

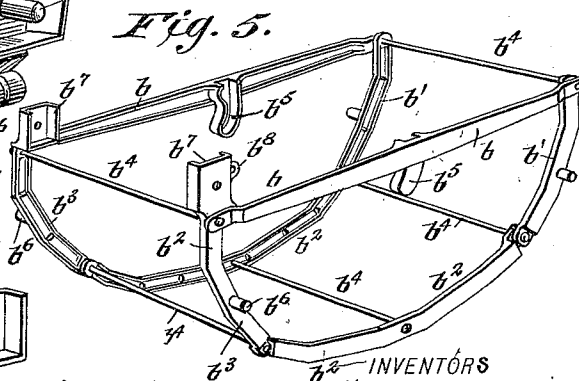
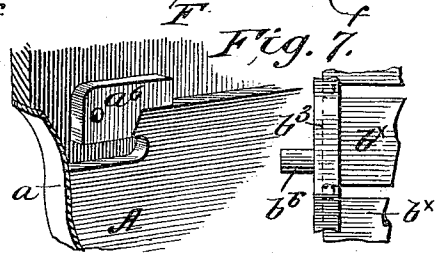
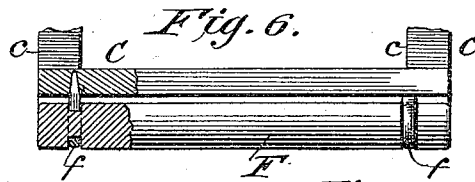
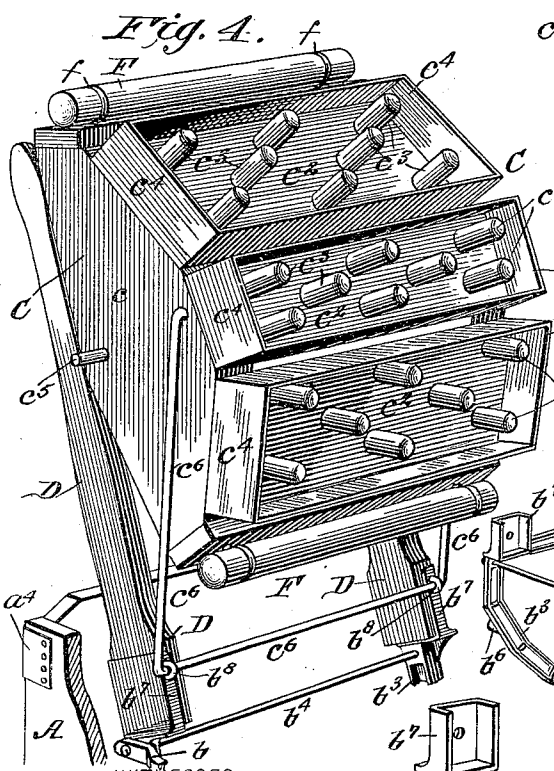
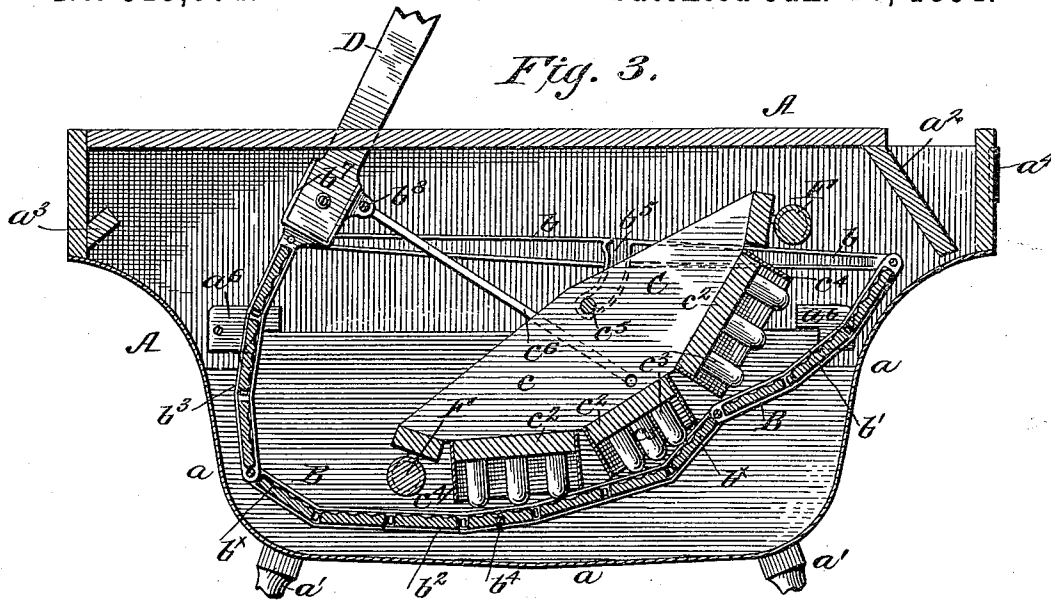
(No Model.)

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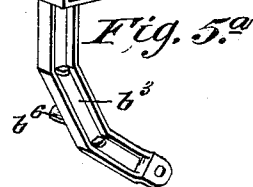
C. M. COATS & J. L. SPRAGUE.
WASHING MACHINE.

No. 513,004.

Patented Jan. 16, 1894.



WITNESSES:
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UNITED STATES PATENT OFFICE.

CHARLES M. COATS, OF AURORA, ILLINOIS, AND JAMES L. SPRAGUE, OF MINNEAPOLIS, MINNESOTA; SAID SPRAGUE ASSIGNOR TO SAID COATS.

WASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 513,004, dated January 16, 1894.

Application filed November 4, 1893. Serial No. 490,016. (No model.) Patented in Canada August 5, 1893, No. 43,838.

To all whom it may concern:

Be it known that we, CHARLES M. COATS, of Aurora, in the county of Kane and State of Illinois, and JAMES L. SPRAGUE, of Minneapolis, in the county of Hennepin and State of Minnesota, have invented a new and Improved Washing-Machine, (patented in the Dominion of Canada August 5, 1893, No. 43,838,) of which the following is a full and exact specification.

Our invention is an improvement in that class of washing machines, in which a swinging rubber is suspended and reciprocated within a suds-box; and it includes certain novel features in the construction and arrangement of certain parts, as hereinafter set forth.

In the accompanying drawings—Figure 1 is a perspective view of our machine. Fig. 2 is a central, vertical, longitudinal section of the same. Fig. 3 is a similar section illustrating the operation of the machine. Fig. 4 is a perspective view of the combined rubber and air-chamber in the position it occupies when raised out of the "cage," or clothes receptacle, and resting against the levers. Fig. 5 is a perspective view of the skeleton, metal frame of the "cage," or clothes receptacle. Fig. 5^a is a perspective view of a portion of such frame. Fig. 6 is an end view—partly broken—illustrating the attachment of the roller to the combined rubber and air-chamber. Fig. 7 is a detail perspective view showing separately a trunnion of the "cage," and a socket therefor.

The oblong suds-box, A, is constructed with wooden sides and a galvanized-iron bottom, *a*, and supported by legs, *a'*.

Inclined boards *a*², *a*³, (Fig. 2,) prevent the suds splashing out when the machine is operated, and the end of the box, A, to which the wringer is attached, in practice, is strengthened by metal clamps *a*⁴.

The combined rubber and air-chamber, C, is pivotally suspended in and reciprocates with a "cage," or clothes-receptacle, B. The skeleton metal frame of the latter (see Fig. 5) is composed of pairs of internally grooved bars *b* *b'*, *b*² *b*^{2'}, *b*³ *b*^{3'}, and four transverse tie rods, *b*⁴, which also joint the pairs of bars together, as shown. Wooden handles, or levers, D, D, are clamped in sockets, *b*⁵, formed

at one end of bars *b*, *b*. Said sockets have eyes, *b*⁸, that support a bent rod, *b*⁶, whose ends are pivoted to the sides of the rubber, C. The latter has lateral pivots, or trunnions, that rest detachably in sockets, *b*⁵, formed integrally with bars *b* *b* of "cage" B.

The "cage" is suspended by its trunnions *b*⁶, in shouldered sockets *b*⁵ (see Figs. 3 and 7) formed in the inner sides of the suds-box A. The said sockets open upward and rearward, there being a rearward projection on the upper side which forms a shoulder that holds the trunnions in place, that is to say prevents them from vertical displacement.

Pivoted blocks, *a*⁶, are arranged to close the upper sides of the trunnion sockets and fill the space between the side bars *b'* *b*² of the cage B, and the adjacent sides of the suds-box, thus serving to prevent the clothes entering such spaces by which they would be liable to injurious abrasion.

The combined rubber and air-chamber, C, is constructed as follows:—The body of the same is composed of parallel wooden side bars, *c*, and a series of transverse boards or flat wooden pieces, *c*², which form the slightly convex bottom of the rubber. Each of said boards or pieces *c*², is provided with a series of blunted or round-pointed pins *c*³, which project and form a rubbing surface; and a narrow metal plate or strip, *c*⁴, is also attached to the four sides of each board, *c*², by means of screws or analogous devices. This strip, *c*⁴, is continuous and projects downward some two inches from the face of the board, thus surrounding the pins and forming a cup-like air-chamber of rectangular shape. The trunnions, *c*⁵, attached to the sides of the rubber, C, enter the pendent grooved sockets, *b*⁵, of the upper connecting bars, *b*, of the clothes receptacle or "cage," as before described.

To produce and govern the oscillation of the rubber, it is connected with the levers by means of the bent rod, *c*⁶, which passes through the eyes of the lever sockets as before stated. A roller, F, is affixed to each end of the rubber, C, and, as a means of fastening them thereto, yet permitting their free rotation without preventing their endwise extension to the full width of the rubber, C, we employ staples *f* which are clasped around the roll-

ers in circumferential grooves as shown, so that they are flush with the surface of the rollers.

The operation of our improved machine is as follows:—A suitable quantity of hot water is poured into the suds-box. It is understood that soap or other detergent is also supplied in due quantity. The rubber and air-chamber, C, being raised and thrown back in the position shown by full lines in Fig. 4, the clothes to be washed are placed in the "cage" or receptacle, B, and the rubber C, lowered to its normal or working place, as shown in Fig. 2. The operator then vibrates the handles or levers D, which oscillates the cage, B, and rubber, C, simultaneously, in the same direction, or endwise. That is to say, the forward throw of the levers causes them to assume the position shown in Fig. 3, and, upon the reverse movement of the levers, they reach the same relative position in the opposite direction. The rubber has however not merely a reciprocating movement with the "cage," but an independent vertical oscillation by reason of its connection with the levers and "cage" through the medium of the rod c^6 . In other words, at each movement of the "cage," the rubber, C, goes with it and at the same time turns on its pivots c^5 and thus approaches close to the corrugated bottom of the "cage," which rises at one point to meet it—as shown in Fig. 3—but the end of the rubber also is raised quickly upward, so that it rubs against the clothes and presses them against the ends of the cage. Practical experience has demonstrated that the clothes tend to work upward at each end of the cage, and to restrain them within certain limits. We employ the roller F, which as before described is held but adapted to rotate in bearings at each end of the rubber C. Said roller not only obviates undue sliding friction with the clothes, but lessens wear, while exerting due pressure, and reducing to a considerable degree the manual force required to work the machine. It is obvious that in the entire movement of the rubber, C, the blunted pins c^3 rub and press the clothes on one side and gradually turn them over so that they are well scrubbed. But the most important function of and effect produced by

the device, C, remains to be stated, namely: as it rises at each end of its oscillatory movement, a cup or air-chamber c^4 is exposed above the suds, and, as the rubber recedes, a quantity of air becomes confined in the same. The rubber being carried farther down and pressed upon the clothes with considerable force, such confined body of air is correspondingly compressed, and, reacting by its own elastic property, it forces outward or expels from the cup or air-chamber the suds received into it, and, the cup being in contact with the clothes, such body of suds is forced into and through the clothes. Thus the clothes are constantly and simultaneously subjected to three operations, namely: rubbing or friction, squeezing or pressing, and the passage of currents of mingled water and air, and thus the desired result, to-wit: the cleaning of the clothes, is attained in a minimum time, with minimum labor and wear of the clothes.

What we claim is—

1. The combination with the oscillating "cage" or clothes receptacle, of an oscillating rubber and air-chamber composed of a frame having its under side formed of boards or wooden pieces provided with rubbing pins and metal strips which are attached to said pieces around the pins and project downward, as shown and described.

2. The combined rubber and air-chamber, for use in a washing machine, the same consisting of a frame having its under side formed of boards or pieces provided with projections to form rubbing surfaces, and a metal strip attached to and pendent from said pieces, to form the air holder, as shown and described.

3. In a washing machine of the class specified, the combination with an oscillating clothes-receptacle composed of a jointed frame and corrugated rubbing boards forming its bottom and ends, of the combined rubber and air-chamber pivoted in said cage, and means for oscillating it, as shown and described.

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Witnesses:

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