

(No Model.)

4 Sheets—Sheet 1.

T. BURROWS & D. E. RADCLYFFE.
IMMERSING APPARATUS FOR DISINTEGRATING OR TREATING FIBROUS
MATERIAL, &c.

No. 580,637.

Patented Apr. 13, 1897.

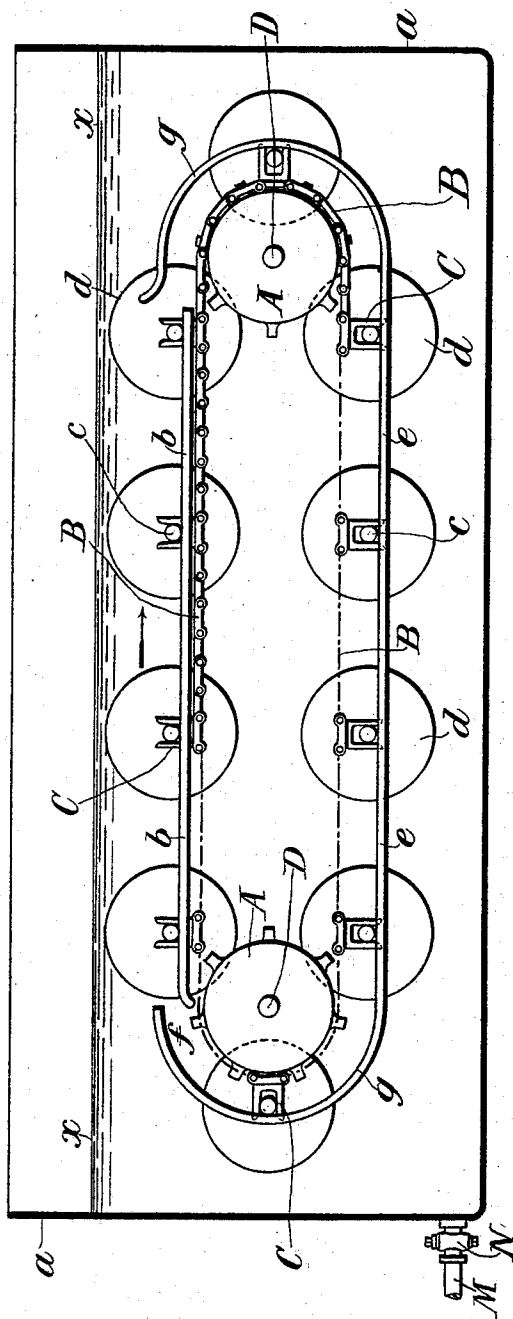


Fig. 1.

WITNESSES:

Loth. Haackel
R. F. Pilouze

INVENTORS

Taylor Burrows and
Dick Edwards Radclyffe
BY *Charles Hargreaves*
ATTORNEYS.

(No Model.)

4 Sheets—Sheet 2.

T. BURROWS & D. E. RADCLYFFE.
IMMERSING APPARATUS FOR DISINTEGRATING OR TREATING FIBROUS
MATERIAL, &c.

No. 580,637.

Patented Apr. 13, 1897.

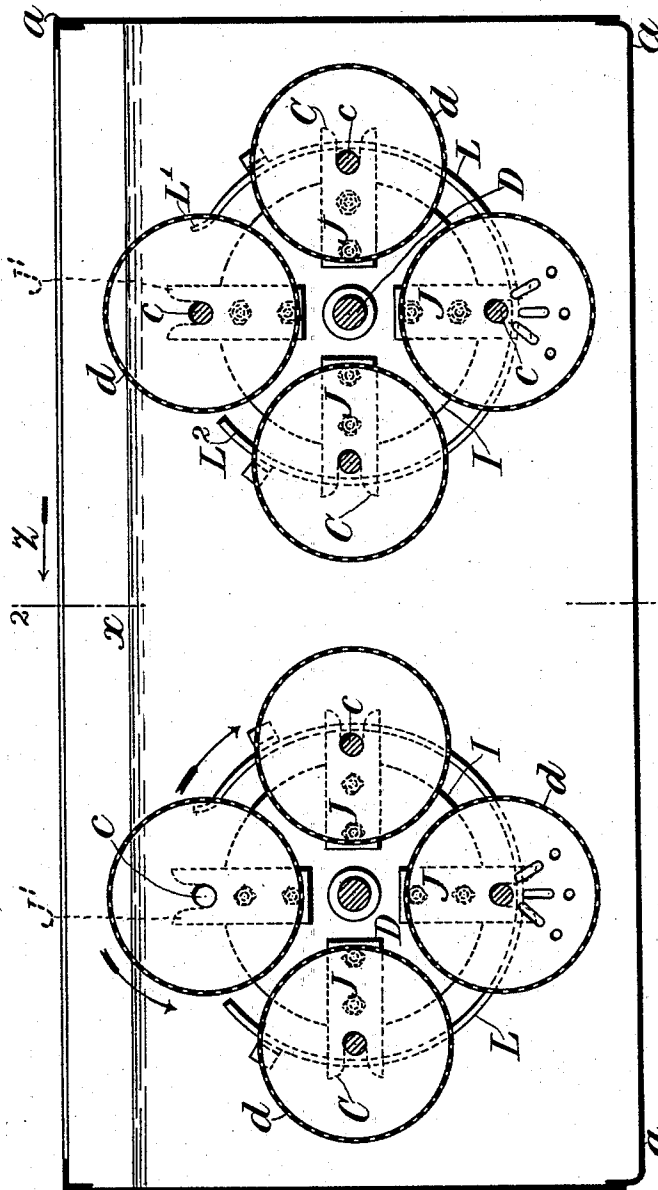


Fig. 2.

WITNESSES:

Geo. H. Jackel
R. F. Plouffe

INVENTORS
Taylor Burrows
Dirk Edwards Radclyffe
BY *Charles H. Rogers*
ATTORNEYS.

(No Model.)

4 Sheets—Sheet 3.

T. BURROWS & D. E. RADCLYFFE.
IMMERSING APPARATUS FOR DISINTEGRATING OR TREATING FIBROUS
MATERIAL, &c.

No. 580,637.

Patented Apr. 13, 1897.

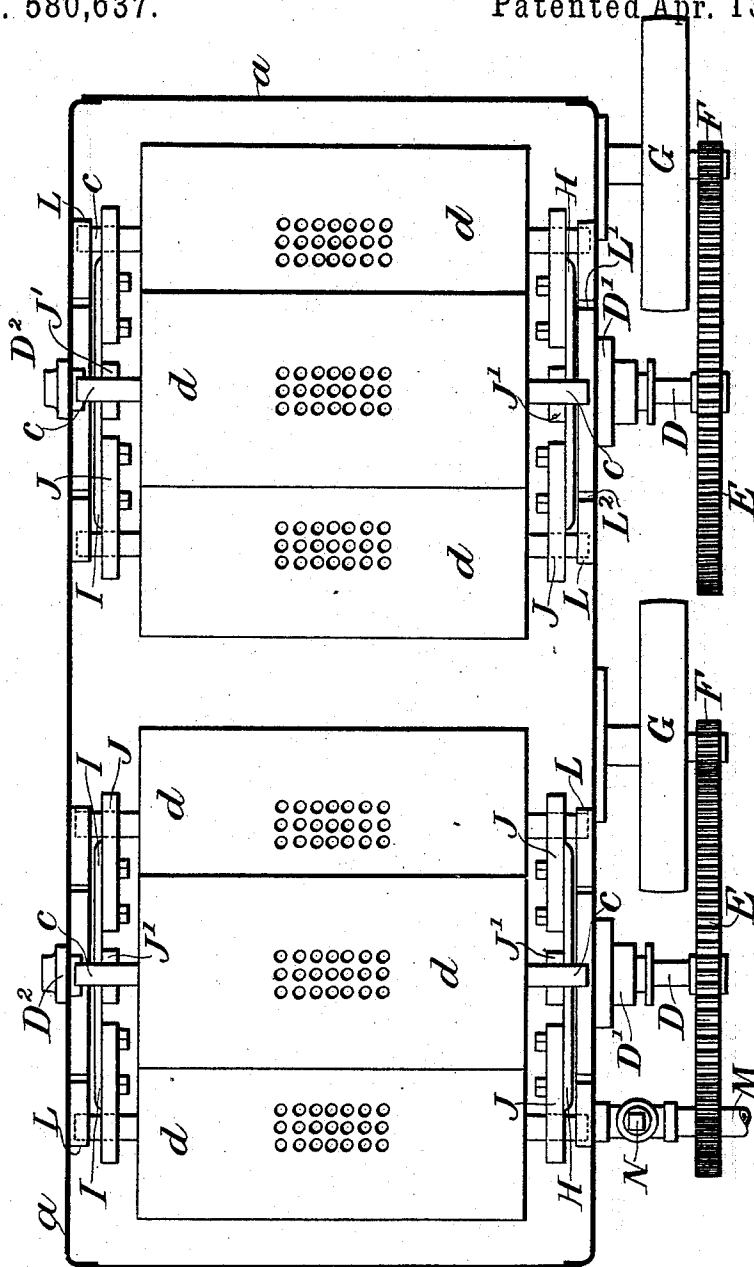


Fig. 3.

WITNESSES:
Geo. F. Baker
R. F. Selinger

INVENTORS
Taylor Burrows
Dick Edward Radclyffe
BY *John R. Quinn*
ATTORNEYS.

(No Model.)

4 Sheets—Sheet 4.

T. BURROWS & D. E. RADCLYFFE.
IMMERSING APPARATUS FOR DISINTEGRATING OR TREATING FIBROUS
MATERIAL, &c.

No. 580,637.

Patented Apr. 13, 1897.

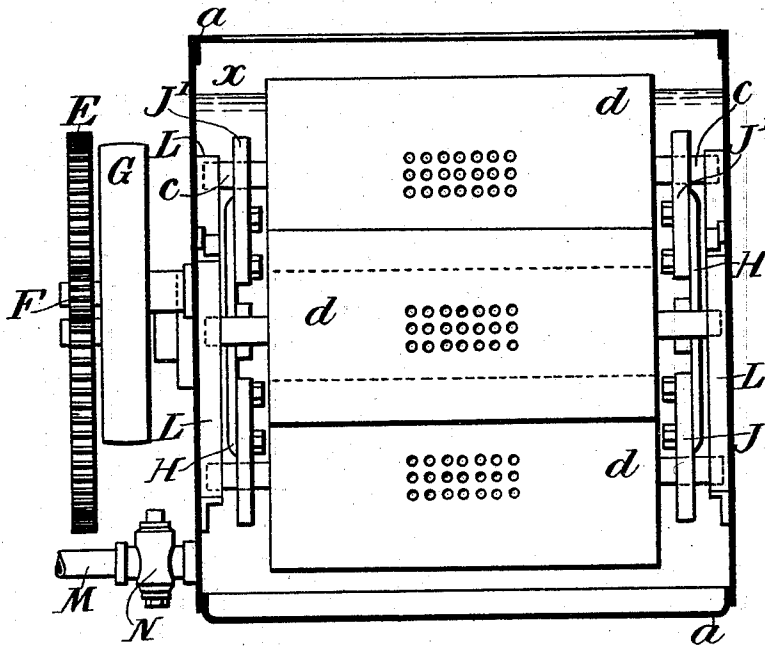


Fig. 4.

WITNESSES:

Geo. H. J. J. J.
R. F. Pelouze

INVENTORS
Taylor Burrows
Dick Edwards Radclyffe
BY
Alfred C. C. C.
ATTORNEYS.

UNITED STATES PATENT OFFICE.

TAYLOR BURROWS AND DICK EDWARDS RADCLYFFE, OF LONDON,
ENGLAND.

IMMERSING APPARATUS FOR DISINTEGRATING OR TREATING FIBROUS MATERIAL, &c.

SPECIFICATION forming part of Letters Patent No. 580,637, dated April 13, 1897.

Application filed February 4, 1896. Serial No. 578,045. (No model.) Patented in England August 3, 1894, No. 14,903.

To all whom it may concern:

Be it known that we, TAYLOR BURROWS, engineer, of 88 Upper Kennington Lane, and DICK EDWARDS RADCLYFFE, gentleman, of 56 Gloucester Crescent, Regent's Park, London, England, subjects of the Queen of Great Britain, have invented new and useful Improvements in Immersing Apparatus for Disintegrating or Treating Fibrous Materials and other Substances, (for which we have obtained Letters Patent in Great Britain, No. 14,903, dated August 3, 1894,) of which the following is a specification.

This invention relates to apparatus for the treatment by immersion of the fibers extracted from fibrous plants, stems, or straws, such as flax, ramie or china-grass, hemp, or other fibrous material to which this present invention is applicable.

The object of this invention is to provide simple, economical, and practical means or apparatus for degumming, cleaning, softening, bleaching, (or any or all of same,) or otherwise treating such fibers by immersion after they have been freed from the non-fibrous parts of such plants, stems, or straws—*i. e.*, after same have been rotted or decorticated or scutched.

To ungum, soften, bleach, or otherwise treat the said fibers, they are placed in a bath or succession of baths, some chemical and others only water, any suitable chemicals or compounds being used for effecting any of the above purposes, as is well understood. For instance, first, an alkaline bath, to ungum; second, clean-water bath, to wash out gum; third, chlorin bath, to bleach; fourth, cold-water bath, to wash out bleaching material; fifth, soap or other suitable compound, to soften or produce a gloss—all of which baths or treatments, *per se*, are well known and understood.

The present invention (which we will now proceed to describe as used in an open tank or vat, it being understood that any number of such tanks may be used, either open or closed in steam-tight, or otherwise, as desired) is as follows, reference being had to the accompanying drawings.

Figure 1 represents a longitudinal section of this apparatus in which the cage-carrier is in the form of an endless chain mounted on

the sprocket-wheel. Fig. 2 represents a longitudinal section of this apparatus in which the cage-carrier is in the form of a rotary frame. Fig. 3 is a plan of Fig. 2. Fig. 4 is a section on line 2 2, Fig. 2, looking in the direction of the arrow *z*.

Similar letters of reference indicate corresponding parts throughout.

Referring to Fig. 1, A A are the sprocket-wheels.

B is the endless chain running over said sprocket-wheels A.

C C are the forked bearings mounted in or carried on said endless chain B.

D D are the axles or axes upon which the sprocket-wheels are mounted and which extend through suitable glands or bearings (not shown) in the side of the tank and are there driven (rotated) in any suitable manner, or these sprocket-wheels A A may be actuated by power applied inside the tank or in any other suitable way.

A lower interior track *e* is disposed at opposite sides of the tank *a* and is provided with upwardly-curved ends *d*. This track is disposed inside the outer line of travel of the outer peripheries of the cages hereinafter described and just outside the line of travel of the trunnions thereof. An upper horizontal track *b* is disposed in a plane below the terminals of said curved ends and just inside the line of travel of the trunnions of said cages. The trunnions or axes *c* of said cage *d* project through and beyond the afore-said forks or traveling bearings C on said endless chains B, and these projecting ends of the trunnions or axes *c* pass into a curved guide-channel *f*, formed by the curved guide bars or pieces *g*, which in the case illustrated are shown as continuations of the said bottom support *e* and mounted (on or near the side of the tank *a*) concentric to the axes D of the said sprocket-wheels and similarly at the other end of or opposite side of the tank, so that when the trunnions or projecting axes *c* of said cage *d* are dropped into the afore-said forks or bearings C on said traveling chain B, upon the latter being caused to travel around thereupon the said cage will be rolled along the uppermost horizontal table afore-said, if used, or along the side strips or sup-

ports, such as *b*, and thereby rotated until it passes off same, and the projecting ends of said axes pass into said curved guideway *f* around the sprocket-wheels at one end of the tank, and the cage *d* will thus be carried down; still guided in said guideway *f* until it rests on the bottom support *e* or upon the bottom of the said tank. Thereupon, if desired, these projecting ends may pass clear of said guideway, though still controlled by the forked bearings *C* on the traveling chain, which will now roll said drum along the bottom of the tank in the opposite direction to its former rotation until the said ends *c* pass into the curved guideways *f* at the other end of the tank, whereupon said cage will be forced up said guideways or curved channels and rolled along the supports *b*, (or along the top table, if used,) and same can then be removed from this bath or passed around again and again, as often as required, according to the treatment it is desired to impart to the fiber.

Referring now to Figs. 2, 3, and 4, *a* is the tank. *c* is the axle or axis of each cage *d*, as before. *D* is the main shaft extending through the side of the tank *a* (through a suitable liquid-tight bearing or gland *D'*) and having on the outer end thereof the large toothed wheel *E*, meshing with a smaller toothed wheel *F*, which latter is driven by a band on the pulley *G*, fixed to *F* on the same axle. The other end of the main shaft *D* is mounted in a suitable bearing, such as *D''*, on the opposite side of the tank, or this main shaft *D* may be mounted and actuated in any other suitable manner, as desired. Inside the tank this main shaft *D* has rigidly keyed or fixed thereto the disks *H* and *I* at opposite sides of the tank *a*, and to these disks, respectively, are rigidly fixed the radial arms *J*, in the case illustrated four such arms being shown, (see Fig. 2;) but any other suitable number may be used, as desired. At each outer end the arm *J* is forked at *C* or formed so as to form a recess or bearing into which the axis or axle *c* of the cage *d* can be dropped (and again readily removed therefrom) as each pair of forked bearings *C* on the opposite sides of the tank come uppermost—*i. e.*, when in the position marked *J'*, Fig. 2.

L is a curved track fixed to the tank at each side and extending from the upturned point *L'* for nearly the complete circle, terminating at *L''* (see Fig. 2) and forming, in conjunction with the aforesaid forked ends *C*, a guideway or guide-channel which prevents the ends of the axles *c* passing out of the said forked ends *C* of the radial arms *J* as the latter are rotated by or on the shaft *D*. This curved track is disposed within the line of travel of the periphery of the cages and just outside the line of travel of the trunnions thereof.

A cage *d* (which may be of any suitable character and construction, as hereinafter described,) is placed in the forked bearings *C*, formed to receive same in the uppermost

pair of radial arms *J'*, and the shaft *D* is then rotated, so that each projecting end of the axle *c* of this cage is carried under the point *L'* of the guideway *L* on each side, (and similarly a cage is placed in each successive pair of radial arms *J* as same come uppermost in rotation,) and as such cage is carried around by the rotation of the radial arms *J* the axle *c* bears against the guideway *L* and is thereby prevented from dropping out of said bearing *C* when the latter is below the horizontal line, and thus the fiber in the cage is immersed in the liquid in the tank *a* (and the cage *d* may be carried around and around as many times as desired) until the axis *c* comes from under the point *L''* of the guideway into the position *J'*, (see Fig. 2,) and then the cage can be easily lifted out of said forked bearings and another cage placed therein, and so on.

Referring now to the whole of the drawings, *M* is the draw-off pipe controlled by the cock *N*.

x is the top of the liquid in the tank, which liquid may be of any suitable character, and more or less of which may be used, as desired.

The cage *d* for holding the fibrous material (ribbons, strips, &c., as aforesaid) may be formed of wirework, perforated metal, or other suitable reticulated or open-work formation, as desired, and advantageously having stout rings at its ends or along its length, upon which rings said drum may be rolled along, as above described, and to add strength to the whole cage, or any other suitable construction for my purpose may be used. This cage *d* is provided with a removable cover or covers (not shown) at one or both ends or other suitable opening to gain access to the interior thereof when desired, and having any suitable catches or other suitable means for retaining such cover or means of closure in position when closed. This cage *d* may advantageously be divided into two or more longitudinal compartments by placing a division (either a solid plate or open-work division or series of bars) longitudinally down the cage, so as to insure the turning over and consequent thorough soaking of every particle of fiber in said cage. These cages and the other parts of the mechanism may be made of any suitable material or combination of materials according to the nature of the chemicals to be used in the bath in which they are to be employed.

A very advantageous cage *d* may be formed by constructing same in two halves (*i. e.*, divided in two longitudinally) and hinging same together, the longitudinal division aforesaid being also hinged to the same hinge and carrying the trunnions or axle *c* of said cage.

Any suitable crane or overhead lifting mechanism, either on an overhead railway or other suitable device, (not shown,) may be used for lifting the said cages *d* in and out of said bath or transferring same from one bath into another.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent of the United States, is—

1. The combination of a vat for containing
5 a treating liquid, a moving cage-carrier disposed in said vat and provided with open journal-bearings, a series of cages provided with trunnions engaging said journal-bearings, means for moving said cage-carrier, said cages
10 being each bodily removable from said cage-carrier when the latter carries them to their uppermost position, and a curved track disposed just outside the line of travel of the trunnions of said cages, and serving as a guide
15 therefor.

2. The combination of a vat for containing a treating liquid, sprocket-wheels disposed in said vat, an endless sprocket-chain passing over said sprocket-wheels, and provided

with forked bearings, means for moving said 20 sprocket-chain, a series of cages provided with trunnions resting in said bearings, a lower track disposed within said vat and provided with curved ends, said track being just
25 outside the line of travel of the trunnions of said cages, and an upper horizontal track disposed in a plane below the terminals of said curved ends and just below the path of travel of said trunnions, said trunnions being guided
30 and supported on said tracks during the movement of the sprocket-chain and said cages being free to be removed from the vat when traveling over the upper track.

TAYLOR BURROWS.

DICK EDWARDS RADCLYFFE.

Witnesses:

HENRY BIRKBECK,

GEORGE WILLIAM KEY.