(No Model.) 3 Sheets—Sheet 1.

J. F. McQUAIDE.

TUMBLER WASHER.

No. 386,256. Patented July 17, 1888.

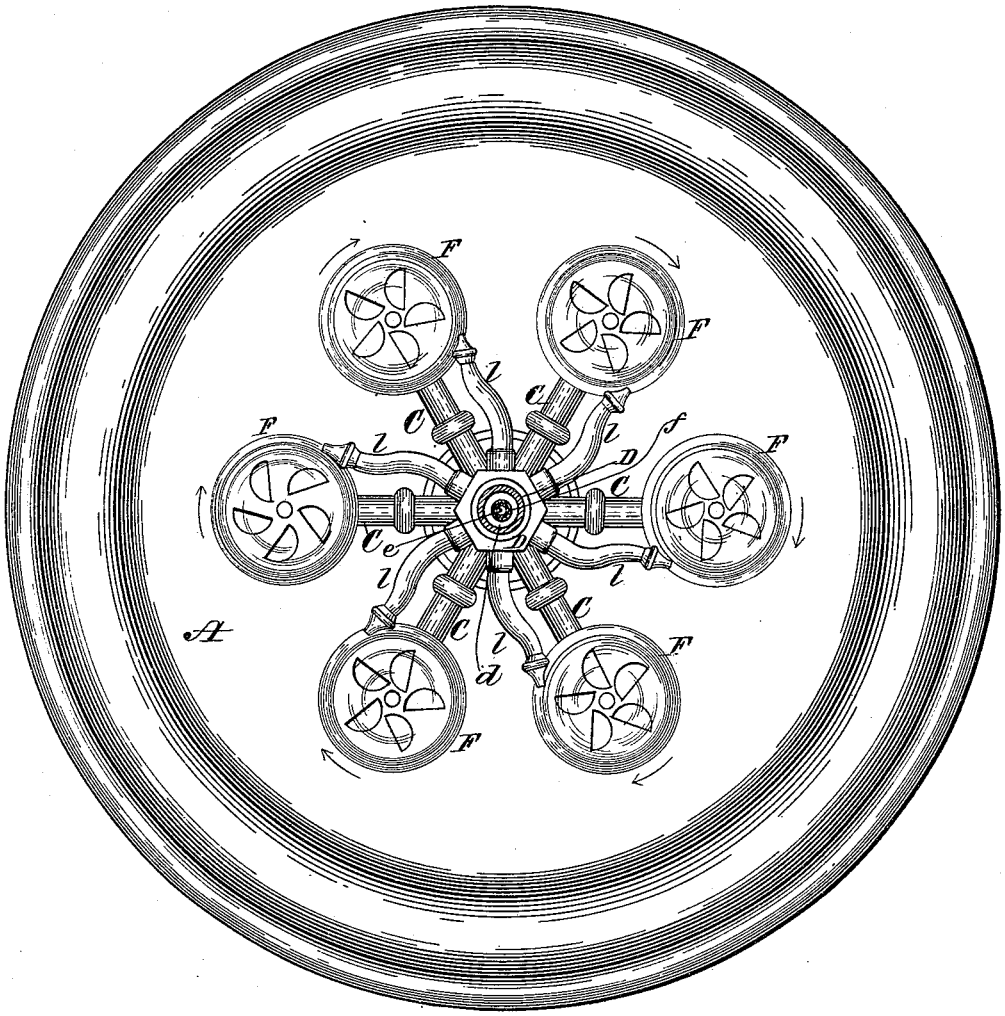

Fig. 1.

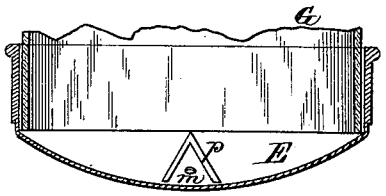

Fig. 9.

WITNESSES.

H. W. Aiken.

F. V. Hayden.

INVENTOR.

John F. McQuaide.

By F. C. Teschemacher.

Atty

(No Model.) 3 Sheets—Sheet 2.

J. F. McQUAIDE.

TUMBLER WASHER.

No. 386,256. Patented July 17, 1888.

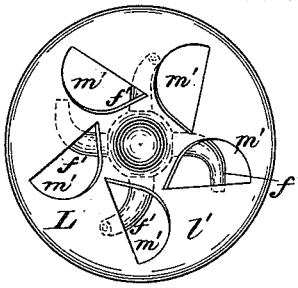

Fig. 5.

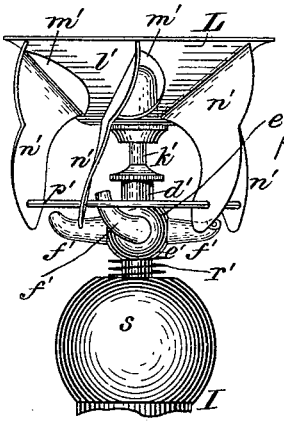

Fig. 4.

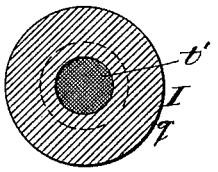

Fig. 10.

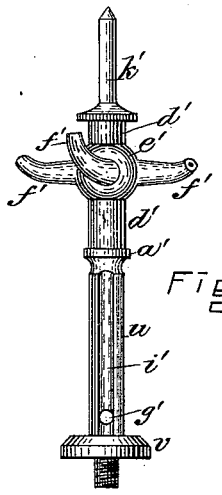

Fig. 6.

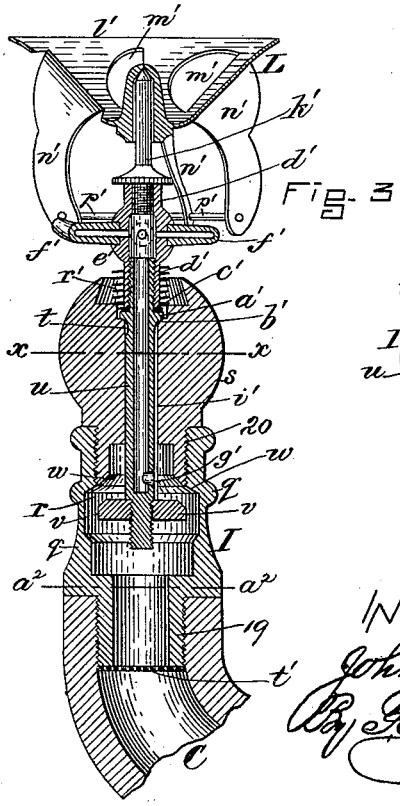

Fig. 3.

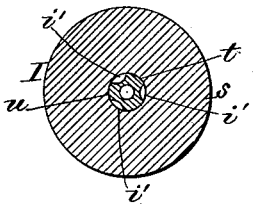

Fig. 7.

WITNESSES.

H. W. Aiken.

F. F. Hayden.

INVENTOR.

John F. McQuaide.

By F. Teschemacher

Atty.

(No Model.) 3 Sheets—Sheet 3.

J. F. McQUAIDE.

TUMBLER WASHER.

No. 386,256. Patented July 17, 1888.

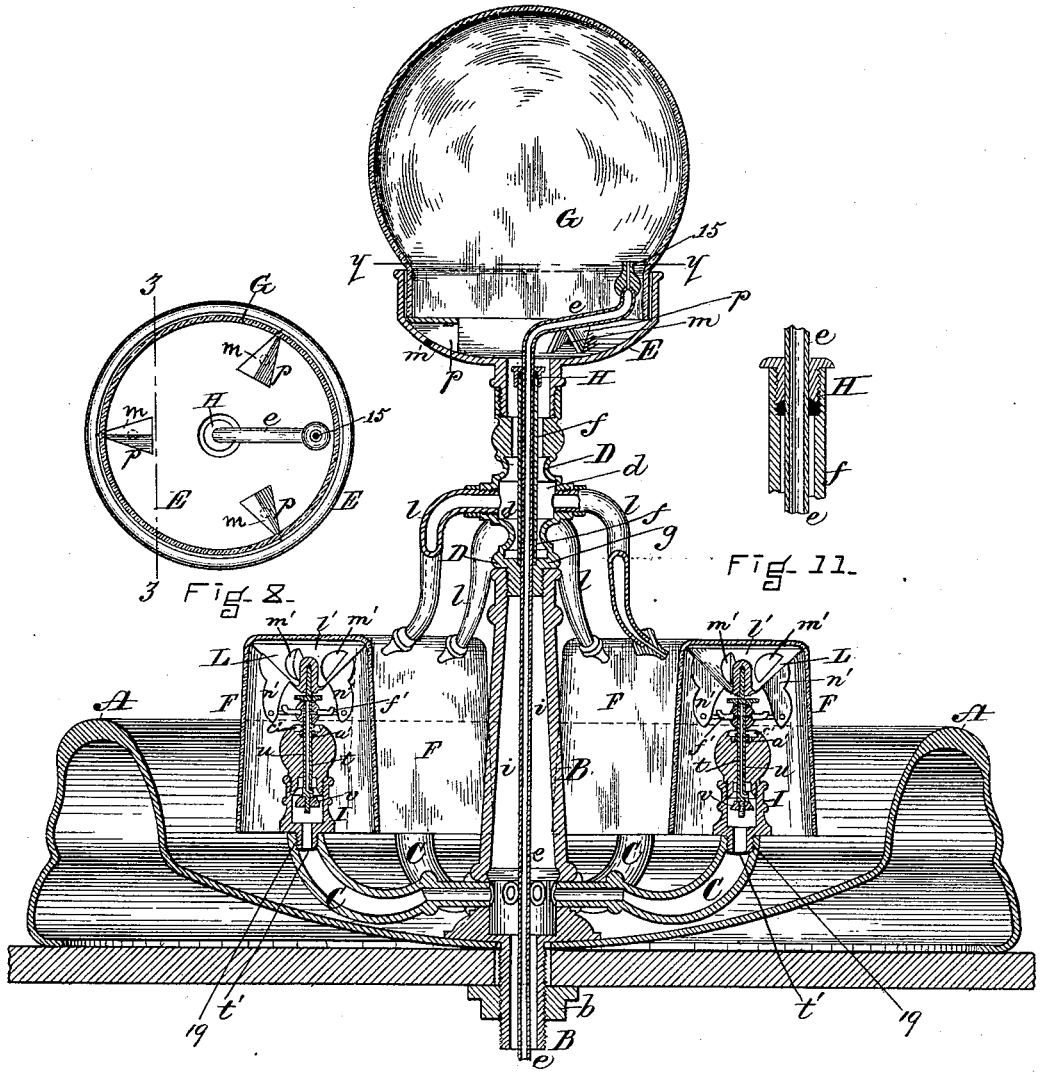

Fig. 2.

Fig. 8.

Fig. 11.

WITNESSES.

H. W. Aiken.

F. V. Hayden.

INVENTOR.

John F. McQuaide.

By F. E. Teschemacher

Atty

UNITED STATES PATENT OFFICE.

JOHN F. McQUAIDE, OF SOMERVILLE, ASSIGNOR TO JAMES W. TUFTS, OF MEDFORD, MASSACHUSETTS.

TUMBLER-WASHER.

SPECIFICATION forming part of Letters Patent No. 386,256, dated July 17, 1888.

Application filed December 12, 1887. Serial No. 257,729. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. McQUAIDE, a citizen of the United States, residing at Somerville, in the county of Middlesex and State of Massachusetts, have invented certain Improvements in Tumbler-Washers, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a sectional plan of a tumbler-washer constructed in accordance with my invention. Fig. 2 is a vertical section through the center of the same. Fig. 3 is an enlarged vertical section through one of the tumbler supporting and washing devices and the valve mechanism connected therewith. Fig. 4 is a side elevation of a portion of the same. Fig. 5 is a plan of the rotating support or turbine wheel upon which the tumbler is placed while being washed. Fig. 6 is an elevation of the valve-spindle and its water-jet attachment. Fig. 7 is a horizontal section on the line *x x* of Fig. 3. Fig. 8 is a horizontal section on the line *y y* of Fig. 2. Fig. 9 is an enlarged vertical section on the line *z z* of Fig. 8. Fig. 10 is a section on the line a^2 a^2 of Fig. 3. Fig. 11 is a sectional detail showing a stuffing-box of different construction to that shown in Fig. 2.

My invention relates to certain improvements in tumbler-washers, and has for its object to improve the construction and remedy certain defects and disadvantages hitherto existing in apparatus of this description.

To this end my invention consists in certain novel combinations of parts and details of construction, as hereinafter set forth and specifically claimed.

In the said drawings, A represents a circular basin forming the lower portion of the apparatus, from the center of which rises the main tubular standard B, secured in place by a suitable clamping-nut, *b*, the pipe through which the water under pressure is furnished to the apparatus being coupled in the usual manner to the lower end of the standard B. From this standard B, near its bottom, project the radial branch pipes C, which communicate with its interior and are curved upward at their outer ends, to which are fitted the tumbler washing and supporting devices, to be hereinafter described.

Within the upper end of the standard B is screwed a hollow casing, D, a portion of the interior of which is enlarged to form a chamber or reservoir, *d*, Fig. 2, and to the upper end of this casing D is screwed the basin or receiver E, within which fits the removable glass globe or dome G, against the interior of which a jet of water is forcibly projected from the nozzle 15 of a pipe, *e*, in order to attract attention in a well-known manner by the noise thereby produced.

f is a sleeve or pipe, the lower end of which is fitted into the bottom *g* of the casing D in such a manner as to form a tight joint and shut off communication between the chamber *d* and the interior of the hollow standard B, and through this sleeve *f* passes the small jet-pipe *e*, which also extends down through the interior of the standard B, beneath which it is coupled to the water-supply pipe, (not shown,) said pipe *e* being provided with an independent stop-cock, (not shown,) whereby the water can be shut off when it is not desired to operate this part of the apparatus.

At the top of the pipe *f* is a stuffing-box, H, through which the pipe *e* passes, the stuffing-box being made of either of the forms shown in Figs. 2 and 11, as preferred, an air-tight joint being thus produced at this point, which prevents any escape of air from the top of the hollow standard B, whereby an air-chamber, *i*, Fig. 2, is formed within said standard, for a purpose to be hereinafter described.

Around the sides of the casing D, and communicating with the chamber *d*, are formed a series of threaded apertures corresponding in number and location to the branch pipes C, and into these apertures are screwed a series of curved jet-pipes, *l*, through the nozzles at the ends of which is discharged the waste water, which flows from the basin or receiver E down through the upper open end of the casing D into the chamber *d*. The water from the jet-pipe *e*, which has expended its force against the inside of the dome and has fallen into the basin E and thence into the chamber *d*, is discharged from the nozzles of the pipes *l* against

the exterior of the tumblers F with very little force, and consequently the spattering of the water therefrom and the slopping of the same beyond the lower basin, A, onto the counter and other surrounding objects, as is liable to occur when these jet-pipes are supplied with water under the usual pressure, are entirely avoided. The jet-pipes *l* are preferably curved and arranged to discharge the water against the exterior of the tumblers in a direction contrary to that in which they are revolving, in order that the friction of the counter-current may the more readily cleanse the tumblers, this being possible without retarding their motion to any appreciable extent, owing to the slight force with which the water is discharged; but the pipes *l* may be arranged to discharge the water tangentially against the tumblers in the same direction in which they are rotating, if desired.

In the bottom of the basin or receiver E are formed overflow-openings *m*, Figs. 2 and 9, through which the water escapes and drops into the lower basin, A, if it should rise above the desired level. Over each of these openings *m* is placed a guard or shield, *p*, having the form of a gable-roof, through the open end of which the water is free to flow to the opening *m* when it rises to the level thereof, while the shield *p* prevents the water which is constantly falling from the top of the dome G from dropping directly into the apertures *m* and leaking or dripping through the same, as would be the case if the apertures were left open and unprotected. Furthermore, the upper portions or tops of the shields *p* form knife-edges upon which the lower edge of the glass dome G rests, as seen in Fig. 9, whereby it is supported at a few points only instead of around its entire edge, and an increased vibration of the glass when struck by the water-jet is thus permitted, resulting in a louder noise, as is desirable to attract attention.

Within the outer end of each of the branch pipes C is screwed the nipple 19, Figs. 2 and 3, of a valve casing or box, I, composed of a lower portion, *q*, having a valve-chamber, *r*, and an upper solid portion, *s*, preferably of spherical form, screwed into the portion *q* at 20, and having a straight vertical passage, *t*, which forms a guide for the valve stem or spindle *u*, which carries at its lower end a valve, *v*, fitting the seat *w*, and near its upper end another valve, *a'*, fitting the seat *b'* at the bottom of a chamber, *c'*, formed by enlarging the upper portion of the passage *t*. The valve-stem *u* is hollow, and is closed at its lower end and open at its upper end, to which is screwed a short tube, *d'*, having at its upper end a spherical enlargement or bulb, *e'*, from which extend a series of short curved jet-pipes, *f'*. The valve-stem *u* is provided on its side just above the lower valve, *v*, with an aperture, *g'*, Figs. 3 and 6, through which the water passes to its hollow interior when the lower valve, *v*, is open, and thence to the jet-pipes *f'*. Any suitable number of these jet-pipes may be employed, and a portion of them are arranged to discharge the water in a horizontal direction, while the others are curved to discharge the water in a vertical or nearly vertical direction, the water being discharged from all of these horizontal jet-pipes in the same direction as that in which the tumbler is revolving. The exterior of the valve-stem *u* is provided with a series of longitudinal grooves or channels, *i'*, as seen in Figs. 3, 6, and 7, extending from the lower valve, *v*, to the upper valve, *a'*, so that when the valve *a'* is raised by an increased pressure of the water on the under side of the lower valve, *v*, the water will flow up through these grooves *i'* and pass by the valve *a'* into the chamber *c'*, from the top of which it is discharged.

To the closed top of the tube *d'* is secured a pin, *k'*, of hard metal, having a conical center point or apex, upon which rests a turbine water-wheel, L, having a hardened center which fits over the point of the pin *k'*, upon which the wheel rotates freely. This wheel consists of an upper cup or funnel shaped portion, *l'*, which forms a steady support for the inverted tumbler which is placed thereon, as seen in Figs. 1 and 2.

The portion *l'* is provided with a number of large apertures, *m'*, through which the water discharged from the vertical or nearly vertical jet-tubes *f'* passes into contact with the interior of the tumbler to cleanse the same. To the outside of the portion *l'* of the wheel L are secured a series of curved fans or buckets, *n'*, which extend downward and are stiffened and prevented from being bent out of place by a ring or wire, *p'*, passing through and soldered to each fan. The streams of water discharged from the horizontal jet-pipes *f'* impinge against the fans *n'*, and thus serve to rapidly rotate the wheel L and the tumbler placed thereon, the water from the horizontal jet-pipes striking the fans *n'* at or nearly at a right angle, and the streams from these pipes, as the fans are carried out of their range, also strike the interior of the tumbler itself in the direction of its motion, thereby assisting in rotating the same, while the streams from the vertical or nearly vertical jet pipe or pipes alternately strike the fans and pass through the apertures *m'* into direct contact with the bottom of the tumbler which rests on the wheel L, the water being thus brought into contact with all portions of the interior of the tumbler, thereby thoroughly cleansing it, as required.

The valve *v*, through which the water is admitted to the jet-pipes, is so arranged that the action of the water, assisted by a light spiral spring, *r'*, placed within the chamber *c'*, will close it when not held open by the weight of the tumbler on the valve-spindle *u*.

I will now describe the operation of the relief-valve *a'*.

When one or more tumblers are taken off the apparatus for use, the pressure of the water in the branch pipes C of the remaining tumblers becomes excessive, and is sufficient, by reason

of the additional upward pressure on the under side of their valves *v*, to raise the same against the weight of the tumblers upon their valve-spindles. This raising of the valve *v* causes the valve *a'* to rise from its seat, when the water will instantly flow up through the grooves or channels *i'* on the outside of the valve-stem *u* and into the chamber *c'*, from which it is discharged against the water-wheel L and the interior of the tumbler at or about a right angle with the direction of its motion, which causes it to check the velocity of the tumbler and prevent it from revolving too rapidly.

It will be obvious from the foregoing that whenever the pressure of the water in the branch pipes C is increased from any cause whatever—such as the removal of one or more tumblers from the apparatus, or a sudden increase of pressure in the main supply-pipe—the valve *a'* affords instant relief automatically by opening an additional outlet for the water, which is not wasted, as in other relief-valves hitherto applied to apparatus of this description, but is utilized to assist in washing the tumbler, and also to check any increase in its velocity; and I am thus enabled to effectually prevent the water from being thrown off the exterior of the glasses by centrifugal force and slopped or spattered over the counter, floor, or surrounding objects, while no adjustment whatever of the relief-valve is required for varying pressures, as heretofore, it being always ready to act whenever the pressure increases beyond the desired degree, while it is automatically returned to its seat whenever the normal pressure of the water is restored.

As the water enters the bottom of the hollow standard B and flows thence into the branch pipes C, it rises within the air-chamber *i* and compresses the air in the upper part of the same, forming an elastic cushion, which enables the valves *v* to be depressed with less force, and consequently they are more easily and surely opened by the weight of the tumblers acting on their valve-stems than would be the case if opened against the solid pressure of the water in the supply-pipe, while when a valve *v* is suddenly closed on the removal of a tumbler from the support connected therewith the elasticity of the air in the chamber *i* prevents the sudden and unpleasant jar or concussion which would otherwise occur and the consequent liability of injury to the apparatus.

Each of the valve-casings I has secured to the bottom of its threaded nipple 19 an independent strainer, *t'*, formed of a circular piece of wire-gauze or other suitable material best adapted to prevent the passage of impurities contained in the water, which would clog or obstruct the apparatus.

Hitherto a single strainer for the entire apparatus has been placed in the main water-passage, from which all the branch pipes are supplied, and as the clogging of this strainer—an event of frequent occurrence—caused the stoppage of the entire machine much time was wasted in taking apart and cleansing the strainer, while the putting together and readjusting of the parts required a degree of skill not generally possessed by the owner of the apparatus, and on this account it was often found to be out of order. These serious objections are entirely overcome by providing each separate valve mechanism with a separate and independent strainer, *t'*, as above described, which, by reason of its location and attachment to the bottom of the valve-casing I, can be instantly removed from its position within its branch pipe by simply unscrewing and removing the valve-casing, when it can be readily cleansed and returned to its place without disorganizing the machine or requiring any readjustment of the parts beyond the mere screwing of the nipple 19 of the valve-casing into the end of the pipe C; and it is obvious that by this construction the further important advantage is gained of having each strainer independent of the others, so that the clogging of one strainer only effects one tumbler-washing valve instead of the entire number, as heretofore, whereby much time is saved and much annoyance avoided.

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

1. In a tumbler-washer, the combination, with the standard B, of the independent chamber *d*, closed at its bottom and having an inlet-opening at its top, whereby it is adapted to receive the waste water flowing back after its discharge from the jet-pipe *e*, and a series of jet-pipes, *l*, connected with the chamber *d* and adapted to discharge the waste water from the jet-pipe *e* upon the exterior of the inverted tumblers when placed upon their supports, substantially in the manner and for the purpose set forth.

2. In a tumbler-washer, the combination of the standard B, the independent chamber *d*, having the sleeve or pipe *f* extending up through the same, the jet-pipe *e*, passing up through the sleeve *f*, the stuffing-box H on the sleeve *f*, the receiver E, dome G, and jet-pipes *l*, connected with the chamber *d* and adapted to discharge the waste water from the jet-pipe *e* upon the exterior of the tumblers, substantially as and for the purpose set forth.

3. In a tumbler-washer, the combination, with the dome G and basin or receiver E, having the waste-water openings *m*, of the guards or shields *p*, placed over said openings, and having knife-edges at their tops forming rests for supporting the lower edge of the dome, whereby the maximum vibration of the latter when struck by the water is produced, substantially as described.

4. In a tumbler-washer, the combination, with the valve-casing and valve-spindle of the tumbler-washing device, of a relief-valve placed within said valve-casing and closing an outlet-aperture therein, through which the water may escape when said relief-valve is raised, whereby an additional outlet is afforded,

through which the water is discharged against the interior of the tumbler, substantially as set forth.

5. In a tumbler-washer, the combination, with the valve-casing I, having the valve-seats *w* and *b'*, of the tubular valve-spindle *u*, carrying the main valve *v* and relief-valve *a'* and having the aperture *g'* above the valve *v*, communicating with its interior and provided on its exterior surface with grooves or channels *i'* for the passage of the water to the relief-valve, whereby an additional outlet is afforded for the water when the pressure of the same is increased, substantially as and for the purpose set forth.

6. In a tumbler-washer, the combination of the valve-casing I, tubular valve-spindle *u*, carrying the valve *v* and having an opening, *g'*, above said valve leading to its interior, the tube *d'*, with its jet pipes *f'*, the spring *r'*, and a tumbler-supporting device rotating upon a pin or point at the top of the tube *d'*, all operating substantially in the manner and for the purpose set forth.

7. In a tumbler-washer, the combination, with the valve-casing I, tubular valve-spindle *u*, carrying the valve *v* and having an opening, *g'*, above said valve, and the tube *d'*, with its jet-pipes *f'*, of the tumbler-supporting water-wheel L, rotating upon a vertical pin or point projecting from the top of the tube *d'* and having the apertures *m'* in its top and the downwardly-projecting fans or buckets *n'* on its sides, all constructed and arranged to operate substantially as set forth.

8. In a tumbler-washer, the combination, with the standard B, branch pipes C, and the valves of the tumbler-washing devices connected with the said branch pipes, of an air-chamber common to all of said branch pipes, whereby the force required to open said valves is diminished, substantially as set forth.

Witness my hand this 9th day of December, A. D. 1887.

JOHN F. McQUAIDE.

In presence of—

P. E. TESCHEMACHER,

H. W. AIKEN.