

W. H. RUSSELL.

Rag-Engine.

No. 216,349.

Patented June 10, 1879.

Fig. 1

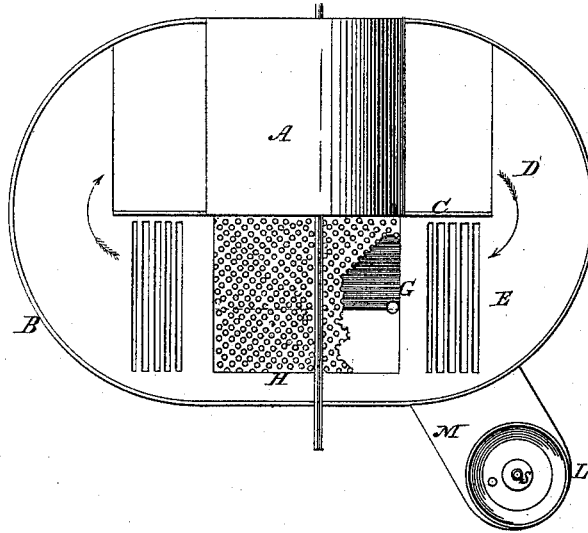
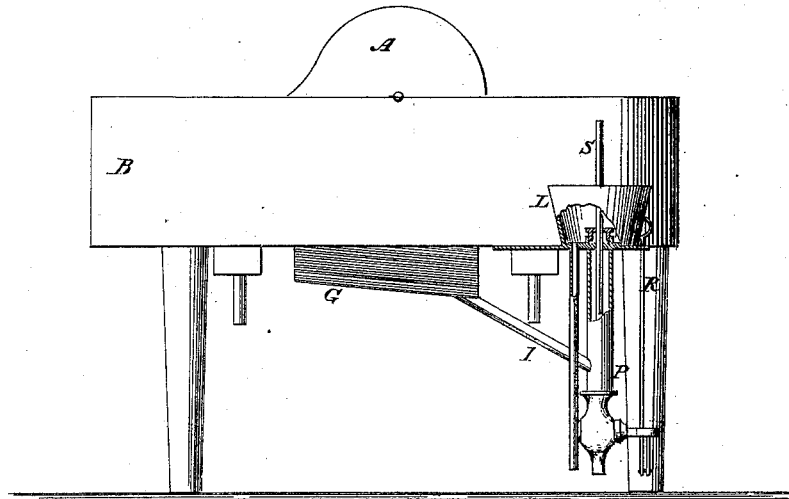


Fig. 2



Witnesses.  
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# UNITED STATES PATENT OFFICE.

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## IMPROVEMENT IN RAG-ENGINES.

Specification forming part of Letters Patent No. **216,349**, dated June 10, 1879; application filed March 3, 1879.

*To all whom it may concern:*

Be it known that I, WILLIAM H. RUSSELL, of Dalton, in the county of Berkshire and State of Massachusetts, have invented a new and useful Improvement in Rag-Engines or machines for making pulp from rags and cleansing the same for making paper; and I hereby declare that the following is a description of my invention, reference being had to the annexed drawings, forming part of this specification, in which—

Figure 1 is a plan view, and Fig. 2 a side elevation, with a portion of the adjustable fountain-discharge in section to show the interior.

Similar letters refer to like parts on both figures.

The invention relates to a more complete separation and removal of dirt from ground rags in the rag-engine in which rags and like materials are ground into pulp and washed in the process of making paper.

In the common rag-engine the usual arrangement and device for catching sand and other foreign substances is simply a narrow channel covered with a grating in the bottom of the engine-box near the grinding-roll. The ground rags have but a comparatively short and violent motion over the grate of this shallow channel. The dirt does not subside rapidly nor well in it. Therefore it does not fulfill the office of a good dirt-trap. Besides this defect no current passes down through it to carry away any dirt during the washing operation.

The nature of my invention consists in providing a large and deep inclined dirt-well under the bottom of the box of the rag-engine, and in the second apartment, separated from the grinding-roll, the said dirt-well forming a good dirt-trap. The ground rags are moved for a considerable period of time over the screen-cover of the dirt-well, and the dirt subsides rapidly below surface agitation.

It also consists in providing an adjustable fountain or suction discharge in connection with the dirt well or trap to vary the pressure and discharge of water at the early stage of the operation, the pressure being exerted upon the rags forcing a current of water through them and carrying the dirt from them into the

dirt-well, thence out of the fountain discharge-pipe. This adjustable fountain-discharge regulates the pressure and the discharge according to the point at which the fountain-pipe is set. It also stops the discharge in this direction, at the proper period, when the pulp becomes fine.

It also consists in providing a most suitable way of discharging and cleaning out the dirt deposits after a batch of pulp has been finished and removed.

In the figures, A represents the inclosed grinding-roll, with its appurtenances. All these parts are made, arranged, and operated in the usual way, and need not be further described.

B is the box of the rag-engine. It is divided into two apartments, D E, by the partition C; but they are in free communication. In the second apartment, E, where the cleansing is chiefly effected, there are two small grated recesses for catching larger substances, such as buttons and the like, left in rags. These need not be further described.

G is a large dirt-well, placed about the middle and under the bottom of the box in apartment E. It is comparatively deep and made with inclined sides, and its dip is toward one end, where it is connected at the lowest point of the bottom with the outlet-pipe I, and it is also connected with the fountain-pipe. The dirt-well G has a fine perforated plate cover or screen, H.

L is an adjustable pressure-fountain of discharge. It is secured on a plate or platform, M, attached to the box of the rag-engine. On its top is the basin, with an opening and exit-tube in its bottom, or its bottom may be covered with a screen.

P is a large fixed discharge-pipe having a cock near the lower end, operated by rod R, to open and close the outlet-passage. Within this large discharge-pipe is a smaller pipe, S, which may have any suitable handle. It works in a stuffing-box in the main pipe P, and is thus capable of being raised and depressed and set at any desired point. It only extends down in the main pipe to the inclined pipe I when it is set lowest. When raised highest its top is level with the surface-water in the box of the rag-engine. This is an ad-

justable fountain-pipe, forming the discharge-pipe of the dirty water coming from the rag-engine box at the early stage of the grinding and washing operations. It regulates the pressure of discharge, and also arrests the discharge at the proper time.

Operation: After the rags are boiled in the usual lime solution, a batch of them weighing about seven hundred pounds is placed in the apartment of the grinding-roll, and water is admitted to the box until it stands about thirty-five inches in depth. A stream of water in the ordinary way flows in steadily at the surface. Rags and such like materials usually contain lime, sand, pieces of broken needles, pins, buttons, and various foreign substances. The adjustable fountain-pipe S is now pushed down to its lowest point, which is nigh to the outlet-pipe I. When farthest down the difference of head or surface of water in the box of the engine and the top of the fountain-pipe S is then about eight inches. The grinding-roll being set in motion, the rags are ground and continually moved forward around the partition C, which divides the box, and over the perforated plate or screen H of the dirt-well. The motion of the ground rags is circuitous. They are constantly drawn under the grinding-roll, and the grinding and washing operations are continued until the rags are reduced to proper pulp. The difference of level between the surface level of the water in the box B and the top of the adjustable pipe S will be the head of pressure by which the dirty water is forced through and out of the ground rags while they are passing over the screen of the dirt-well and through the fountain-pipe. This, therefore, is a fountain-discharge, and the pressure or "suction," so called, is regulated by the point at which the pipe S is set. While the rags are coarse—such as at the time of starting—the full fountain-pressure may be used; then as the rags become finer the pipe S is raised and the pressure reduced; then after about two hours grinding the fountain-pipe is raised to a level with the surface of the water in box B, and the discharge in this direction is stopped; otherwise some fine pulp might pass over. During the period of discharge through the fountain-pipe S, as described, the ground rags have their dirt removed and carried from them by the downward current in a far more effectual manner than in the common way.

When the fountain-discharge is arrested, the grinding and washing actions are still continued on the same batch of rags for about four or five hours longer. During this long operation the ground rags or pulp pass over the plate or screen H from seven to eight hundred times, and as the dirt-well G is placed at

the bottom, about the middle of the apartment E, far more dirt, especially metallic particles, does subside, pass down, is trapped, and removed from the pulp than by the common modes.

When the pulp is finished in the rag-engine, it is discharged by a gate or valve for further operations in the common way. Common channels for catching dirt are cleaned by raising their grates, scooping out the sand and other dirt, or through outlets having common plugs.

When a batch of pulp has been discharged from this rag-engine, the dirt which has been deposited in the dirt-well G and that which has passed down into the main pipe P of the fountain is all discharged by opening the cock of the pipe by the rod R. Water is allowed to flow from the box B through the dirt well or trap until all the dirt is washed out preparatory to operation upon another batch of rags.

Portions of broken needles and like substances when left in rags and ground fine, if not separated from the pulp, are very injurious, because they produce specks or stains of rust on sheets of white paper, all of which sheets have to be worked over again, thus involving much waste and expense.

The dirt-well placed in such a favorable position and connected with a low discharge-exit performs the office of a superior dirt-trap for sand and metallic particles.

The fountain adjustable discharge carries a requisite current of water through the ground rags, thereby removing more effectually all kinds of dirt from the ground rags than is done in the usual way. The method of discharging the dirt from the well G and cleaning it out is very convenient and effective.

Having described my invention, what I claim, and for which I desire Letters Patent, is—

1. The deep inclined dirt-well G, placed in the apartment E under the bottom of the box, and having a low discharge at the bottom into the outlet-pipe, thus providing an effectual dirt-trap, as set forth.

2. The adjustable fountain-discharge, in connection with the dirt-well G, or connected with any other part of the rag-engine to carry off the dirt by a downward regulated pressure and current during a period of the washing of the ground rags.

3. The combination of the dirt-well with the main discharge-pipe P of the fountain, to discharge the deposits and cleanse the well after the pulp has been discharged, as set forth.

WM. H. RUSSELL.

Witnesses:

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JOHN WRINKLE.