W. H. ELLIOT & L. F. CLARK.

MACHINES FOR CLEANING PAPER-PULP SCREENS.

No. 194,960. Patented Sept. 11, 1877.

Fig. 1.

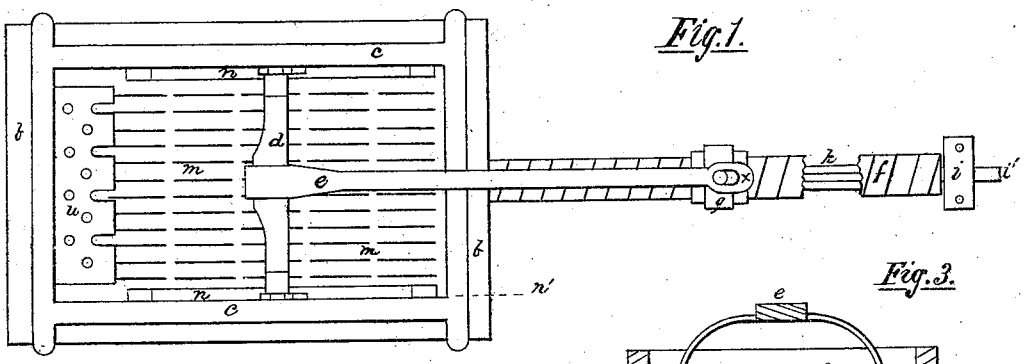


Fig. 3.

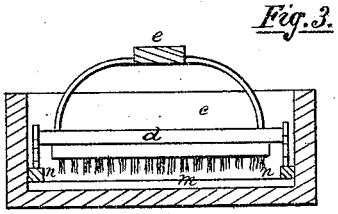


Fig. 2.

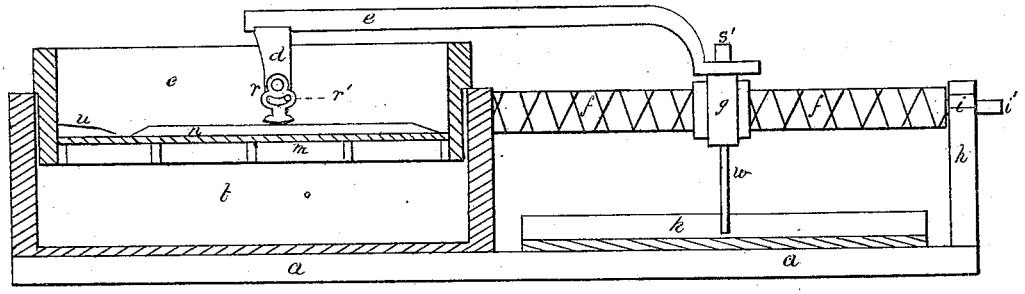


Fig. 4.

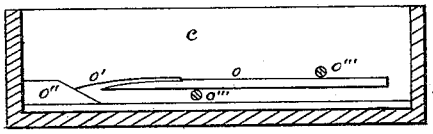


Fig. 5.

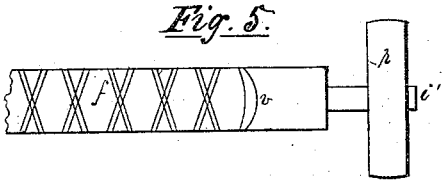


Fig. 6.

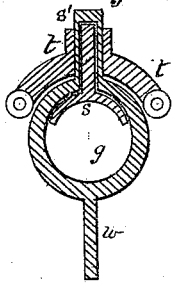


Fig. 7.

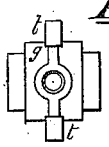
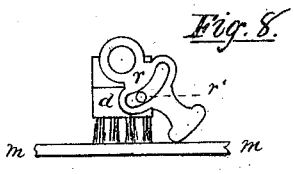


Fig. 8.



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UNITED STATES PATENT OFFICE.

WILLIAM H. ELLIOT, OF NEW YORK, AND LEONIDAS F. CLARK, OF ILION, N. Y.

IMPROVEMENT IN MACHINES FOR CLEANING PAPER-PULP SCREENS.

Specification forming part of Letters Patent No. **194,960**, dated September 11, 1877; application filed April 10, 1877.

To all whom it may concern:

]] e ELLIOT, of the city, county, and State of New York, and LEONIDAS F. CLARK, of Ilion, county of Herkimer, and State of New York, have invented new and useful Improvements in Machines for Cleaning Paper-Pulp Screens, which improvements are fully set forth in the following specification, reference being had to the accompanying drawings.

The object of our invention is to remove from the prepared pulp of which paper is made knots and other refuse matter that gather upon the screen-plates, by means of a brush or rake, which, by its peculiar operation, brings all of the refuse materials to the front of the screen, from whence it can readily be removed by hand.

The nature of our invention consists, first, in a traversing device composed of a screw (single or double) having upon it a traveler or nut, which, by means of a suitable connection, gives motion to the brush; second, in trips which are pivoted to the ends of the brush, and which raise the brush during its movement in one direction, but let it down so that it will rest upon the screen-plates while moving in the other direction; third, in a raised plate placed at the end of the screen upon which the brush rises and by means of which the refuse matter is deposited at the front of the screen; fourth, in joining the traveling nut to the connecting rod or brush by means of a sliding joint, whereby the movement of the brush may be made less than that of the nut, and the brush brought to a rest for an instant at each end of the screen; fifth, in a guide and pin for preventing the nut from revolving with the screw, while it is left free to move longitudinally.

Figure 1 is a plan of our improved pulp-screen cleaner. Fig. 2 is an elevation of the same, showing a section of the screen and vat at dotted line *n'*. Fig. 3 is a vertical cross-section of the same. Fig. 4 is a modification of our invention, showing a different method of raising the brush. Fig. 5 is an elevation of one end of the double or endless screw. Fig. 6 is a vertical section of the traveling nut, showing a modification of our method of attaching the connecting-rod to the nut. Fig. 7 is a plan of the same. Fig. 8 is an elevation of the end of the brush, showing the brush and trip resting upon the screen-plates.

a is the bed upon which the vat *b* and the support *h* rests. *c* is the screen; *d*, the brush; *e*, the connecting-rod. This may be of any desired length, according to circumstances. It serves merely to connect the nut with the brush, and may be considered a part of the brush. *f*, the screw; *g*, the traveling nut; *i*, box on support *h* in which the gudgeon *i'* of the screw revolves; *k*, guide for the pin *w*; *m*, bottom of the screen, composed of brass plates, through which long narrow openings are cut, and through which the pulp, in passing, leaves behind it the refuse matter; *n*, raised portion of the bottom of the screen upon which the trips travel; *o*, support for the end of the brush during its movement in one direction; *o'*, spring; *o''*, inclined surface; *o'''*, section of pins in the end of the brush-block; *p*, pulley on the gudgeon of the screw; *r*, trips pivoted at their upper ends to the brush-block; *r'*, pin in the end of the brush-block, which limits the movement of the trip; *s*, fork, which travels in the threads or lead of the screw; *t*, yoke on the hollow stem *s'* of the nut; *u*, plate in the end of the screen upon which the brush rises, and which relieves the brush of the refuse matter; *v*, union of the two leads of the double screw; *w*, a pin, which projects down from the lower side of the nut, and which runs in guide *k*; *x*, slot in the end of the connecting-rod, through which the hollow stem *s'* projects. By this means the brush ceases its traversing movement long enough for the sediment to fall away from it and for the trips to swing to a vertical position.

Fig. 1 represents the brush resting upon the screen-plates and moving to the left toward the front of the screen, in which movement the trips *r* are in the position shown in Fig. 8. When the brush reaches the front end of the screen it passes upon the plate *u*, where it rests till the lost motion of the slot *x* is taken up by the movement of the nut, when it commences its return. While the brush rests upon the plate *u* the trips, being lifted clear of the bottom of the screen, or the raised

portion of it, *n*, at once swing to a vertical position, where they are stopped by pin *r*, as seen in Fig. 2. The backward movement of the brush keeps the trip, by friction, in a vertical position, by which the brush is held up clear from the screen-plates. When the brush reaches the rear end of the screen it rests for an instant, and then commences its forward movement, which brings the trips to the position shown in Fig. 8, with the brush resting upon the screen-plates. When it reaches the front end of the screen it again rises upon plate *u*, as before described, and again remains for awhile stationary, which gives time for the sediment to fall away from the brush. The plate *u* serves two purposes. It raises the brush so as to give the trip a chance to come to a vertical position before the backward movement is commenced. It also relieves the brush of the sediment. To effect the latter purpose the lower edge of the plate may be raised a little from the bottom of the screen, as seen in Fig. 2, or it may be perforated, as seen in Fig. 1, or both.

As a traversing device I prefer a screw with a crank or pulley attached to the gudgeon *i'*. The screw shown in Fig. 1 is a single one, and in use would require to have its motion reversed. It would therefore be best operated by a crank. The screw shown in Fig. 2 is an endless or double screw. It is both a right and a left handed screw, the grooves forming the lead crossing each other at regular distances. Fig. 6 shows the internal arrangement of the nut for the endless screw, the lower end of fork *s* fitting in the lead of the screw, while its shank projects up into the hollow stem *s'* of the nut. This fork turns upon the axis of its shank, so as to follow the direction of the lead, and as it reaches the ends of the screw the curved groove *v*, Fig. 5, conducts it from one lead to the other, and so reverses the movement of the nut without reversing the motion of the screw. The endless screw would therefore be best suited to be driven by power.

In Fig. 2 the screw is represented as leading faster one way than the other. The object of this is to move the brush toward the rear end of the screen while it is raised up from the screen-plates faster than it travels in its forward movement while it is working. By this arrangement the brush is operating upon the plates considerably more than half of the time.

Fig. 4 is a modification of our invention for raising the brush during the backward movement and lowering it upon the screen-plates during the forward movement. *o* are longitudinal projections upon the inside of the screen-box, opposite the ends of the brush. *o'''* are pins, shown in section, which are driven into the ends of the brush-block, and long enough to touch the sides of the screen above and below the projections. These pins pass forward under the projections *o*, with the brush resting upon the bottom of the screen. As they approach the forward or left-hand end of the screen the pins pass up the incline *o''*, and in so doing raise the springs *o'*, which fall back as soon as the pins have passed. When the motion of the brush is reversed the pins pass over spring *o'* and over the projection *o*, keeping the brush raised until it reaches the rear or right-hand end of the screen, where the pins pass off the rear ends of the projections, and the brush falls upon the screen-plates, ready for its forward movement.

The yoke *t*, Figs. 6 and 7, is an improved device for attaching the connecting-rods to the nut. In this case the connecting-rod is forked, its two ends being attached to the two extreme ends of the yoke. These points of attachment are opposite the bearing of the fork in the lead of the screw, and as the hollow stem *s'* passes through the middle of the yoke, which turns freely upon the stem, the draft of the nut on the brush has no tendency whatever to throw the nut out of place or cause it to bind upon the screw.

The pin *w* is firmly fixed in the nut, while its lower end passes along in the guide *k*. This prevents the friction of the nut on the screw from having any tendency to twist the connecting-rod, or to interfere in any way with the operations of the brush.

A very good method of constructing a rake for removing the sediment from the screen-plates is to use, instead of bristles, a double series of brass plates. Each plate should be about an inch and a half in width and three inches long, and bent in the form of the teeth of a horse hay-rake. These teeth should be placed about an inch apart, and so arranged that the teeth of one series will be opposite the open spaces of the other series, so as to break joints. These teeth by their elasticity would conform to the inequalities of the surface of the screen as well as a brush, and would remove the sediment by the process of scraping.

All paper-pulp screens have to be violently agitated to facilitate the process of screening, and this is usually done by hinging the screen-box to the vat on one side, and then, by means of cams, the other side of the screen is made to rise and fall with great rapidity. This agitation of the screen is indispensable.

It will be observed that the traversing devices in our invention are all supported independently of the screen, and are not in any way affected by its movements, the brush only having imparted to it the tremulous motion of the screen, which actually makes the operation of the brush upon the screen-plate more effectual.

Having described our invention, what we desire to have secured to us by Letters Patent of the United States, is—

1. The screw *f* and nut *g*, in combination

with connecting-rod *e* and brush *d*, provided with trips *r*, substantially as and for the purpose specified.

2. The trips *r*, in combination with a brush which has a traversing movement over paper-pulp screen-plates, substantially as and for the purpose set forth.

3. The plate *u*, in combination with screen *c* and brush *d*, substantially as and for the purpose specified.

4. The pin *w* and guide *k*, in combination with a screw, *f*, nut *g*, connecting-rod *e*, brush *d*, and screen *c*, substantially as and for the purpose specified.

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