

No. 701,310.

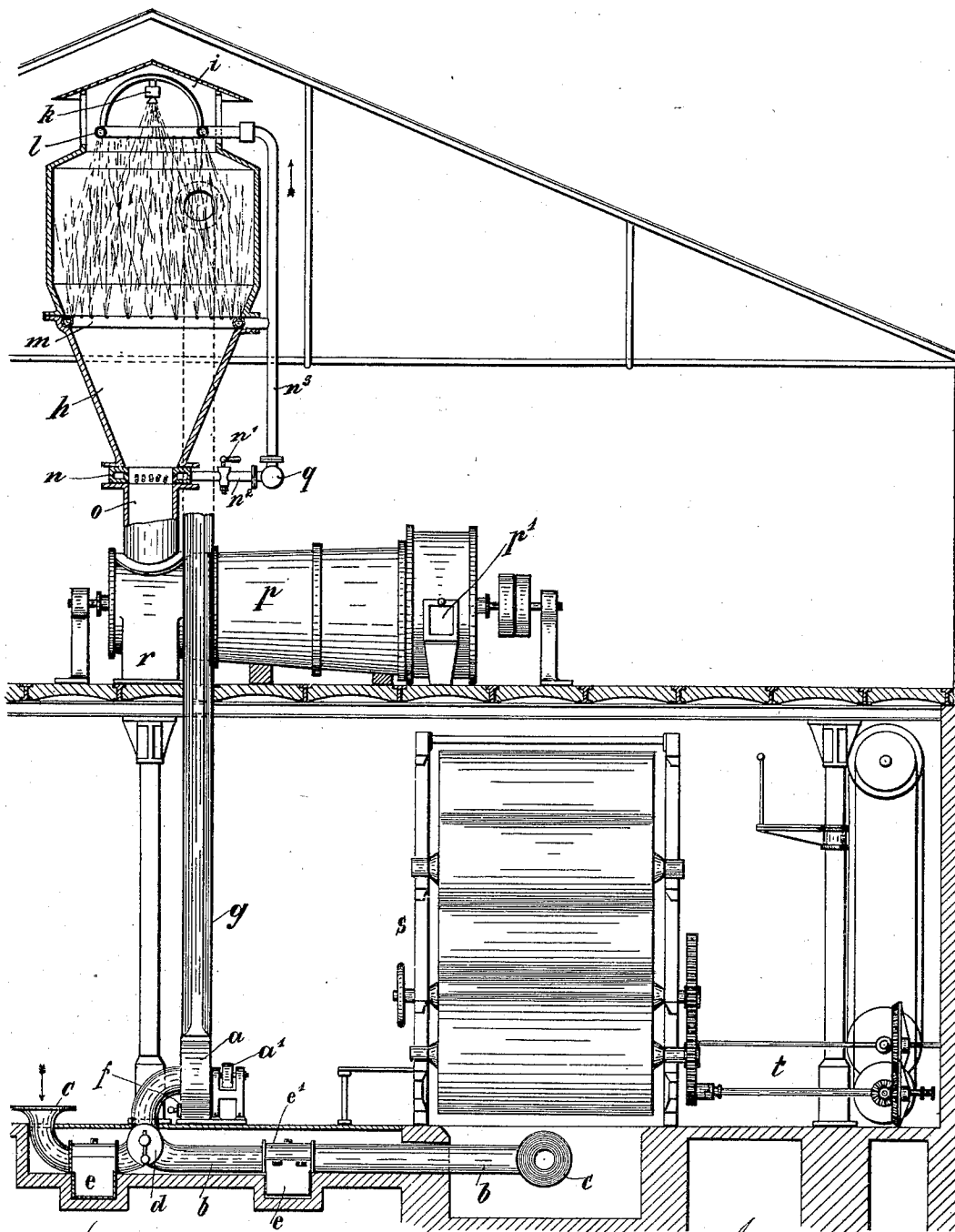
Patented June 3, 1902.

R. DIETRICH.

TREATMENT OF WASTE MATERIAL FOR USE IN THE MANUFACTURE OF PAPER.

(Application filed Oct. 17, 1900.)

(No Model.)



Witnesses:
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UNITED STATES PATENT OFFICE.

ROBERT DIETRICH, OF MERSEBURG, GERMANY.

TREATMENT OF WASTE MATERIAL FOR USE IN THE MANUFACTURE OF PAPER.

SPECIFICATION forming part of Letters Patent No. 701,310, dated June 3, 1902.

Application filed October 17, 1900. Serial No. 33,332. (No model.)

To all whom it may concern:

Be it known that I, ROBERT DIETRICH, paper-manufacturer, a subject of the Emperor of Germany, residing at Merseburg, in the Empire of Germany, have invented certain new and useful Improvements Relating to the Treatment of Waste Material for Use in the Manufacture of Paper, of which the following is a specification.

In paper-works large quantities of waste paper or paper shreds are produced at various parts and at other parts waste from rags, straw, and the like accumulate which heretofore have been removed by hand. By thus removing such waste to the cutting-room for reuse in the manufacture of paper more or less of the material drops in the various rooms, so that the latter are constantly in a dirty and untidy condition. Besides, this method of removing waste by hand is costly and inconvenient.

Now this invention relates to a combination of devices providing an apparatus whereby the waste materials are continuously removed by mechanical means from their place of origin and during transport are drawn through an exhaustor and mechanically cleansed, so that finally the said material is delivered into the disintegrating apparatus in such a prepared condition that the power required for the reëxtraction of the fibers therefrom is reduced to a minimum. This object is obtained by combining an exhaustor for the paper and other material with a "cyclone," into which latter the material is delivered and is therein completely freed from dust and moistened by means of water-jets and moistening devices, so as to be suitable for immediate delivery into the fiber-extracting machines. The exhaustor draws in the material through a suction-conduit direct from the places where the waste is produced, the latter being freed during transport from such impurities as would injure the exhaustor if allowed to pass in.

The improved arrangement will be readily understood by reference to the accompanying drawing, which shows a general elevation of the same, partly in section, arranged on two floors and extending up into the roof.

Obviously the details of construction may

be altered in many ways to suit various conditions without altering the nature of the invention.

a is the exhaustor, which may be rotated by belt-pulley *a'* or in any other convenient manner. One or more suction pipes or conduits *b* lead to the exhaustor from the places where the paper shreds can be introduced into the said conduit *b*, which latter in order to facilitate the introduction of the materials may be widened to form a trumpet-shaped mouth-piece *c*. The various suction-conduits deliver into a collector-head *d*, fitted with valves or slides to enable any one of the said conduits to be closed when not in use, so as to prevent unnecessary displacement of air. Furthermore, the suction-conduits are provided with separator-boxes *e*, having a lower level of floor than the conduit-pipes, so as to retain heavier substances, sand, and metallic pieces, &c., which may have found their way into the conduit and which otherwise would damage the exhaustor. These separator-boxes are preferably fitted with tight-closing hinged covers *e'* to enable the boxes being readily cleaned out during interruptions in working. For further safety the exhaustor may be furnished at its lowest portion with a drawer *f* to serve as a further means for catching any impurities which may have found their way into the exhaustor, while at the same time enabling the interior of the apparatus to be readily accessible. The materials thus freed from coarse impurities are drawn into the exhaustor and are then passed through the conduit *g* into a cyclone *h* and thence into any reducing apparatus. The reduced material delivered from the pipe *g* into the cyclone *h* carries with it all the light dust and other impurities mixed with the paper, waste rags, straw, and the like, and as during the conveying of the reduced materials downward all the air is constantly tending to escape upwardly and must of necessity be allowed to pass out it will be found in the vicinity of the cyclone there is a constant accumulation of highly-inflammable dust unless special precautionary measures are taken. To this end it is necessary that the material, which spreads itself out in the wider cylindrical part of the cyclone, should be well moistened, so

as to render it more fit for the fiber-extracting apparatus, while at the same time the air laden with dust is thoroughly washed thereby, so that only air free from all dust can escape through the sides or from the top of the cyclone, the paper-dust thus retained being utilized in the manufacture. Sufficient water must be injected at such parts of the cyclone and in numerous fine jets or sprays as to evenly moisten the materials, as well also as to effectually prevent the escape of dust-laden air. The cyclone *h* is fitted with a ventilating-top *i*, beneath which there is arranged a spraying device *k*, adapted to produce an evenly and finely divided shower for washing the ascending air. In order to obtain a more effectual action of the waste spray, the cylindrical portion of the cyclone may be furnished both at its upper and lower end with a ring-tube *l* and *m*, which supply converging jets or sprays crossing each other and thoroughly penetrating the materials, while at the same time either cold or warm water may be employed, as may be preferred. Thus in the upper part of the cyclone there is obtained an effectual deposition of the dust and an even moistening of the materials, the latter owing chiefly to the material being enabled to spread out in the upper widened cyclone portion. The material thus treated gravitates through the outlet-pipe *o* into the fiber-extracting apparatus *p*, disposed below the cyclone. In gravitating downward the material becomes again more compact, and thereby renders the moisture of the entire material still more perfect. If desired, the downward motion of the closely-packed materials in the pipe *o* may be added by strong downwardly-directed water-jets from a pipe *n*. This pipe, by means of a cock *n'*, is connected with a water-supply pipe *n²*, branching off from the service-pipe *q*, from which latter another branch pipe *n³* leads to the spraying-pipes *k l m*. Any convenient fiber-extracting apparatus *p* may be used. Finally the pasty materials, now thoroughly disintegrated, issue through an outlet *p'* from the fiber-extracting apparatus, are run into vats, and thence into the stuff-box for the paper-manufacture.

Owing to the fact that all heavy impurities are separated previous to passing into the exhauster *a*, it will be sufficient to provide the inlet of the fiber-extracting apparatus with a sand-catcher *r* for retaining the ejected particles of dust of the shreds and the like.

s designates an ordinary paper-machine, and *t* is the driving-gear for the same. The entire general arrangement is such as to dispose a paper-machine to the right and the left of a centrally-located exhauster *a*. As, however, such general arrangement does not form part of the invention no further description relating thereto is needed.

What I claim, and desire to secure by Letters Patent of the United States, is—

1. A machine for treating paper-waste material comprising an exhauster, suction-pipes leading to the exhauster, a cyclone having a ventilating-top, a conduit connecting the exhauster with the cyclone, a water-spraying device within the ventilating-top adapted to play on the material issuing from the conduit and a fiber-extracting apparatus into which the cyclone discharges.

2. A machine for treating paper-waste material comprising an exhauster, suction-pipes leading to the exhauster, a cyclone having a ventilating-top, a conduit connecting the exhauster with the cyclone, a water-spraying device within the ventilating-top, a spraying-ring surrounding the spraying device, and a fiber-extracting apparatus into which the cyclone discharges.

3. A machine for treating paper-waste material comprising an exhauster, suction-pipes leading to the exhauster, a cyclone having a ventilating-top, a conduit connecting the exhauster with the cyclone, a water-spraying device within the ventilating-top, an upper spraying-ring, a lower spraying-ring, and a fiber-extracting apparatus into which the cyclone discharges.

4. A machine for treating paper-waste material comprising an exhauster, suction-pipes leading to the exhauster, a cyclone having a ventilating-top, a conduit connecting the exhauster with the cyclone, a water-spraying device within the ventilating-top, an upper spraying-ring, a lower spraying-ring, a spraying-ring at the discharge end of the cyclone, and a fiber-extracting apparatus into which the cyclone discharges.

5. A machine for treating paper-waste material comprising an exhauster, suction-pipes leading to the exhauster, a cyclone having a ventilating-top, a conduit connecting the exhauster with the cyclone, a water-spraying device within the ventilating-top, a spraying-ring at the discharge end of the cyclone, and a fiber-extracting apparatus into which the cyclone discharges.

6. A machine for treating paper-waste material comprising an exhauster, suction-pipes provided with separator-boxes and leading to the exhauster, a cyclone having a ventilating-top, a conduit connecting the exhauster with the cyclone, a water-spraying device within the ventilating-top, and a fiber-extracting apparatus into which the cyclone discharges.

In testimony whereof I have hereunto set my hand, in presence of two subscribing witnesses, this 27th day of September, 1900.

ROBERT DIETRICH.

Witnesses:

RUDOLPH FRICKE,
CHAS. J. BURT.