D. F. HERVEY.

MECHANICAL STOKER.

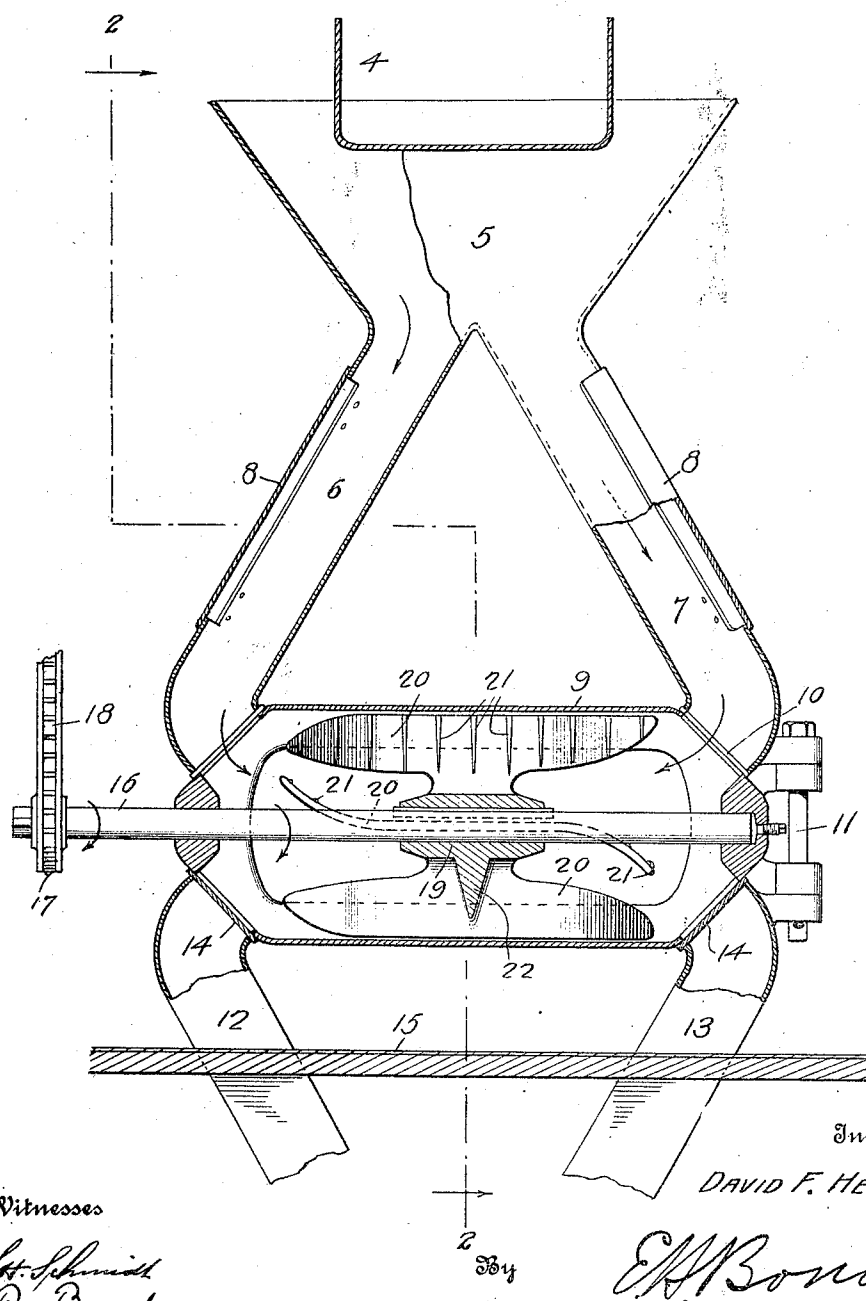
APPLICATION FILED MAR. 25, 1912.

1,049,357.

Patented Jan. 7, 1913.

3 SHEETS—SHEET 1.

Fig. 1.



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3 SHEETS—SHEET 2.

Fig. 2.

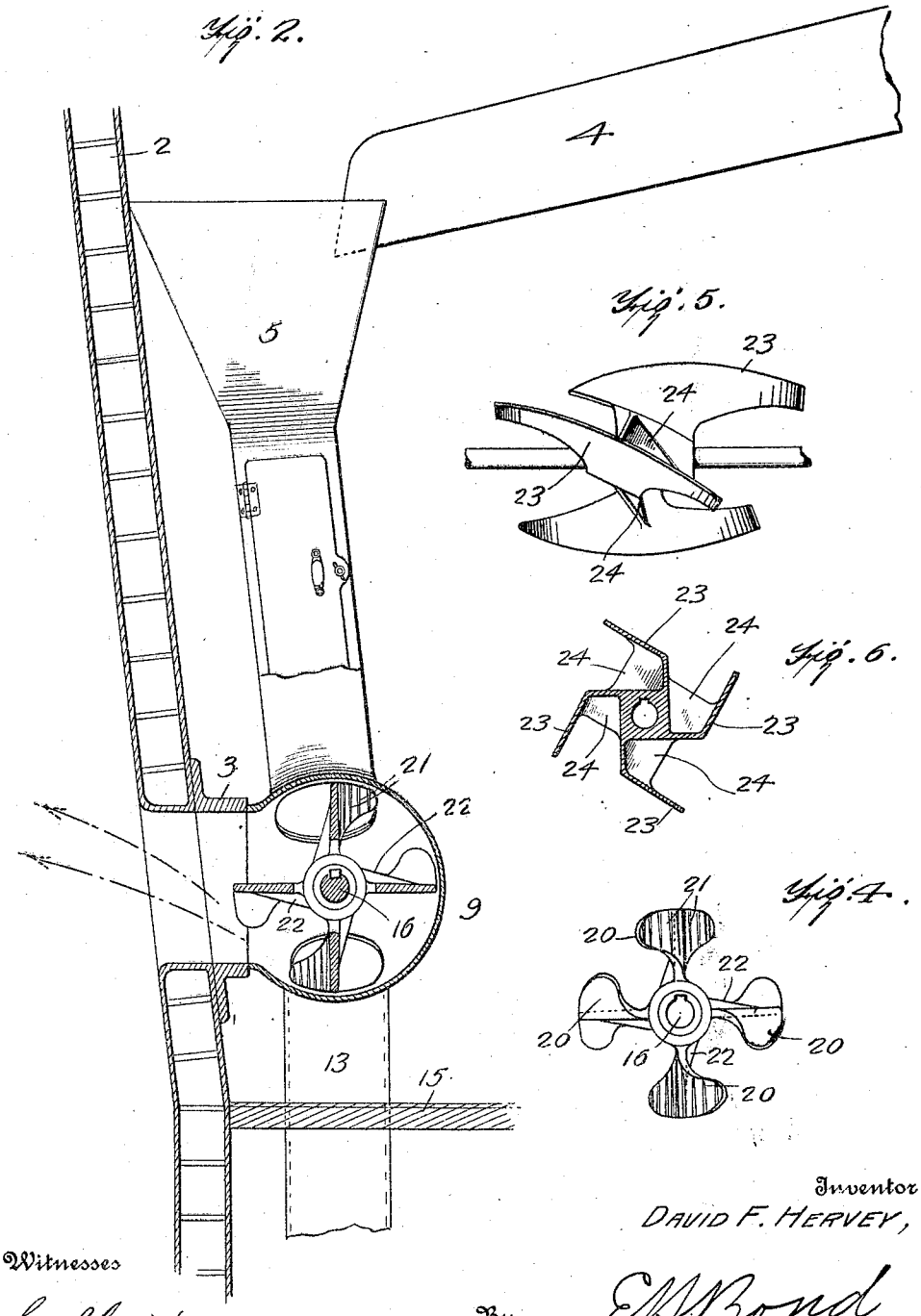

Fig. 5.

Fig. 6.

Fig. 4.

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3 SHEETS—SHEET 3.

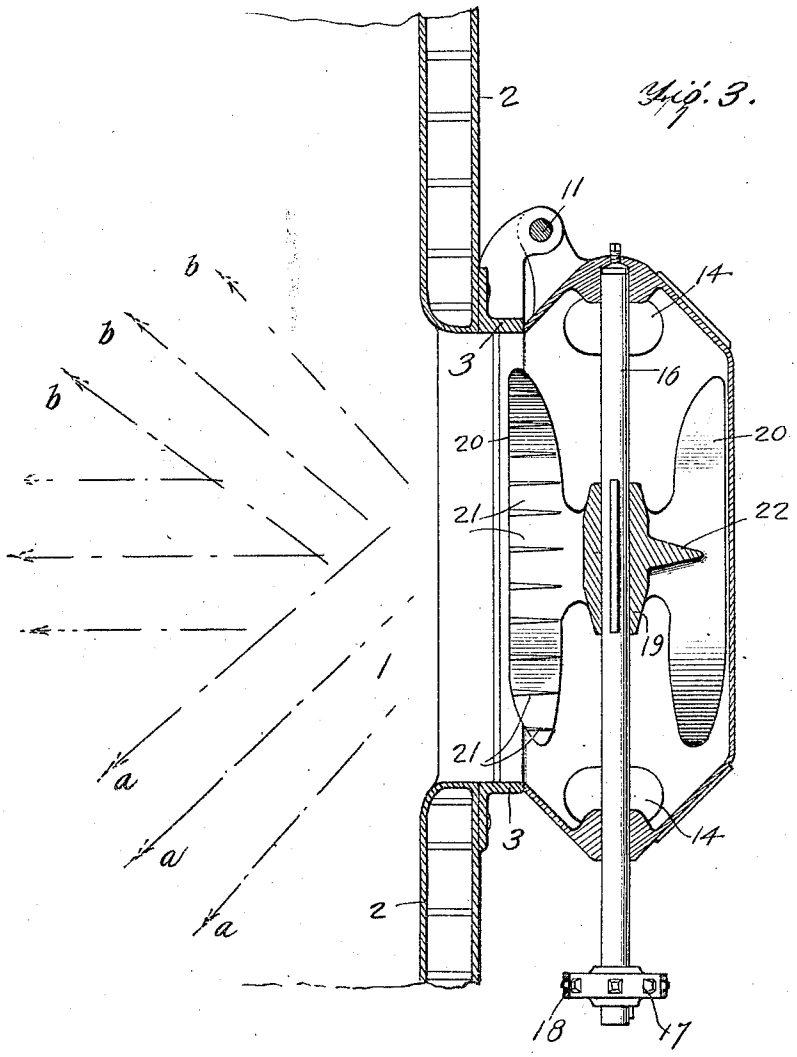

Fig. 3.

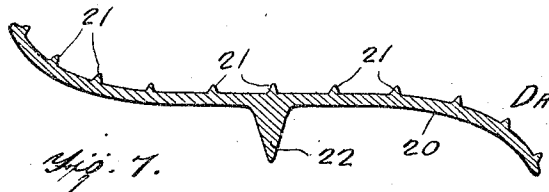

Fig. 7.

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UNITED STATES PATENT OFFICE.

DAVID F. HERVEY, OF LOGANSPORT, INDIANA.

MECHANICAL STOKER.

1,049,357. Specification of Letters Patent. **Patented Jan. 7, 1913.**

Application filed March 25, 1912. Serial No. 686,185.

To all whom it may concern:

Be it known that I, DAVID F. HERVEY, a citizen of the United States of America, and resident of Logansport, in the county of Cass and State of Indiana, have invented certain new and useful Improvements in Mechanical Stokers, of which the following is a specification.

This invention relates to certain new and useful improvements in mechanical stokers of the general character set forth in the Patent No. 966,547 issued to me August 9, 1910.

The present invention has for its objects among others to provide an improved form of distributer which will effectually cross-fire, that is insure a positive sweep of all of the fuel in the casing nearest the opening to the furnace in one direction by one blade, the following blade sweeping all of the fuel in its path in the opposite direction, the arrangement being such that the fuel delivered from one set of blades will not come in contact with the fuel delivered by the succeeding blade, as my construction insures the fuel propelled by one blade being well into the fire-box or furnace before a succeeding delivery is begun, thereby insuring the non-intermingling of the fuel thrown to the right and left while on its way to the furnace. My distributer, with its arms or blades reaching the length of the casing, insures the delivery of the fuel successively to one side of the fire-box and then to the other, working equally as well in either the forward or backward motion.

Other objects and advantages of the invention will hereinafter appear and the novel features thereof will be particularly pointed out in the appended claims.

The invention is capable of embodiment in a variety of forms, some only of which are herein illustrated, but these are deemed sufficient to clearly show the mode of application and use of the present invention. The invention, in such preferred forms, is clearly illustrated in the accompanying drawings, which, with the numerals of reference marked thereon, form a part of this specification, and in which—

Figure 1 is a substantially central vertical section through the parts embodying my present invention. Fig. 2 is a vertical section at right angles to Fig. 1 as on the line 2—2 of Fig. 1 looking in the direction of the arrows. Fig. 3 is a horizontal section looking down, the section being taken on a line just above the distributer shaft in Fig. 2. Fig. 4 is an end elevation of the distributer and its shaft. Fig. 5 is a side view of a modified form of distributer. Fig. 6 is a cross section through Fig. 5 at substantially the mid center. Fig. 7 is a longitudinal section through the propeller shown in Fig. 1.

Like numerals of reference indicate like parts throughout the different views.

Referring to the drawings, 1 designates the fire-box of a boiler 2 and 3 the permanent fire-box door frame which is rigidly secured to the boiler head in any suitable well-known way. These parts, as well as all other parts of the locomotive or stationary boiler with which my present improvement is employed, may be of any of the well-known forms of construction, such, for instance, as shown in my patent hereinbefore referred to.

4 is an inclined chute on which the fuel is fed from the tender to the hopper 5, the chute being supported in any well-known way and the coal delivered thereto by elevator or otherwise, this being non-essential to the present invention. The hopper has the divergent chutes 6 and 7 which may be provided with suitable doors 8 for access to the interior of the inclined chutes or hopper legs should the coal clog in the latter. At their lower ends these inclined chutes or hopper legs 6 and 7 converge inwardly toward each other and communicate with the interior of the casing 9, suitable doors or closures 10 being provided to control the flow of the fuel through the legs into the interior of the casing. This casing may be supported in any suitable manner convenient to the opening in the fire-box at the door frame 3 and may be mounted to swing as on a suitable hinge 11, the direction of swinging of this casing being dependent upon the amount of room left after the other necessary fixtures have been applied to the boiler head. It may swing horizontally or it may be mounted on hinges to move upwardly or downwardly, as circumstances may dictate.

From the casing 9 depend the fuel conduits 12 and 13, communication between the same and the casing being controlled by the doors or closures 14, as seen best in Fig. 1. These fuel conduits extend down through the deck 15 and are designed for use where the coal is to be admitted when the deck or underdeck type of boiler is

used. When this latter type of boiler is employed, the closures 10 will be closed. When the delivery is from above, as through the chute 4 and hopper 5 and its legs 6 and 7, the communication between the fuel conduits 12 and 13 and the interior of the casing will be shut off by the closures 14.

Within the casing 9 I mount the shaft 16 supported in suitable bearings at opposite ends with one end extended and carrying a sprocket wheel or the like 17 to which motion is given by a sprocket chain or the like 18 which, in turn, is designed to derive its motion from a motor or the like, as in my patent hereinbefore referred to and to which reference is made for one form of arrangement for this purpose. On this shaft I mount so as to rotate therewith my improved distributer which comprises a hub or body portion 19, from which project the distributer blades 20 which are, by preference, formed upon a compound curve, as seen best in Figs. 1 and 7, and oppositely disposed, as seen in Fig. 4, the said blades being set at an inclination with relation to the axis of the distributer, as seen in Figs. 4 and 5, so that as the shaft revolves the one blade will throw the fuel into the fire-box in the one direction, as indicated by arrows *a* in Fig. 3, and the next succeeding blade will force the fuel in the opposite direction, as indicated by arrows *b* in said Fig. 3, the result being a cross-firing so that the coal will be evenly distributed all over the bed of the fire in the fire-box and the disposition of the blades is such that the fuel moved from the interior of the casing by the one blade will be out of the way of the fuel thrown by the succeeding blade, so that there is no danger of the coal intermingling or that thrown by one blade being hit by that thrown by the other. The blades are each substantially the entire length of the discharge opening of the casing, as seen in Fig. 3. If desired, the acting faces of the blades may be provided with projections, ribs or the like, as seen at 21 in Figs. 1, 2, 3, 4 and 7, in order to keep the coal from sliding along the blades. Between the hub and the blades, I provide the angularly disposed arms or the like 22 which serve to prevent the clogging of the coal at the bases of the blades and which serve also to throw the coal out toward the outer extremities of the blades. These propeller blades may be of different forms. In Figs. 5 and 6 I have shown the blades 23 as angular in cross section with the angular members 24 therebetween which serve the same purpose as the angular members 22 in the form hereinbefore described. The action of this form of distributer in cross firing is substantially the same as the action of the form hereinbefore described.

The casing may be of any well-known or approved form of construction, being made of one or more parts as may be found most convenient, but this does not enter into the essentials of the present invention.

From the foregoing, it will be seen that I have devised a simple, cheap and efficient form of construction for insuring efficient cross-firing, and while the structural embodiments of the invention as hereinbefore disclosed are what I at the present time consider preferable, it is evident that the same is subject to changes, variations and modifications in detail, proportion of parts, etc., without departing from the spirit of the invention or sacrificing any of its advantages. I, therefore, do not intend to restrict myself to the exact construction hereinbefore disclosed, but reserve the right to make such changes, variations and modifications as come properly within the scope of the protection prayed.

By having the distributer blades disposed with their major portions parallel with the shaft, the fuel is distributed more evenly throughout the entire surface of the fire-box, the central portions of the blades delivering at the center of the fire-box and the curved ends delivering the fuel evenly toward the outer walls thereof. In connection with these blades with curved ends, the disposition of the chutes so as to deliver the fuel to the ends of the blades further tends to better delivery and distribution of the fuel.

What is claimed as new is:—

1. In a mechanical stoker, a rotary distributer embodying a shaft and blades disposed substantially lengthwise of the shaft with their major portions parallel with the shaft and each blade having its ends bent in opposite directions whereby said ends extend upon opposite sides of the axis of the shaft, said blades arranged to alternately cross-fire and to insure non-interference of the fuel as it is thrown to the right and left.

2. In a mechanical stoker, a rotary distributer comprising a shaft and blades disposed substantially lengthwise of the shaft, each blade having its ends bent in opposite directions whereby said ends extend upon opposite sides of the axis of the shaft, and provided with means for preventing sliding movement of the fuel longitudinally of the blades.

3. In a mechanical stoker, a rotary distributer comprising a shaft and blades disposed substantially lengthwise of the shaft, each blade having its ends bent in opposite directions whereby said ends extend upon opposite sides of the axis of the shaft, said blades being provided with ribs for preventing sliding movement of the fuel longitudinally of said blades.

4. In a mechanical stoker, a fixed casing,

and a rotary distributer therein comprising a shaft and blades fixedly secured thereto, said blades having their ends set at an inclination with relation to the axis of the distributer and having such ends bent in opposite directions whereby said ends extend upon opposite sides of such axis, said blades being arranged to alternately cross-fire, said blades being provided with means to prevent sliding movement of the fuel laterally to the direction of movement of the fuel on the blades.

5. In a mechanical stoker, a fixed casing, and a rotary distributer therein comprising a shaft and blades fixedly secured thereto, said blades being set at an inclination with relation to the axis of the distributer and having their ends bent in opposite directions whereby said ends extend upon opposite sides of such axis, alternate blades arranged to alternately cross-fire, said blades being provided with means for preventing movement of the fuel longitudinally of said blades.

6. In a mechanical stoker, a rotary distributer comprising a substantially horizontally disposed shaft and blades fixed thereon, each blade having its ends bent in opposite directions, with the blade ends set at an inclination to the axis of the distributer with the portion between the bent ends extending substantially parallel with the shaft, and the ends of the adjacent blades arranged to alternately cross-fire, said blades being formed with means to prevent sliding movement of the fuel laterally to the direction of movement of the fuel on the blades.

7. In a mechanical stoker, a rotary distributer comprising a shaft and blades fixed thereon, each blade having its ends bent in opposite directions, with the blades set at an inclination to the axis of the distributer with the portion between the bent ends extending substantially parallel with the shaft and the ends of the adjacent blades arranged to alternately cross-fire, and angularly disposed arms at the inner portions of said blades, said blades being provided with means to prevent sliding movement of the fuel laterally to the direction of movement of the fuel on the blades.

8. In a mechanical stoker, a rotary distributer comprising a shaft and a hub with blades extending substantially in the direction of the length of the shaft and at an inclination with relation to the axis of the distributer, each blade having its ends bent in opposite directions whereby said ends extend upon opposite sides of the hub and disposed at an angle to the inclination of the blades, said blades being provided with means to prevent sliding movement of the fuel longitudinally of the blades.

9. In a mechanical stoker, a casing, a rotary distributer therein, and oppositely inclined fuel conduits leading from the lower portion of said casing for the underfeeding of the fuel, a hopper above the casing and inclined chutes extending from the hopper to opposite ends of the casing.

10. In a mechanical stoker, a casing, a rotary distributer therein, and oppositely inclined fuel conduits leading from the lower portion of said casing for the underfeeding of the fuel, a hopper above the casing, inclined chutes extending from the hopper to opposite ends of the casing, and independent closures for said fuel conduits.

11. In a mechanical stoker, a casing, a rotary distributer therein, and oppositely inclined fuel conduits leading from the lower portion of said casing for the underfeeding of the fuel, a hopper above the casing, inclined chutes extending from the hopper to opposite ends of the casing, independent closures for said fuel conduits and chutes, and means for mounting said casing for swinging movements.

12. In a mechanical stoker, a casing, a revoluble distributer therein, a hopper and oppositely disposed inclined chutes extending therefrom and having communication with opposite ends of the casing at the upper side thereof, and downwardly inclined fuel conduits leading from the lower side of said casing.

13. In a mechanical stoker, a casing, a revoluble distributer therein, a hopper and oppositely disposed inclined chutes extending therefrom and having communication with opposite ends of the casing at the upper side thereof, and fuel conduits extending downwardly from the lower side of said casing, said chutes being provided with doors intermediate the hopper and casing to permit access to the interior of the chutes.

14. In a mechanical stoker, a casing having openings at opposite ends above and below its longitudinal center, a revoluble distributer therein having blades with curved ends, a hopper above said casing having inclined chutes communicating with openings at opposite ends of the casing, and conduits communicating with and leading from openings at the lower side of said casing below the distributer.

15. In a mechanical stoker, a casing having openings at opposite ends above and below its longitudinal center, a hopper above said casing having inclined chutes communicating with openings at opposite ends of the casing, conduits communicating with and leading from openings at the lower side of said casing below the distributer, and closures for communication between the chutes and casing and between the casing and said conduits.

16. In a mechanical stoker, a casing having openings at opposite ends above and be-

low its longitudinal center, a hopper above said casing having inclined chutes communicating with openings at opposite ends of the casing, conduits communicating with and leading from openings at the lower side of said casing below the distributer, and a rotary distributer within said casing having blades upon compound curves and extending substantially the entire length of the casing.

17. In a mechanical stoker, a rotary distributer comprising a shaft and a hub with blades extending substantially in the direction of the length of the shaft and at an inclination with relation to the axis of the distributer, each blade being formed upon a compound curve with the ends extended in opposite directions beyond the axis of the distributer to serve for alternate cross-firing, and a hopper having chutes for delivering fuel to the ends of said blades.

18. In a mechanical stoker, a rotary distributer comprising a shaft and a hub with blades extending substantially in the direction of the length of the shaft and at an inclination with relation to the axis of the distributer, each blade being formed upon a compound curve with the ends extended in opposite directions beyond the axis of the distributer to serve for alternate cross firing, and angularly disposed arms joining said blades to the hub and disposed at an angle to the inclination of the blades, and a hopper having chutes for delivering fuel to the ends of said blades.

19. In a mechanical stoker, a rotary distributer comprising a shaft and a hub with blades extending substantially in the direction of the length of the shaft and at an inclination with relation to the axis of the distributer, each blade being formed upon a compound curve with the ends extended in opposite directions beyond the axis of the distributer to serve for alternate cross firing, said blades being provided with spaced ribs to prevent sliding movement of the fuel longitudinally of the blades.

Signed by me at Steubenville, Ohio, this twentieth day of March 1912.

DAVID F. HERVEY.

Witnesses:
EDGAR J. HERVEY,
JOHN A. KITHCART.