive the crank frames 19 in the open position of the doors and prevent said frames from turning unduly downwardly or going through the line of say three-fourths of a circle. When the crank frame 19 is in its initial position shown in Fig. 2, its link 20 and back 34 coöperate to retain said frame in the substantially horizontal position shown.

The links 20 are pivotally secured at their inner ends between the sides 33 of the crank frame 19, and at their outer ends are pivotally secured to the eye-bolts 21 which are secured in line with the lower edges of the doors 14 and to the angle bar 16 which connects the doors at their lower edges, said eye-bolts being disposed in transverse line with the spaces 28 between the hoppers, as clearly illustrated in Fig. 6. The outer ends of the links 20 are forked to straddle the eyes of the eye-bolts 21, and said links are in the form of flat bars standing on edge between the sides 33 of the crank frames 19. In the initial position of the crank frames and links the lower edges of the links bear upon the backs 34 of said frames, and the center line of the links is slightly below the center of the auxiliary shaft 18, said links in closing the doors moving to the position shown in Fig. 2 below the center of the shaft 18, so as to become locked in position and aid in locking the doors in their closed position, the weight of the doors and the load against them when the links 20 and crank frame 19 are in this position, shown in Fig. 2, acting as a strain to pull the inner end of the links and crank frames downwardly, instead of upwardly.

At the outer end of each end hopper 12 the crank frames 19 may have one of the sides 33 omitted, as I illustrate at the upper portion of Fig. 6, but in all instances in which the crank frame is at a space 28 between adjacent ends of two hoppers, said frame will have two corresponding sides 33 with tubular bearings 31 extending laterally therefrom to receive adjacent ends of the sections of the shaft 18.

In the employment of my invention, the frames 19 and links 20 extend inwardly on about horizontal lines, as shown in Figs. 2 and 4, when the doors 14 are in their closed position. When it is desired to open a set of the doors the shaft 17 therefor will, by means of the lever 23, be given a sufficient rotary movement to impart therefrom through the chain 22 and shaft 18, the upward movement of the inner ends of the crank frames 19, from the position of said frames shown in Figs. 2 and 4 through the line of about a half circle or until said crank

frames are projected in the opposite direction or outwardly and come to rest upon the stops 37. This upward and outward movement of the crank frames 19 results in the inner ends of the links 20 being carried upwardly and outwardly and in the outer ends of said links, through the eye-bolts 21 and angle bar 16, driving the doors 14 outwardly to their open position and holding said doors open during the discharge of the contents from the car. After the load has left the car the operator will reverse the action of the lever 33 and operating shaft 17 and through the chain 22 and shaft 18 turn the crank frames 19 upwardly and inwardly and thereby restore them and the links 20 to their initial position, said links during this movement drawing the doors 14 to their closed position. The shafts 17 and their connections to their respective doors are independent of one another, and hence each shaft 17 will be independently operated from a lever 23 or other suitable means.

My invention presents extremely durable and easily applied and efficient means for opening and closing the doors 14, and in the general design, disposition and construction of the door operating mechanisms, I have aimed to eliminate complications of parts and difficulties in applying door operating mechanisms to cars and to secure maximum efficiency and convenience of operation. For illustration, the operating shafts 17 are at opposite sides of the longitudinal center framing of the car and adjacent to the upper portions of the inner hopper sheets 13 and are thus at a proper height to extend horizontally to the end of the car and still leave adequate clear space for the brake-mechanism and draft-gear; the links 20 are all straight links as distinguished from bent links and in the closed position of the doors 14 have a substantially straight-line pull below the center-line of the auxiliary shafts 18 against the eye-bolts 21 and at about the lowest point of the doors; the auxiliary shafts 18 are in independent sections any one of which may be replaced by a new section without the loss of an entire shaft; the

angle-bar 16 connecting the doors at their lower edges strengthens the doors and aids in affording a very durable bearing for the eye-bolts 21, and the chains 22 are endless sprocket chains arranged parallel with the inner hopper sheets and mounted on sprocket wheels and avoid the results which would ensue from the stretch or slippage of ordinary chains fastened at one end to one sheave and at the other end to another sheave or part.

What I claim as my invention and desire to secure by Letters Patent, is:

A car having at each side of its longitudinal center line a series of hoppers separated at their ends from each other by spaces and having downwardly and outwardly inclined inner sheets, doors hinged at their upper ends at the sides of the car for closing said hoppers and inclined inwardly at their lower portions to meet the lower edges of said sheets, longitudinal main operating shafts at opposite sides of the longitudinal center framing of the car and close below the upper portions of said inner sheets, auxiliary operating shafts adjacent to the lower ends of said sheets, sprocket wheels on said main and auxiliary shafts, sprocket chains on said sprocket wheels, means for manually operating said main shafts, crank-frames on said auxiliary shafts at said spaces and in the closed position of said doors projecting inwardly, and links pivotally connected at their inner ends with the inner ends of said crank-frames and at their outer ends with said doors at the lower portions thereof, said crank-frames being castings comprising sides, a back connecting the same, laterally projected trunnions held by bearings secured to said sheets and having end sockets, and said auxiliary shafts being in line sections whose ends are in said sockets.

Signed at New York city, in the county of New York and State of New York, this 10th day of April A. D. 1911.

EDWARD D. HILLMAN.

Witnesses:

CHAS. C. GILL,  
ARTHUR MARION.