

(No Model.)

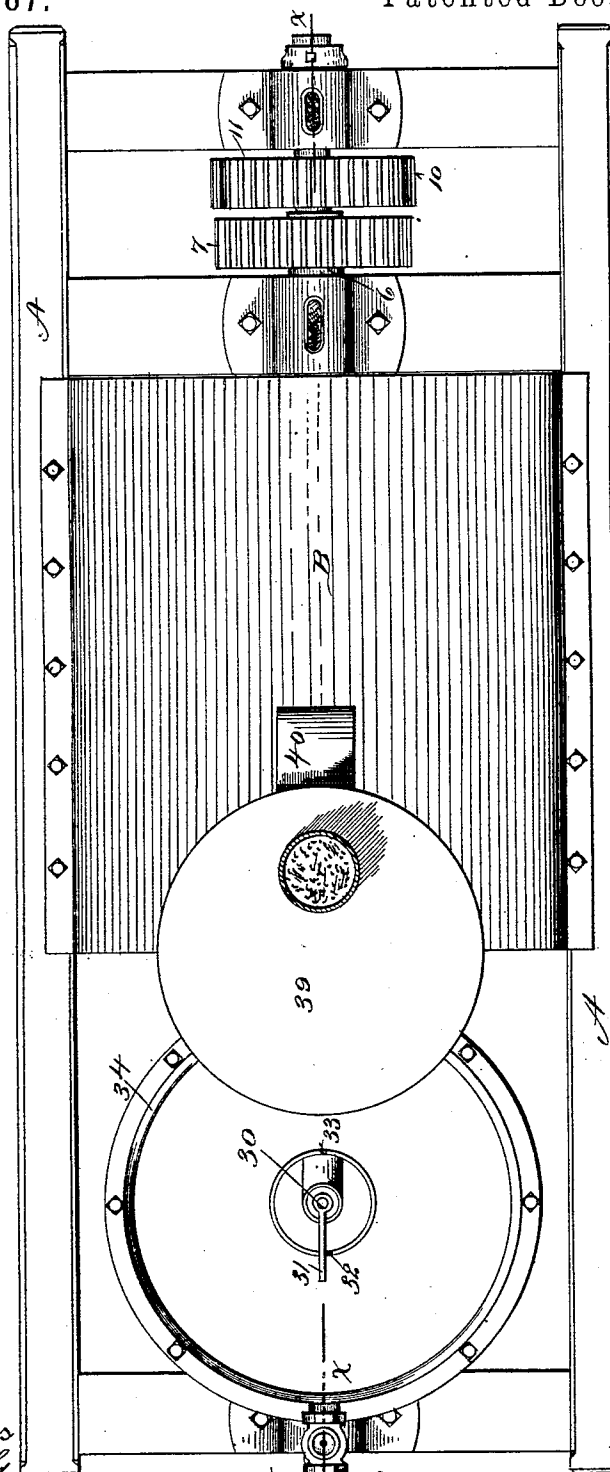
3 Sheets—Sheet 1

J. McDANIEL.
WHEAT WASHING MACHINE.

No. 573,687.

Patented Dec. 22, 1896

Fig. 1.



Witnesses
Jas. C. Hawley
H. M. McNair.

By his Attorney
H. A. Toulmin.

Inventor
Jas. M. Daniel.

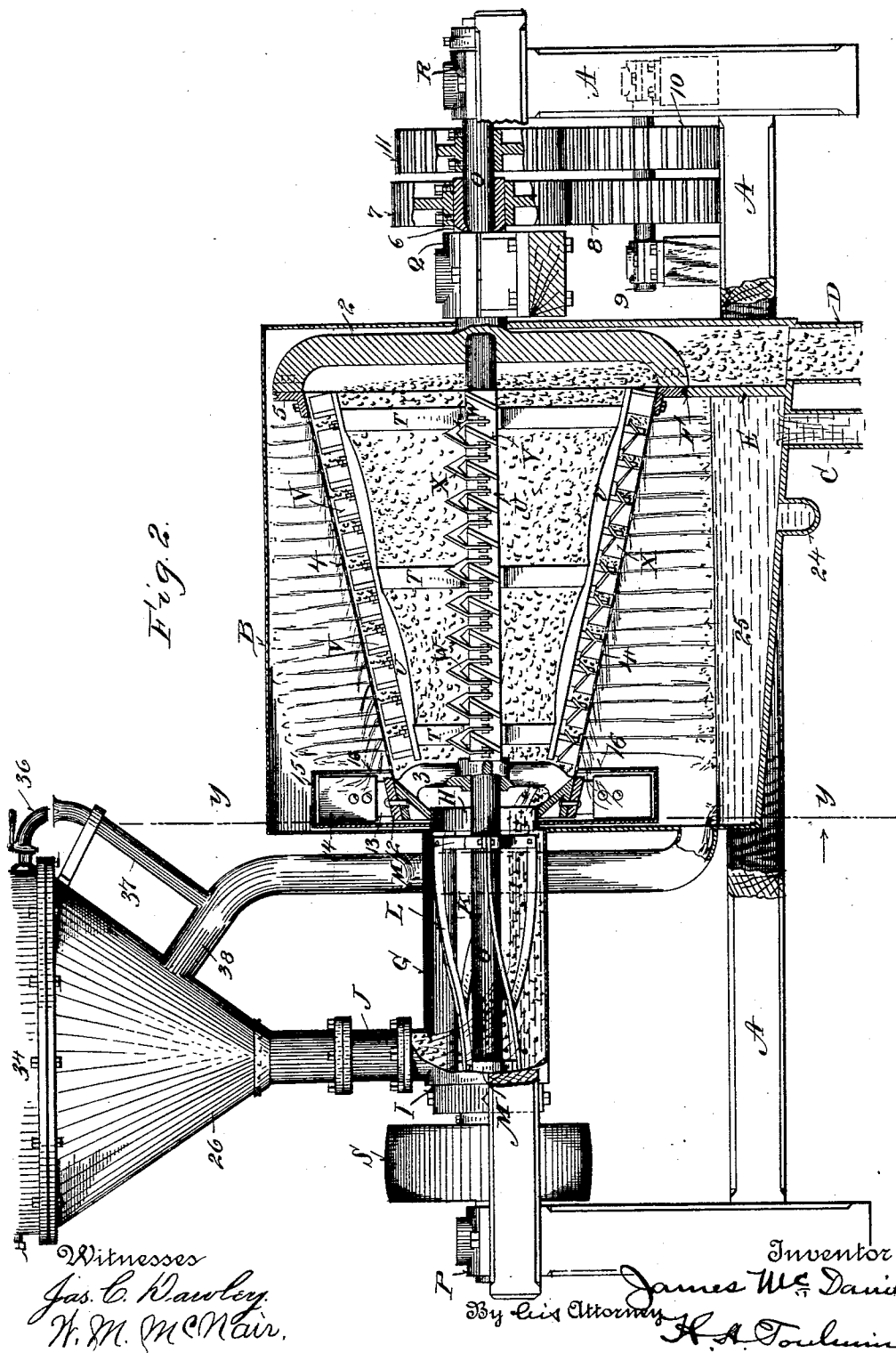
(No Model.)

3 Sheets—Sheet 2.

J. McDANIEL.
WHEAT WASHING MACHINE.

No. 573,687.

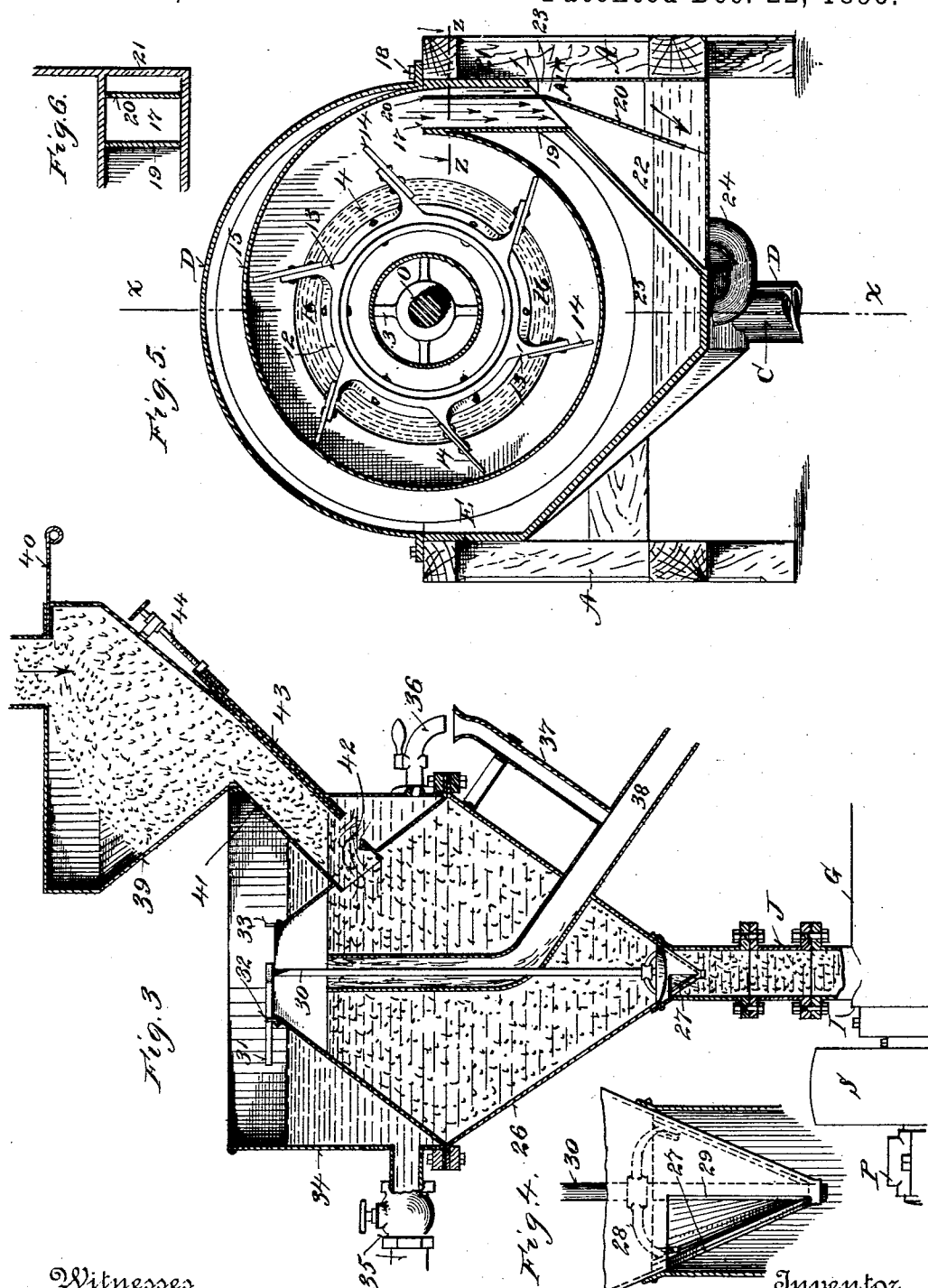
Patented Dec. 22, 1896.



J. McDANIEL.
WHEAT WASHING MACHINE.

No. 573,687.

Patented Dec. 22, 1896.



Witnesses
Jas. C. Hawley.
H. M. McNair.

Inventor
James M. Daniel,
By his Attorney,
H. A. Toulmin.

UNITED STATES PATENT OFFICE.

JAMES MCDANIEL, OF MINNEAPOLIS, MINNESOTA.

WHEAT-WASHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 573,687, dated December 22, 1896.

Application filed February 7, 1896. Serial No. 578,311. (No model.)

To all whom it may concern:

Be it known that I, JAMES MCDANIEL, a citizen of the United States, residing at Minneapolis, in the county of Hennepin and State of Minnesota, have invented certain new and useful Improvements in Wheat-Washing Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention relates to certain new and useful improvements in wheat-washing machines.

On the 29th of October, 1895, I filed in the United States Patent Office an application (designated Serial No. 567,330) for improvements in wheat-washing machines. The present invention is an improvement upon the one covered by that application. These additional improvements consist, essentially, of two things: first, a water separator and hopper for duly feeding the wheat and separating all light material therefrom, as also all matter heavier than the wheat before the grain enters the wheat-washer proper, and, second, a fan attachment to the wheat-washer proper for the purpose of drawing air through the machine in an opposite direction to that in which the wheat is discharged from the machine.

In the accompanying drawings, on which like reference letters and numerals indicate corresponding parts, Figure 1 is a plan view of my machine entire; Fig. 2, a longitudinal vertical sectional view on the line $x x$ of Fig. 1 with the water separator shown in side elevation; Fig. 3, a detail vertical sectional view of a water separator and hopper; Fig. 4, an enlarged detail view of the valve mechanism for the water separator; Fig. 5, a transverse vertical sectional view on the line $y y$ of Fig. 2, looking in the direction of the arrow; and Fig. 6, a detail sectional view on the line $z z$ of Fig. 5, showing the discharge-passages from the fan-casing.

I will first describe so much of the present machine as is like the wheat-washer embraced in my said former application, and then I will refer to the present improvements which I have added to such machine.

50 The letter A designates a stout frame constructed to form a suitable support for the machine proper. A water-tight casing B is suitably supported by the frame and provided

with a water-outlet C, a wheat-outlet D, and a partition E, the upper edge of the latter being V-shaped, as shown at F, to form a joint with an annulus carried by the revolving spiders, as hereinafter specified, to prevent the water used in washing the wheat from mixing with the wheat passing out of the casing to the spout D. A feeding and washing drum G extends from the casing B. It is open at one end, as shown at H, the opening being smaller than the drum itself to retard the discharge and closed at the other, as indicated at I, Fig. 2. A feed-pipe J conveys the water and wheat into this feeding and washing drum G. The interior of the drum at suitable intervals is provided with raised surfaces K, constituting what I term "baffles," which resist the rotary movement of the wheat and water as the same are slushed in a circular direction in the drum by the several feeding-beaters composed of spiral bars or strips L, secured to spiders M, mounted on the main shaft O, which has bearings in the main frame A at P, Q, and R. This shaft is driven by a belt-pulley S. The shaft O is further provided with three spiders T, each having four arms, which spiders carry conveyers consisting each of a bar U, having spirally-set wings or flights V, which when the shaft is revolved travel in a rotary direction within the straining-drum, presently to be referred to. These flights or wings V perform the function of feeding the wheat toward the discharge end of the drum. The centrifugal action of these conveyers also tends to rapidly discharge the water through the straining-drum, but do not act violently on the wheat. The wings are terminated a sufficient distance within the straining-drum to prevent cracking or injuring the wheat. To avoid the liability of the straining-drum to become clogged, I provide what I term "flexible wipers" (shown at W) and consisting of short arms pivoted to the bars U having rubbing or wiping surfaces X, of metal, rubber, or other suitable material. The centrifugal force causes these wipers to rub against the inside of the straining-drum and keep it wiped off clean and free from accumulations. The main shaft O also carries two drum-spiders 2 and 3, loosely mounted thereon and having secured to them a conical or tapering perforated straining-drum 4. The

spider 2 has a ring or annulus 5, with a V-shaped periphery matching the V-shaped edge of the partition E, to which it closely fits to form a joint substantially water-tight.

5 The spider 2 has a sleeve 6, on which is mounted a gear-wheel 7, meshing with a gear-wheel 8, mounted on a counter-shaft 9, also supported in bearings carried by the main frame A. The shaft 9 has also a gear-wheel 10, slightly larger in diameter than the gear-wheel 8, which gear-wheel 10 meshes with a gear-wheel 11, mounted on the main shaft O, but somewhat smaller than the gear-wheel 7.

10 Thus when the shaft O is driven by the pulley S the feeding-agitators are revolved at the speed of the shaft, and the straining-drum is revolved at a slightly-lower speed through the gears described. Thus the feeding-agitators and the straining-drum travel at differential speed, though in the same direction.

20 The effect of this is to convey the wheat through the drum and yet prevent injury to the wheat.

The operation and utility of this portion of my machine will be understood and appreciated by the following, when taken in connection with the foregoing description: As before stated, the wheat and water are fed through the pipe J into the feed-drum G, where it is thoroughly washed by the action of the feeding-beaters L and bafflers K. Passing into the straining-drum the wheat is conveyed through the drum, while the water is separated from the wheat by centrifugal force and each discharged through separate openings and pipes, and while also the interior of the straining-drum is kept free from accumulations which would tend to clog it up by the action of the yielding scrapers.

40 Referring now to that part of my additional improvement, which relates to drying the wheat as it is discharged from the machine, it will be seen that I mount on the spider 3 a fan consisting of a rim 12, fastened to the spider and having projections 13, to which are attached fan-blades 14, so that this fan revolves with the spider 3. A fan-casing 15 is placed about the fan, as seen in Figs. 2 and 5. The eye or opening 16 of the fan-casing, through which air is drawn in by the fan, is somewhat larger than the perforated drum 4 at that end of said drum. When this fan revolves, its action is to create an ingoing current of air which passes up through the wheat-discharge openings D and against the descending wheat and more or less into and through the perforated drum, moving from the larger toward the smaller end thereof. This air-current also passes over and above the partition E, which, as seen in Fig. 5, extends to about the horizontal center of the machine. Passing over this partition it draws rapidly around the outside of the perforated drum toward and into the eye 16 of the fan-casing. The discharge of air from the casing is clearly seen in Figs. 5 and 6, in which 17 and 18 are the discharge-passages, being formed by walls

19 and 20 and the part 21 of the general casing of the machine. This air-current necessarily takes up more or less moisture and the moisture or the water derived from the moisture passes, essentially, out through the passage 17 and collects in the vessel 22, while the remaining discharge from the fan, being essentially air, passes through the passage 18 and out through the air-opening 23, so much of such portion as is water dripping down also into the receptacle 22. From such receptacle this water discharges through the pipe 24 into the lower part 25 of the machine-casing, which part I may term the "sewer" of the machine. Thence the water discharges, as before stated, through the pipe C. Thus it will be seen that by my fan attachment coöperating with the other mechanism of the machine I effect an inward draft of air against the discharge of wheat and thus dry the wheat that has passed so far out of the machine as to be free of the water in the machine.

Referring now to the other feature of my additional improvements, namely, the water separator and its hopper, it will be seen that I mount this separator on the pipe J and construct it of a conical vessel 26, with an opening 27 at its lower end, at which point I fit within it a conical cut-off or valve 28, cut away at 29 to correspond with the opening 27 and controlled by a rod 30, operated by a handle 31, which, when placed against a stop 32, brings the openings opposite each other, so that a discharge may be effected, and which, when adjusted against a stop 33, closes the opening of the conical vessel 26. I mount a water-tank 34 around the upper part of the vessel 26 and supply water thereto through a cock-controlled pipe 35, providing a discharge-faucet 36, which runs into a drip-pipe 37, discharging into an overflow-pipe 38. The overflow-pipe extends to the proper level within the conical vessel, and its function is to carry off water from the conical vessel and also all light foreign matter floating on the surface of the water within the vessel, which matter is by this floating and drawing process separated from the wheat itself. A hopper 39 has a cut-off 40 to control the admission of the wheat, and a neck or extension 41, which leads through the tank 34 into the inner vessel. An opening 42 in the neck 41 is controlled by a sliding cut-off 43, operated and held by a screw 44. Water passes from the tank into the interior vessel through the opening 42, and there is a constant ingoing current due to the fact that the water in the interior vessel, which is accomplished by making the discharge through the valve-opening 27 and the discharge through the overflow-pipe such that the water cannot gain a higher level than indicated in the interior vessel. Thus it flows in constantly through the opening 42 and runs out at the level of the overflow-pipe. This current is just sufficient to prevent the wheat, due to its specific gravity relatively to that of the water, from dropping down through the

opening 42, while all substances heavier than wheat, such as small stones or sand, which frequently get into the wheat, drop out of the opening 42 and collect in the tank, from which they are readily removed, as by emptying the tank, when they can be taken out by hand. Thus by means of this water separator I first separate from the wheat foreign matter that is heavier and then separate from it foreign matter that is lighter, and while these actions are going on the wheat is being constantly fed into the washing part of the apparatus.

The apparatus here shown and described I have built and tested, and the statements here made as to the operation and effects are statements of fact so ascertained.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a wheat-washing machine, the following instrumentalities: a casing having a water and a wheat outlet, a feeding-drum, and a straining-drum in the casing, a revoluble shaft carrying feeding-beaters in the feeding-drum, and conveyers in the straining-drum, a water wheat-separator consisting of a vessel opening into the feeding-drum, a valve for said opening, a tank for water, a hopper having an opening to discharge heavy foreign matter into said tank and a lower opening to discharge wheat into said vessel, said vessel having an overflow for light foreign matter.

2. In a wheat-washing machine, the following instrumentalities: a casing having a wheat and a water discharge opening, a straining-drum in the casing, a feeding-drum discharging into the straining-drum, a revoluble shaft having conveyers within the straining-drum and feeding devices in the feeding-drum, a fan-casing and its fan near the feed end of the straining-drum, said fan being rotated by said shaft and producing ingoing air-currents through the wheat-outlet and against the discharging wheat, a water wheat-separator consisting of a vessel opening into the feeding-drum, a valve for said vessel, a water tank or supply for said vessel, a hopper having a foreign-matter-discharge opening into said water-supply, and a wheat-discharge opening into said vessel, and an overflow-pipe for said vessel for light foreign matter.

3. The combination with a vessel for wheat and water, provided with a valve-controlled discharge, of a tank or water-supply for said vessel, and a hopper or grain-supply for said vessel, the hopper or grain-supply having an upper opening to discharge heavy foreign matter and a lower opening to discharge wheat into said vessel and said vessel having an overflow to discharge light foreign matter.

4. The combination with a wheat and water vessel having a valve-controlled discharge, a tank or water-supply for said vessel, and a hopper or grain-supply for said vessel, the water feeding into said vessel through an extension of the hopper or grain-supply with an ingoing current, such water-opening being also the discharge for heavy foreign matter, and an overflow-pipe for said vessel terminating below the water-level in the supply so as to induce such ingoing current and to carry off light foreign matter.

5. The combination with a conical vessel with an opening 27 and a conical valve 29 having an operating-rod and handle, an overflow-pipe 38, a water-tank 34, a hopper 39 with an opening 42 and a valve 43, said elements operating as described for the purpose set forth.

6. In a wheat-washing machine, the combination with a casing having a wheat and a water discharge opening, a feeding-drum, a straining-drum within the casing with its smaller end receiving grain from the feeding-drum, a revoluble shaft within said drums, feeding-beaters on said shaft within the feeding-drum, and conveyers on said shaft within said straining-drum, a fan-casing with its fan within the main casing and operating to produce an indrawn current through the wheat-discharge opening into the main casing, said fan being revolved by said shaft, whereby in one continuous operation the wheat is fed, is washed and conveyed, is discharged and is dried.

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

JAMES McDANIEL.

Witnesses:

JAMES D. O'BRIEN,
T. C. ESTEE.