

No. 682,814.

Patented Sept. 17, 1901.

F. E. PROUD.

FRUIT CLEANING MACHINE.

(Application filed Mar. 30, 1899. Renewed Mar. 22, 1901.)

(No Model.)

2 Sheets—Sheet 1.

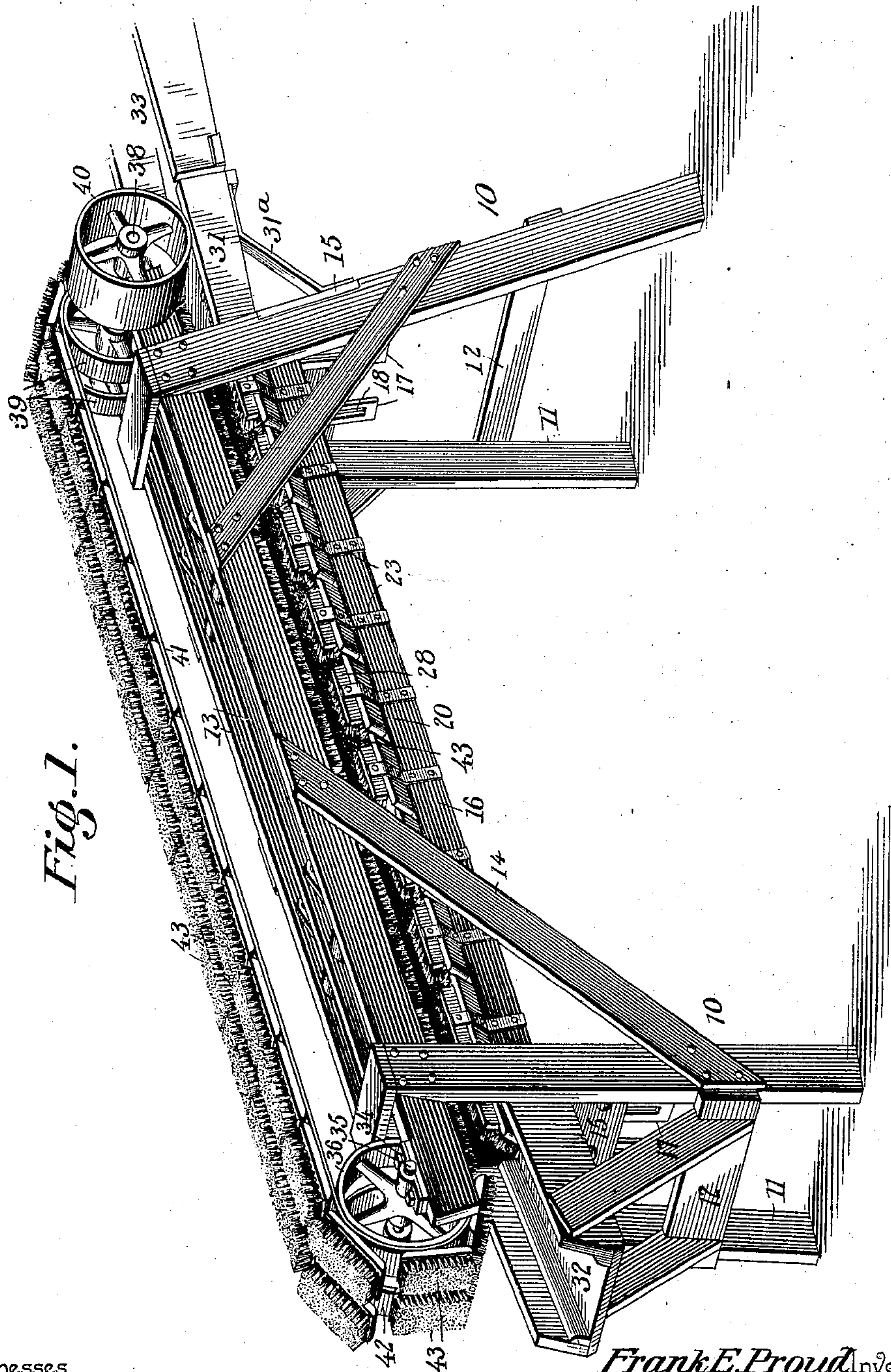


Fig. 1.

Witnesses

Ralph A. Shepard By his Attorneys,

H. J. Berukoff

Frank E. Proud, Inventor

C. A. Snow & Co.



No. 682,814.

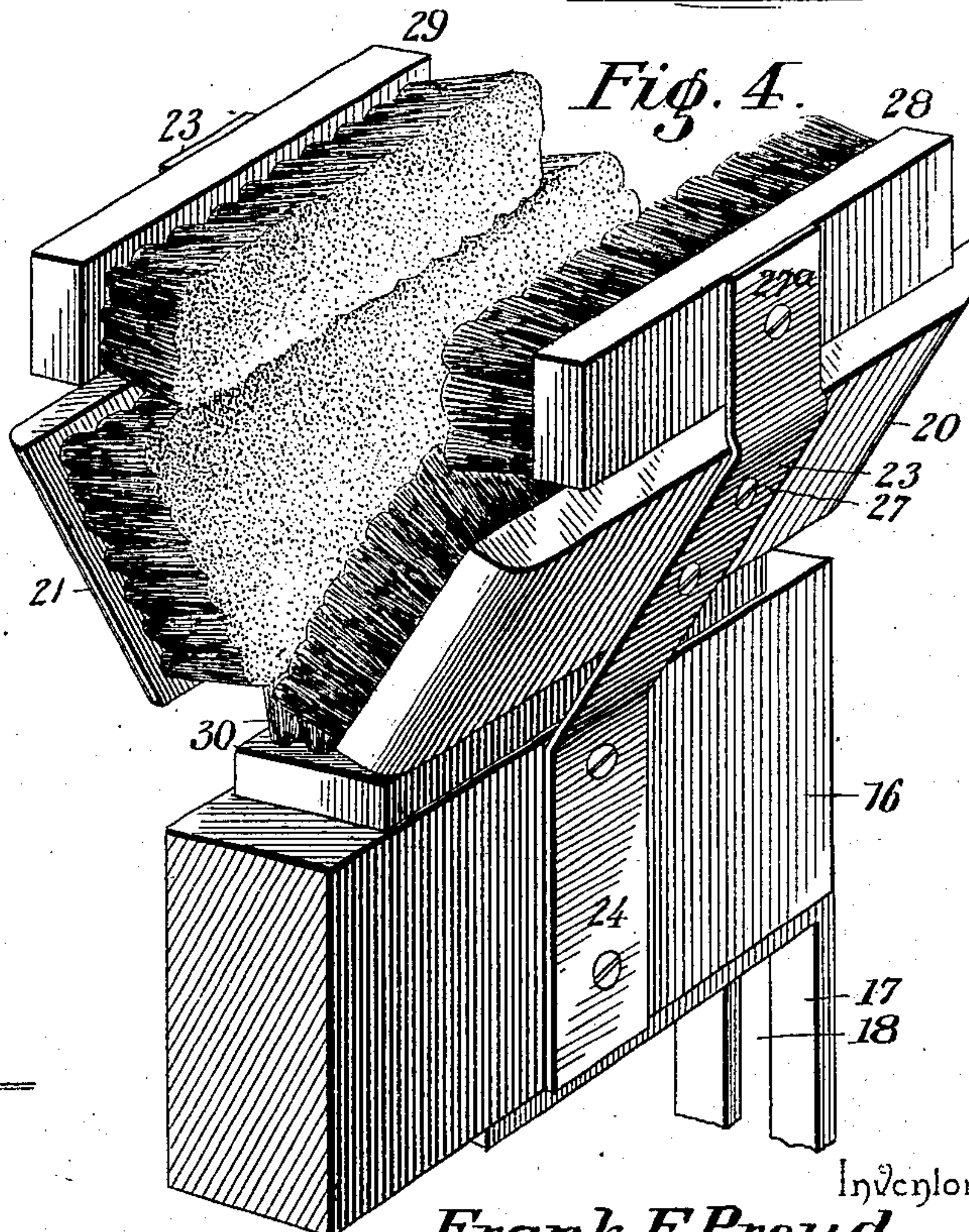
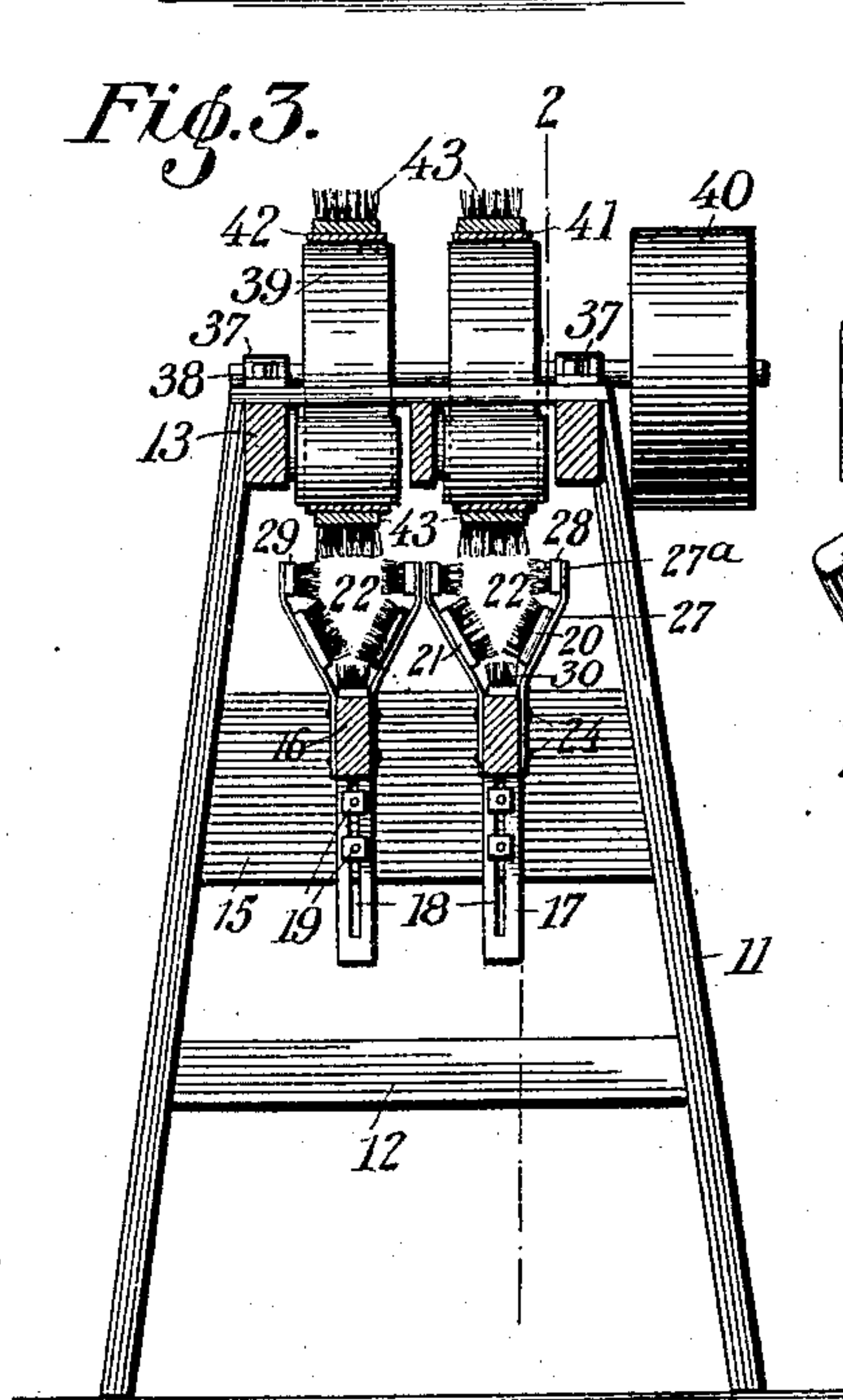
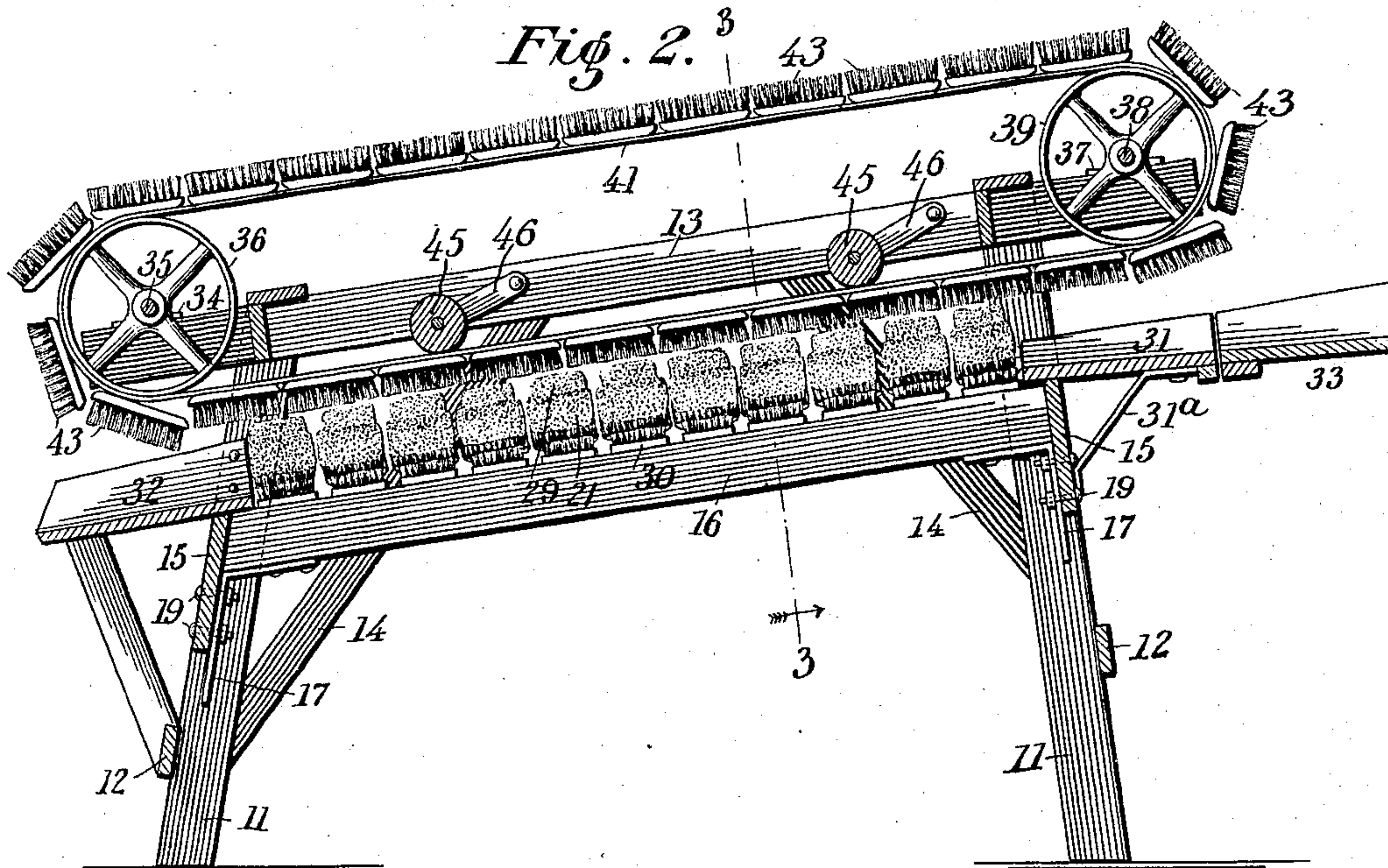
Patented Sept. 17, 1901.

F. E. PROUD.  
FRUIT CLEANING MACHINE.

(Application filed Mar. 30, 1899. Renewed Mar. 22, 1901.)

(No Model.)

2 Sheets—Sheet 2.



Witnesses

Ralph A. Shepard, By his Attorneys, H. J. Bernhof

Inventor

Frank E. Proud,

C. A. Snow & Co.



# UNITED STATES PATENT OFFICE.

FRANK E. PROUD, OF ORANGE, CALIFORNIA.

## FRUIT-CLEANING MACHINE.

SPECIFICATION forming part of Letters Patent No. 682,814, dated September 17, 1901.

Application filed March 30, 1899. Renewed March 22, 1901. Serial No. 52,401. (No model.)

*To all whom it may concern:*

Be it known that I, FRANK E. PROUD, a citizen of the United States, residing at Orange, in the county of Orange and State of California, have invented a new and useful Fruit-Cleaning Machine, of which the following is a specification.

My invention relates to improvements in fruit-cleaning machines, especially designed for treating oranges to remove the dirt which may adhere to the skins thereof; and the primary object in view is to provide a simple apparatus in which the fruit may pass easily and readily through the machine while undergoing treatment.

A further object of the invention is to provide means for rubbing the fruit to remove the adhering dirt without injury to the skin, which mechanism dispenses with the employment of springs to force the rubbing or frictional surface in contact with the fruit.

A further object of the invention is to provide a machine in which the stationary rubbing-surface afforded by a trough or runway may be reversed end for end to compensate for the greater wear which may take place on the brushes at one end of said runway, and the brushes of this runway or trough are yieldably supported to insure proper frictional contact with different sizes of fruit which may be treated by the machine.

With these ends in view the invention consists in the novel combination of elements and in the construction and arrangement of parts, which will be hereinafter fully described and claimed.

To enable others to understand the invention, I have illustrated a preferred embodiment thereof in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a perspective view of a fruit-cleaning machine constructed in accordance with my invention. Fig. 2 is a longitudinal sectional elevation taken centrally through the machine on the plane indicated by the dotted line 2 2 of Fig. 3. Fig. 3 is a vertical transverse sectional elevation on the plane indicated by the dotted line 3 3 of Fig. 2. Fig. 4 is a detail perspective view showing one group of brushes supported on the rail of the runway or trough.

Similar numerals of reference are used to indicate like and corresponding parts in each of the several figures of the drawings.

In carrying my invention into practice I employ a main supporting-frame 10, which may be of any suitable construction and which I have illustrated in the drawings as comprising the legs 11, arranged in pairs and tied together by the cross-bars 12, the longitudinal rails 13, the braces 14, and the cross-rails 15, adapted for the support of the runway or trough. The legs 11 at the delivery end of the machine are shorter than the legs 11 at the receiving end of said machine, and by this construction the rails 13 and the runway or trough are made to assume an inclined position lengthwise of the frame. The longitudinal inclined rails 13 are secured firmly to the legs at opposite ends of the machine-frame, and said rails are stayed by the employment of braces 14, secured to the legs and the rails 13. The cross-rails 15, which support the trough or runway, are fastened to the legs below the rails 13, and these cross-rails lie in different horizontal planes in order to support the trough in an inclined position parallel to the longitudinal rails 13.

16 indicates the pair of trough-rails, which are arranged longitudinally of the machine in an inclined position parallel to and at a suitable distance below the longitudinal rails 13 of the frame. Each supporting-rail of the trough is provided at its opposite ends with the depending metallic plates 17, which are fitted against the cross-rails 15 of the machine-frame, and said plates are formed with vertical slots 18 to receive the bolts 19, that are secured in the rails 15 and pass through the slots of said plates. Each trough-rail 16 is thus secured detachably to the cross-rails of the machine-frame in a position below and midway between the rails 13. Said trough-rails may be removed from the machine-frame in order to reverse the trough end for end, and either end of this rail 16 may be raised or lowered to adjust the frictional brush-surface of the trough or runway in relation to an endless brush belt or apron, as will hereinafter appear.

Each fruit-brushing trough or runway of my improved cleaning-machine has its working surface composed of two series of brushes,



which are attached to or supported on the rail 16 in reversely-inclined positions, and these brushes are arranged or grouped in pairs to make the trough present a substantially V-shaped appearance in cross-section. One series of these brushes are indicated at 20, and they are arranged in an inclined position on one side of the central rail 16. The other series 21 of brushes are arranged on the opposite side of the rail 16 and in positions inclined reversely to the series of brushes 20. It will thus be understood that the two series of brushes 20 21 are inclined reversely to each other to form the trough or runway 22, and this trough is straight throughout its length from the upper to the lower end thereof to facilitate the movement of the fruit through the runway. The brushes forming the series on each side of the rail 16 are in alinement with one another end for end throughout the length of the rail 16, and thus the two series of reversely-inclined brushes are made to present continuous rubbing-surfaces on the sides of the trough or runway. Said brushes 20 21 are disposed in pairs transversely to the plane of the rail 16, and in the preferred embodiment of my invention I prefer to support each brush throughout the series of brushes 20 21 by a yieldable arm 23. The strap or arm 23 for each brush is fastened at its lower end, as at 24, to one side of the rail 16, and said strap is inclined outwardly for a part of its length, as at 27, the upper end of said arm or strap being extended vertically, as at 27<sup>a</sup>. The brushes 20 or 21 are secured to the inclined lengths 27 of the series of arms or straps, and the two brushes of each pair are equal in length. Above the pair of brushes 20 21 on opposite sides of the rail 16 are arranged the auxiliary brushes 28 29, the length of which is not equal to that of the brushes 20 21. These auxiliary brushes 28 29 are fastened to the vertically-extended ends 27<sup>a</sup> of the straps which carry the brushes 20 21, immediately above the latter, and said auxiliary brushes are arranged in vertical planes parallel to the faces of the rail 16. The bottom of the trough or runway 22 is formed by a continuous series of brushes 30, which are fastened to the top of the rail 16 in a position between the lower edges of the brushes 20 21. In the drawings the bottom brushes 30 are represented as made separately and fastened individually to the rail 16; but it is evident that a continuous brush coextensive in length to the rail 16 may be employed, if desired, although I prefer to have the bottom brushes in sections to facilitate renewal of a worn portion of the brushes secured to the rail 16.

The fruit is supplied to the upper end of each inclined trough or runway by means of a feed-chute 31, which is secured to a cross-rail of the frame and is braced by the diagonal struts 31<sup>a</sup>, fastened to the frame. To feed the fruit rapidly to the feed-chute, I may employ a removable supply-tray 32, which is

adapted to be supported in line with the feed-chute 31, that forms an integral part of the machine; but this supply-tray 32 is designed to be removed when emptied and replaced by another tray, in which the fruit is deposited after having been gathered from the tree. At the lower end of the machine I secure a delivery-chute 33 to the frame, and the feed and delivery chutes lie in the plane of the runway or trough 22 in order to conduct the fruit thereto and to discharge the fruit from the machine.

The longitudinal rails 13 of the supporting-frame have their ends extended beyond the legs, and to the lower ends of these rails are fastened the journal-bearings 34, which support an idler-shaft 35, said shaft being equipped with rollers 36. A pair of shaft-bearings 37 are secured to the extended ends of the rails 13 at the opposite upper end of the machine-frame, and in these bearings is journaled the driving-shaft 38, having a pair of rollers 39, that are disposed in alinement with the rollers 36. One end of the driving-shaft 38 is extended beyond the machine to receive a suitable means for operating the endless brush of the machine. A pulley 40 may be secured to said shaft 38 for driving the machine by power; but it is obvious that a hand-crank may be secured to said shaft when it is desired to operate the machine manually.

In connection with the brush-formed tray or runway I employ an endless brush mechanism, which is adapted to sweep or travel centrally over the series of brushes 20 21 on each of the inclined troughs. This brush mechanism consists of endless aprons 41 42, which are spaced a suitable distance one from the other and are disposed in substantially parallel relation, and to the endless aprons are secured a series of brushes 43. The aprons are fitted on the rollers 36 39 of the shafts 35 38, and the endless brush mechanism is thus adapted to be propelled by the motion of the driving-shaft 38. The brushes constituting each series on one of the endless aprons have their backs secured individually to the aprons to allow the ends of the brushes to separate when passing around the rollers, (see Figs. 1 and 2,) and each brush 43 is fastened at a point intermediate its length to one of the aprons, thus leaving the ends of the brush-back free from attachment to the apron. The aprons of the endless brush mechanism present the two series of brushes in close relation to the series of brushes 20 21 of the runway, and said aprons, with the brushes thereon, are operated in a direction to carry the fruit lengthwise of the trough or runway. This being the construction of my fruit-cleaning machine, the operation may be described as follows:

The endless brush mechanism is set in motion by rotating the shaft 38, and a tray loaded with oranges is arranged in alinement with the feed-chute 31. The oranges travel



by gravity from the tray across the feed-chute and enter the space of the inclined troughs or runways 22. As the oranges enter the troughs they are engaged by the brushes on the endless brush mechanism and the fruit is caused to travel through the runway and to be engaged by the brushes of the trough and of the endless brush mechanism. The fruit is turned or rotated as it travels through the troughs and its entire surface is subjected to the action of the brushes, whereby the fruit is cleaned thoroughly from any dirt or other refuse which may adhere to the skin thereof. By driving the endless brush mechanism in a direction to feed the fruit through the troughs it is subjected a number of times to the action of the brushes as it traverses the machine, and the fruit in a thoroughly-clean condition is delivered by the chute 33 into a suitable receptacle.

One of the important features of my invention is the employment of a runway or trough which, although inclined, is straight throughout its length in combination with a positively-driven endless brush mechanism in active relation to said trough. The employment of this straight trough is advantageous, because the fruit may travel easily and freely there-through, and the employment of the endless brush mechanism is advantageous, because the fruit is rotated and thoroughly cleaned by the action of the brushes.

In my improved fruit-cleaning machine the use of springs on the endless brush mechanism are wholly dispensed with, thereby simplifying the construction and promoting the efficiency of operation. It will be noted that the endless brush mechanism is supported at opposite ends by pairs of rollers, and said mechanism is unsupported at points intermediate of its length, whereby the endless brush mechanism is capable of a certain amount of sag or play intermediate between the pairs of rollers, thus giving to the brush the necessary spring or elasticity to present its brushes in yieldable contact with the fruit as it traverses the trough or runway.

It will be observed that the brushes at the upper end of the inclined trough or runway are exposed to more wear and friction than the brushes at the lower end of the runway, which is due to the fact that the upper brushes operate to perform a larger volume of work than the lower brushes. To enable the brushes to wear uniformly at opposite ends of the runway, I contemplate supporting the trough or runway in a manner to facilitate its removal, thus permitting the trough to be reversed end for end. It will be noted that the bolts 19 may be removed from the slotted plates 17, thus permitting the rails 16 to be detached, after which the rail and brushes may be reversed and the rail again secured in place.

The machine of my invention has the following advantages: The parts are simple in construction and reliable in operation and

either of the brushes can be removed when worn and replaced by a new brush. The fruit is fed automatically to the runway, carried therethrough by the action of the endless brush mechanism and delivered at the opposite end of the machine in a thoroughly-clean condition. The brushes have pliable or yieldable bristles which act to thoroughly scour the skin of the fruit without injury thereto. The employment of springs to hold the brushes in their operative position are dispensed with; but the straps which support the brushes 20 21 with the runway are yieldable to a limited extent to permit fruit of large size to pass through the runway without abrading the skin of the fruit.

Changes in the form, proportion, and the minor details of construction within the scope of the appended claims may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Although I have shown two inclined troughs or runways with a duplex brush mechanism having its strands in central relation to the troughs, I do not desire to confine myself to the use of the parts in duplicate, as I am aware that a single trough and a single endless brush may be employed.

As shown by Figs. 1, 2, and 3, the lower strand of the endless brush is kept in proper relation to the trough or runway by gravity-rollers 45, hung by links 46, pivoted to the upper part of the machine-frame. The weight of these rollers depresses the lower series of brushes on the endless apron into close relation to the brushes of the trough and the rollers are free to yield or give in an upward direction when oranges of large size pass through the machine.

What I claim is—

1. In a fruit-cleaning machine, the combination of a straight inclined trough having two series of brushes inclined reversely to each other and presenting straight continuous surfaces to the fruit, and an endless positively-movable brush mechanism disposed above said trough, the vertical axes of the trough and the endless brush mechanism being in a common plane, said endless brush mechanism having between its supports a limited amount of sag or play relative to the brushes of the trough, substantially as described.

2. In a fruit-cleaning machine, the combination of a trough having a plurality of series of brushes presenting continuous straight surfaces, one surface being inclined reversely to another like surface, and an endless brush mechanism coextensive in length with the brush-surfaces of the trough and arranged above the latter, said endless brush mechanism having a limited play in a vertical plane and movable positively relative to the brush-surfaces of the trough, substantially as described.

3. In a fruit-cleaning machine, a straight inclined trough comprising a rail, two series



of brushes inclined reversely to each other and disposed on opposite sides of the rail to present straight continuous surfaces, and yieldable supports for holding the brushes individually on the rail and permitting the brushes of opposing pairs to give laterally with relation to the axis of the rail, combined with an endless brush mechanism arranged above the trough, coextensive in length therewith, and movable positively in a path substantially parallel to the axis of said trough, substantially as described.

4. In a fruit-cleaning machine, a straight trough comprising a rail, the yieldable arms secured individually to the rail and disposed in pairs on opposite sides thereof, each arm having an inclined length and a vertical length extended beyond the rail, the main brushes fastened to the inclined lengths of said arms, and auxiliary brushes attached to the vertical lengths of the arms, combined with a positively-movable brush mechanism coextensive with and in operative relation to the trough-brushes, substantially as described.

5. In a fruit-cleaning machine, the combination of a trough having a plurality of series of yieldably-supported brushes arranged in reversely-inclined positions and presenting straight continuous surfaces longitudi-

nally of the trough, an endless brush mechanism arranged above and in coöperative relation to the trough-brushes for movement in a path substantially parallel to the axis of the trough and also capable of a limited amount of sag relative to said trough-brushes, and pressure devices acting on the lower lead of said endless brush mechanism to depress the brushes thereof toward the trough, substantially as described.

6. In a fruit-cleaning machine, the combination with a frame, and revoluble supporting devices at the ends thereof, of a straight inclined trough having a plurality of series of reversely-inclined brushes, hangers for detachably fastening the respective ends of the trough on the frame, one of said hangers being adjustable, and an endless brush mechanism fitted to the revoluble supporting devices and sustained thereby in coöperative relation to the trough-brushes for movement in a path parallel, substantially, to the axis of the trough, as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

FRANK E. PROUD.

Witnesses:

WM. G. WELLS,  
C. B. CAMPBELL.