

(No Model.)

2 Sheets—Sheet 1.

D. H. BENJAMIN.
STARCHING MACHINE.

No. 561,154.

Patented June 2, 1896.

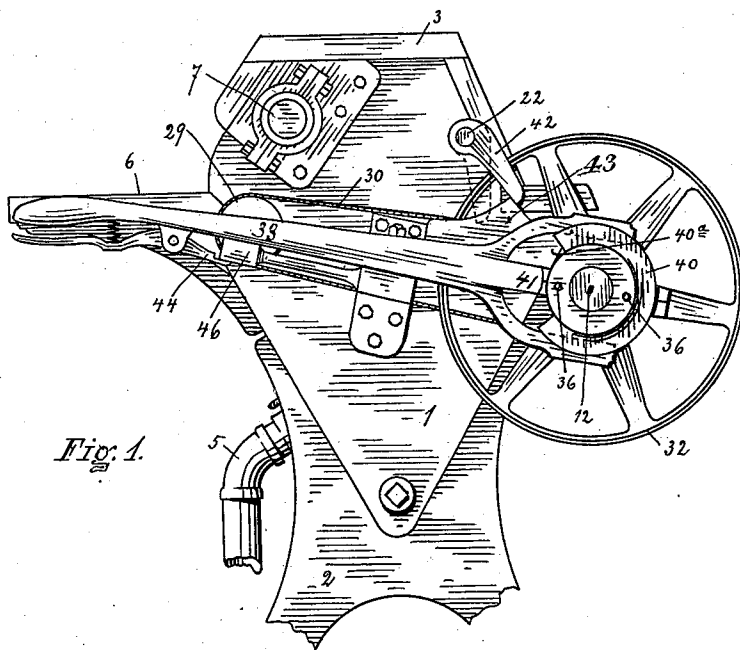


Fig. 1.

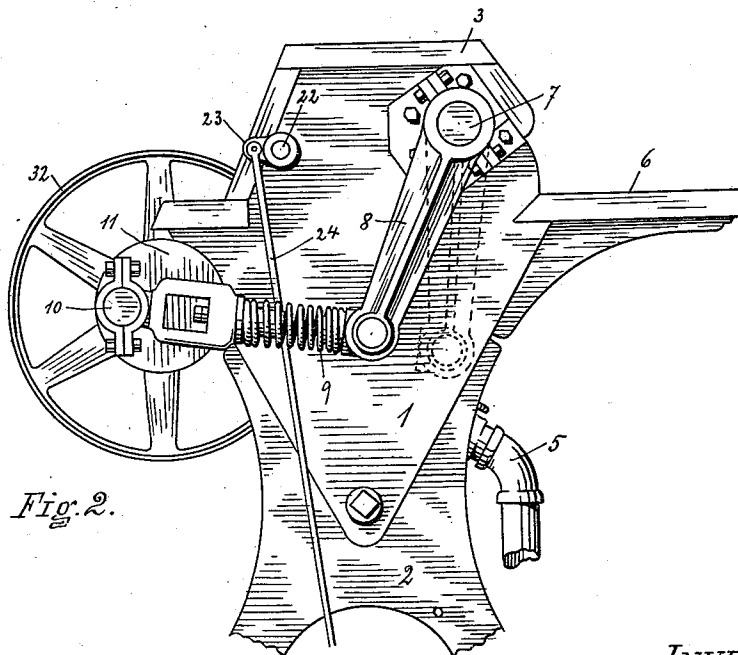


Fig. 2.

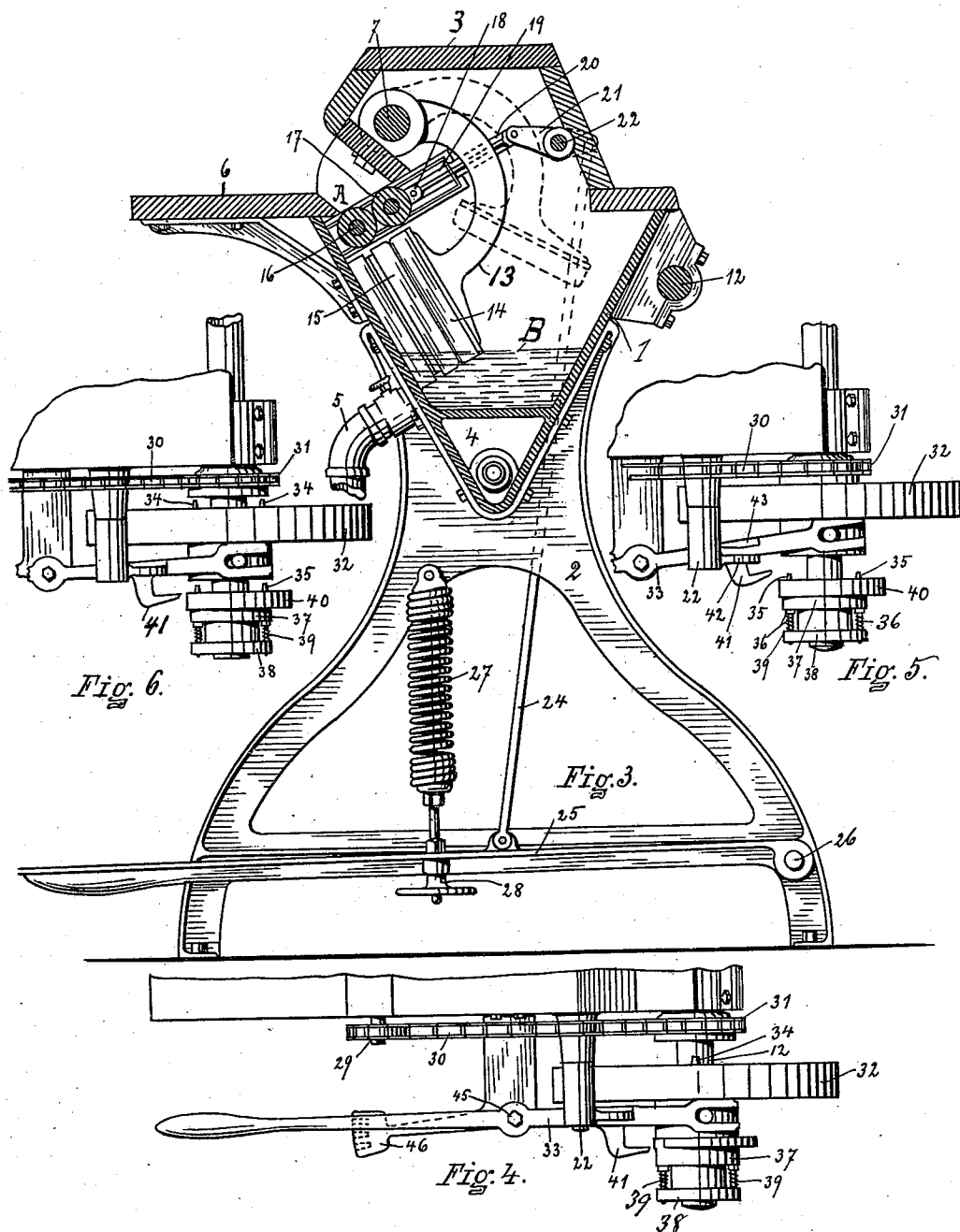
WITNESSES.
Rich. A. George.
A. Gaymonds

INVENTOR.
DANA HOWARD BENJAMIN
BY Kirley, Robinson & Love
ATTORNEYS.

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UNITED STATES PATENT OFFICE.

DANA HOWARD BENJAMIN, OF UTICA, NEW YORK.

STARCHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 561,154, dated June 2, 1896.

Application filed September 17, 1894. Serial No. 523,307. (No model.)

To all whom it may concern:

Be it known that I, DANA HOWARD BENJAMIN, of Utica, in the county of Oneida and State of New York, have invented certain new and useful Improvements in Starching-Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form part of this specification.

My invention relates to an improvement in starching-machines.

In the drawings which accompany and form a part of this specification, and in which similar letters and figures of reference refer to corresponding parts in the several views, Figure 1 shows the right-hand end of the machine, a portion of the supporting legs or frame being removed. Fig. 2 shows the left-hand end of the machine. Fig. 3 shows a vertical section of the body of the machine in connection with one of the pairs of legs or portion of the supporting-frame. Fig. 4 is a plan view of the driving mechanism and particularly a clutch and safety appliances. Fig. 5 shows substantially the same as Fig. 4 in a different position. Fig. 6 shows the same as Fig. 5 in the out-of-gear position.

The machine consists, essentially, of a tank-like body 1, preferably of a substantially V shape, mounted on supporting legs or frame 2 and provided with a removable cover 3. The bottom of the tank is provided with a separate steam-chamber 4 with suitable pipe connections and is adapted to contain steam for heating the starch contained in the main body or tank 1. For emptying the tank I provide a discharge-opening with a discharge-pipe 5 and a suitable valve located in the pipe.

In the upper portion of the tank or body 1, above the feed-opening A and above the line of the table 6, I mount in suitable bearings a rocking shaft 7. On one end of the machine this shaft is provided with a crank-arm 8, to the swinging end of which is attached one end of the elastic pitman 9, the elasticity being provided by a coiled spring which forms a portion of the pitman. The

other end of the pitman 9 is connected to a crank-pin 10, mounted in the disk 11, which disk is secured on the main driving-shaft 12. Within the body of the tank and mounted upon one or more curved arms 13 is a beating or operating paddle 14, which operates against the stationary padded starching-plate 15. The paddle and starching-plate are faced with canvas or any suitable material, and the plate 15 is secured on the stationary tank with its upper edge somewhat below the horizontal face line of the feeding-table 6 and on an incline from a vertical line, so that the goods will readily lie on the plate 15 and can be readily placed thereon and removed therefrom.

Between the feeding-table and the starching-plate 15 is provided a stationary wringer-roll 16 with its face substantially in line with the face of the stationary plate 15.

Engaging on and operating in opposition to the wringer-roll 16 is a movable wringer-roll 17, which is mounted at either end in sliding bearings 18, movable within the guides 19. These guides and sliding bearings are entirely contained within the end walls of the tank 1. To the sliding bearing 18 is attached a connecting-rod 20, which connects with a crank-arm 21 on the rocking shaft 22, passing through the tank from end to end of the machine.

On the left-hand end of the machine there is provided on the end of the rocking shaft 22 a crank 23, to which is attached one end of the connecting-rod 24, which extends down to and is attached to the tread-lever 25. The tread-lever 25 is pivoted to the legs or frame of the machine at 26 and has its free end extending in suitable position to be reached by the foot of the operator.

A spring 27 is attached at one end to the framework of the machine and has the other end adjustably connected by a screw and nut 28 to the lever and is tensioned to draw the tread-lever upward and by the thrust of the rod 24 and its connections, extending to the movable wringer-roll 17, operates to close the movable wringer-roll onto the stationary wringer-roll and hold it under spring-tension against the same. The wringer-rolls 16 and 17, when in their closed position, operate to close the feed-opening A of the machine

against the splashing starch. The feed-opening A is made between the inner end of the table 6 and the side wall of the cover adjacent to the opening.

5 For driving the wringer-rolls there is provided on the end of the shaft of the stationary wringer-roll 16 a sprocket-wheel 29, on which runs the sprocket-chain 30, which passes also around the sprocket-wheel 31, mounted loosely on the shaft 12, close to the end of the tank or body, as shown. Loosely
10 mounted on the shaft 12 is the driving band-wheel 32, which is free to slide along the shaft within its limits of movement and is operated by the forked hand-lever 33. On one
15 side of the hub of band-wheel are provided pins 34, adapted to engage in openings or recesses in the sprocket-wheel 31, and when so engaged to rotate the sprocket-wheel. On
20 the opposite end of the hub of wheel 32 are provided a pair of recesses adapted to receive the projecting ends 35 of the sliding pins 36, which pass through the fixed collars 37 and 38 and are held under tension against or toward the hub of the wheel by the springs 39.
25 On the collar 37 is also provided a fixed enlargement 40, which passes about three-fourths around the shaft, as clearly seen in Fig. 1, leaving the cut-away portion 40^a. On
30 the lever 33 is provided a hook 41, which projects close to the circumference of the fixed collar 37 and is only able to pass the collar or rim 40 when the end of the hook is opposite the cut-away portion of the rim or collar 40.
35 Thus the movement of the operating-lever 33 can only be made when the shaft is in a certain portion of its revolution. On the right-hand end of the rocking shaft 22, which operates the movable wringer-roll, is a detent
40 42, which is adapted, when the operating-lever is in a certain position of its movement, to engage upon the end of the wall or plate 43, and when not so engaged swings by the side of the wall and prevents the movement
45 of the lever 33.

For securing the lever 33 in any of its three positions of movement there is provided, extending from the framework or body of the machine, a stationary rack 46, having three
50 notches, in which engages the spring-actuated catch 44 on the handle end of the lever. The lever 33 is pivoted to a projection from the frame at 45. The tank of the machine will be filled, when the machine is in use,
55 with starch of the proper consistency, substantially so that the surface of the starch will coincide with the line B of Fig. 3.

In operation the machine is driven by a belt running upon the band-wheel 32, and
60 with the operating-lever 33 adjusted to its middle position, as shown in Fig. 6, the parts of the machine are at rest, with the band-wheel running free on the shaft of the machine. When the parts are in this position,
65 the wringer-rolls may be opened by the operator depressing the lever 25, and with the wringer-rolls held open the operator inserts

the goods to be operated on through the opening A and between the wringer-rolls, and places them upon the stationary plate 15. At the time this operation takes place the
70 movable paddle 14 will be in its open position, substantially as shown in dotted lines in Fig. 3. When the goods have been placed in the machine, the operator allows the treadle
75 to be raised by the action of the spring 27, which, through the connections described, closes the movable wringer-roll onto the goods and grips them against the face of the stationary wringer-roller.
80

It will be understood that this machine is particularly intended to operate upon goods a portion of which only is to be saturated with starch, and particularly shirts.

When the wringer-rolls have been allowed
85 to close on the goods and held them in the machine, the machine is then placed in operation by releasing the catch 44 and moving the lever 33 to throw the hub of the band-wheel 32 into engagement with the projecting
90 pins 35. In case that the recesses or sockets in the end of the hub do not exactly coincide with the projecting ends 35 of the pins 36 when the lever is operated they will be forced in against the tension of the springs
95 39 until the point in the revolution is reached when they do coincide, when they will be immediately shot into their place and the shaft 12 clutched to the band-wheel and rotate in unison with it. When the shaft 12 is placed
100 in motion through the intermediate connections heretofore described, the operating-paddle 14 is caused to be brought into contact with the goods on the stationary plate
105 15 and carried away from the same with considerable rapidity. As the paddle 14 separates from plate 15 in this operation, and the lower sides being beneath the surface of the starch and opening faster at the lower edge
110 than at the upper edge, the starch is sucked in between the paddles as they open and is brought into contact with the goods, and to coat the surface of the starching-plate and paddle, so that in a repeated number of
115 operations of the paddle the starch is thoroughly worked into the goods, while the goods are not submerged in the starch. At the time that the movable paddle separates from the stationary plate the goods are also more
120 or less withdrawn from the stationary plate by the suction of the movable paddle, so that the starch, when drawn in between the paddle and plate by suction, passes in on each side of the goods. When the paddle has made
125 a sufficient number of operations to thoroughly introduce the starch into the goods, the paddle is thrown out of operation by operating the lever-handle 33 to disengage the wheel-hub from the clutching-pins 36; but this can only take place when the paddles
130 are in open position for the reason that at any other time the hook 41 on the lever-handle 33 will engage with the rim 40 and can only be passed when opposite the cut-away

portion 40^a thereof, which coincides with the open position of the paddle. At the time that the lever is operated to disengage the clutching mechanism it is also, preferably, carried to its other extreme limit of movement, thereby engaging the pins 34 on the other end of the band-wheel hub with the sprocket-wheel 31, which is caused to revolve, and through the medium of the sprocket-chain 30 and the sprocket-wheel 29 causes the wringer-rolls to revolve and carries the goods out of the machine, at the same time wringing out any excess of starch that may be in the goods. When the goods have been passed out of the machine, the lever-handle 33 is operated into its middle position, which disengages the driving-power from the wringer-rolls and places the whole machine at rest. The operator removes the goods discharged from the machine onto the operating-table 6 and substitutes a new piece, which is inserted into the machine after separating the wringer-rolls, as hereinbefore described.

As the starch in the tank, when the machine is in use, is hot and is more or less splashed by the operation of the paddle and in order to guard against accident it is necessary that the wringer-rolls should be kept closed while the paddle is in operation, and as a safety device against their being opened, there is provided the detent 42, which engages upon the end of wall 43 on the lever 33 and prevents the wringer-rolls from being opened or the tread-lever depressed when the paddle is in operation. When the paddle is out of operation and the wringer-rolls are open, it is also desirable to prevent the paddle being put in operation, and this is accomplished by having the swinging end of the detent 42 in position to engage with the side of the wall 43 and prevent the lever 33 being moved into the position to set the paddles in operation while the wringer-rolls are open.

It is evident that numerous alterations and modifications in and from the details of construction herein described may be made without departing from the equivalents of my construction.

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

1. In a starching-machine, a tank, a stationary starching-plate located within the tank and inclining outwardly from a vertical line, a feed-opening at the upper edge of the plate, a paddle mounted and arranged to operate on the plate from a center of movement

adjacent to the upper edge of the plate and in the operation to move upwardly and outwardly away from the starching-plate into the upper portion of the tank, and means for operating the paddle, substantially as set forth.

2. In a starching-machine, a tank having a feed-opening at its top, a stationary starching-plate within the tank inclining outwardly from a vertical line and having its upper edge below the feed-opening, a paddle arranged to operate against the plate and mounted upon a rocking shaft located above and on the opposite side of the feed-opening from the upper edge of the plate, and means for rocking the shaft to operate the paddle, substantially as set forth.

3. The combination in a starching-machine of a V-shaped starching-tank, a stationary starching-plate secured on an incline on one side of the tank, a cover for the tank, a feed-opening into the top of the tank over the edge of the stationary plate, a movable paddle mounted on a rocking shaft located above the plate and feed-opening and more contiguous to the upper edge of the stationary plate than to the other whereby the paddle is arranged to operate from the upper portion of the tank downwardly into contact with the stationary plate, a crank-arm secured on the rocking shaft, and a crank and connecting-rod for operating the paddle, substantially as set forth.

4. The combination in a starching-machine of a V-shaped starching-tank having a feed-opening over its upper edge, a stationary starching-plate mounted on an incline on the side of the tank, a movable paddle adapted to operate against the starching-plate and mounted on a rocking shaft in the upper portion of the tank above the stationary plate and more contiguous to the upper edge thereof whereby the paddle is adapted to operate downwardly into the tank and into contact with the starching-plate, a crank-arm mounted on the end of the rocking shaft, a crank, an elastic connecting-rod for operating the paddle, and a pair of wringer-rolls located between the feed-opening and the stationary plate, substantially as set forth.

In witness whereof I have affixed my signature in presence of two witnesses.

DANA HOWARD BENJAMIN.

Witnesses:

RICH. A. GEORGE,
GEORGE C. CARTER.