

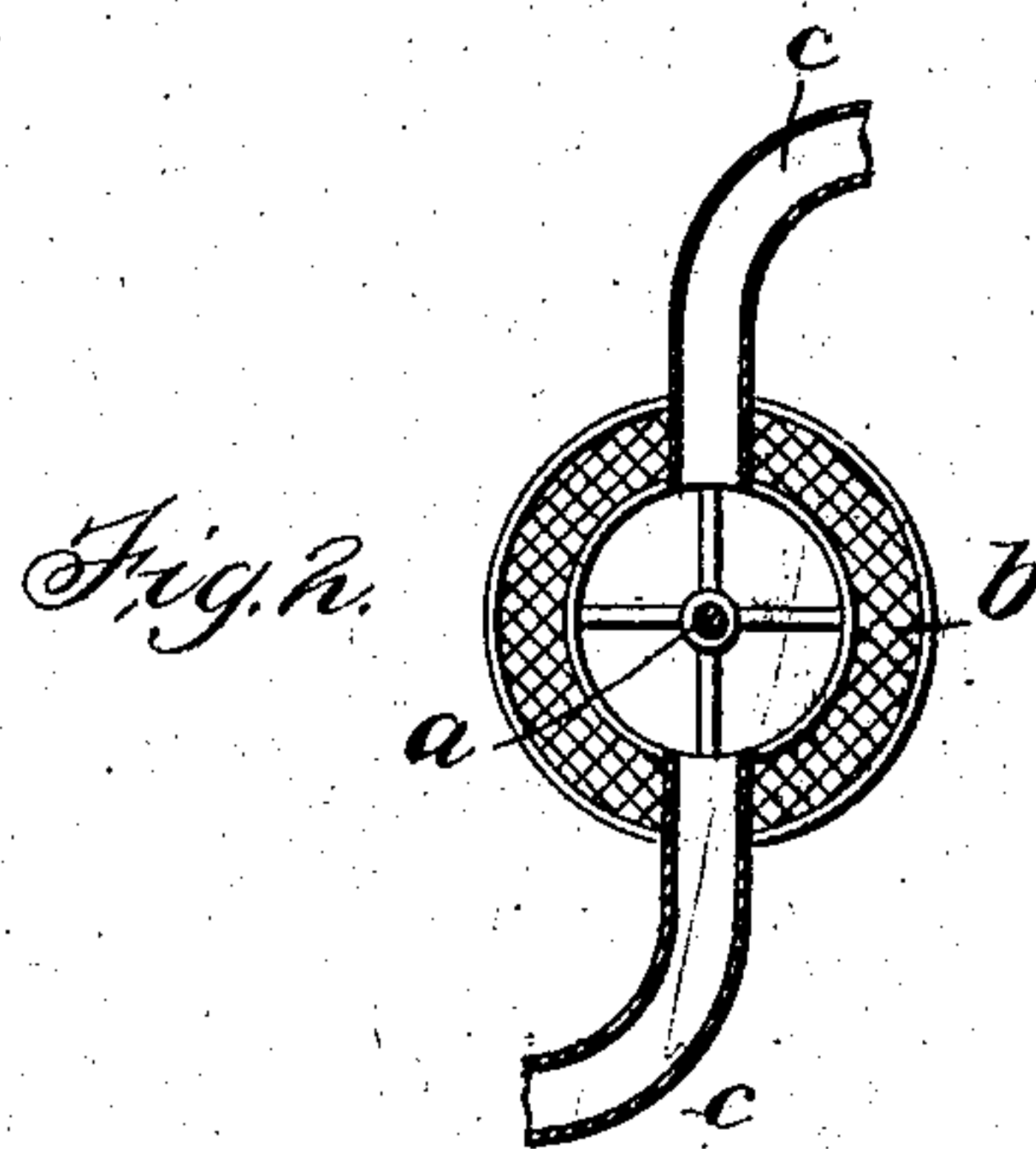
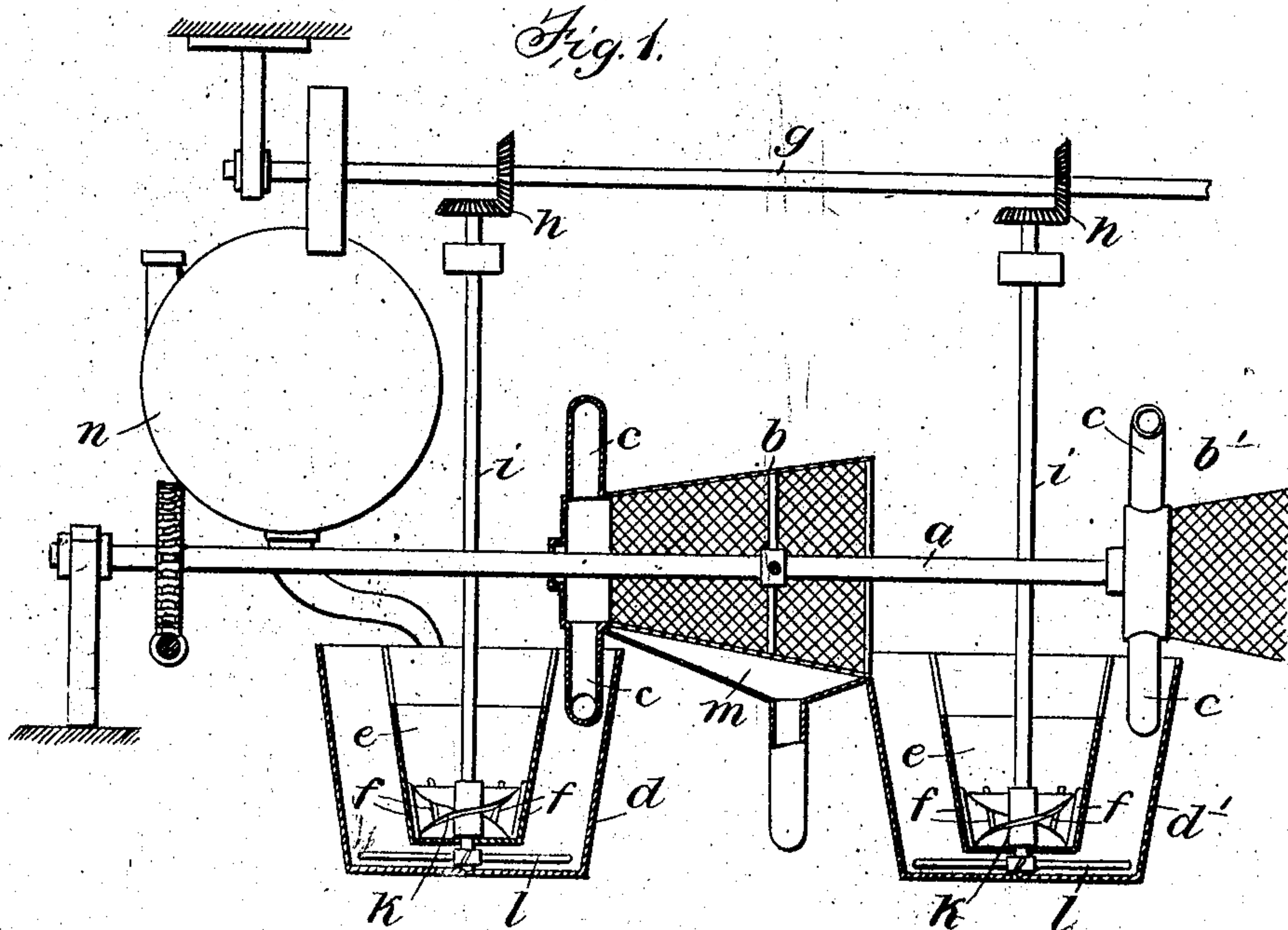
No. 814,967.

PATENTED MAR. 13, 1906.

C. KNOFF.

APPARATUS FOR OBTAINING PURE COTTON OR FIBROUS MATERIAL  
FOR TEXTILE AND LIKE PURPOSES FROM WASTE PRODUCTS.

APPLICATION FILED JUNE 19, 1905.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

CARL KNOFF, OF HEMELINGEN, NEAR BREMEN, GERMANY, ASSIGNOR,  
BY MESNE ASSIGNMENTS, TO JOHANNES DIEDRICH BARTH, OF BRE-  
MEN, GERMANY, AND PAUL HERMANN MINCK, OF HEMELINGEN,  
GERMANY.

APPARATUS FOR OBTAINING PURE COTTON OR FIBROUS MATERIAL FOR TEXTILE AND LIKE PURPOSES  
FROM WASTE PRODUCTS.

No. 814,967.

Specification of Letters Patent.

Patented March 13, 1906.

Application filed June 19, 1905. Serial No. 266,070.

*To all whom it may concern:*

Be it known that I, CARL KNOFF, a subject  
of the King of Prussia, German Emperor,  
and a resident of Hemelingen, near Bremen,  
in the Empire of Germany, have invented a  
new and useful apparatus for use in processes  
for obtaining pure cotton or fibrous material  
suitable for textile and like purposes from  
waste products, of which the following is a  
specification.

The present invention relates to apparatus  
for use in processes for obtaining pure cotton  
or fibrous material suitable for being further  
worked up for textile and like purposes from  
waste products which have hitherto been in-  
capable of being used in this respect—such  
as, for example, the cotton-seed hulls of oil  
factories and ginning-works or other indus-  
trial waste containing fibrous materials—ap-  
paratus according to the present invention  
being particularly intended for use in carry-  
ing out the process described in the specifica-  
tion accompanying the United States patent  
application, Serial No. 266,069, dated June  
19, 1905, and comprises washing and hulling  
apparatus which serves for completely separ-  
ating the hull remains and other impurities  
from the fibers. As a rule, in the case of  
manufacturing processes employed up to the  
present time a not inconsiderable quantity  
of cotton has remained adhering to the cot-  
ton-seed hulls. As these remnants are only  
used as fodder for cattle, the said quantity of  
cotton is completely lost as far as the textile  
industry is concerned. Processes of the na-  
ture referred to make it possible to separate  
out in an industrially applicable pure form  
these remnants of cotton, as well as the  
fibrous remnants of other waste material from  
works, which material may be incrustated and  
soiled by dirt or coloring-matter—for exam-  
ple, the waste products of the industries deal-  
ing with the treatment of jute and other  
fibrous materials.

According to the processes of the nature  
described the waste materials of the above  
nature are first treated in suitable seethers or  
like vessels with solutions of chemicals which  
are able to dissolve both the impurities of the  
fibers and of the hull remains, but which,  
however, attack the fibers themselves only  
to a trifling extent or absolutely not at all.

Chemicals suited for this purpose are, among  
others, the well-known alkalies, alkaline  
earths, diluted acids, alkaline sulfites, calcium  
bisulfite, magnesium bisulfite, potassium bi-  
sulfite, sodium bisulfite, &c. The waste is si-  
multaneously treated in the vessel with one or  
more of these solutions until the hulls, &c.,  
are disintegrated entirely or for the greater  
part without the fibrous material itself being  
attacked in a noticeable manner. The  
fibrous mass is then placed in washing and  
hulling apparatus which serves for com-  
pletely separating the hull remains and other  
impurities from the fibers.

Apparatus according to the present inven-  
tion is illustrated by way of example in the  
accompanying drawings, in which—

Figure 1 is a central vertical section, and  
Fig. 2 is a cross-section, of the scooping device  
forming part of the apparatus.

Upon the shaft *a*, which may pass through  
the apparatus from one end to the other and  
which is driven in a suitable manner, a num-  
ber of conical sieves *b b'* are arranged, said  
sieves being provided at their narrower end  
each with a scooping device. These scoop-  
ing devices may suitably consist of one, two,  
or more tubes *c*, bent knee-shaped, which on  
the shaft *a* being rotated dip into the hull-  
ing-vats *d d'*, standing under said shaft, and  
simultaneously scoop a portion of the fibrous  
mass in said vats into the rotating sieves *b b'*.  
In each hulling-vat *d* a conical device which  
is open below is situated, said device being  
provided in its lower part with a number of  
vertical ribs or edges *f*. The worms or  
screws *k*, arranged on vertical shafts *i* in the  
lower part of the devices *e*, are driven from a  
second shaft *g* by means of bevel-wheels *h* or  
in any other suitable manner, narrow wings  
or beaters *l* being also provided on the lower  
free ends of these shafts *i*. Under the con-  
ical sieves *b* shallow dishes *m* are situated,  
said dishes being connected with piping for  
the reception of the washing-water flowing  
through the sieves.

The fibrous mass treated in the vessel *n* in  
the described manner with chemicals in-  
tended to disintegrate or loosen the hull re-  
mains flows with the solution with which it is  
mixed into the device *e* of the vat *d*. The re-  
mains of the hulls, &c., are continually more



and more and in a mechanical manner loosened from their connection with the fibers by means of the cooperation of the mixing-screws *k* and the ribs *f* and by means of the beaters *l*, the solvent being besides washed out with water. By means of the scoops *c* of the conical sieve *b* the mass is then raised into the latter, and the fibers subsequently arrive in the second vat *d'*, while the rinsing-water flows away into the dish *m*, situated under the sieve *b*. In said vat *d'* the fibrous mass is treated with fresh water in the same manner as previously it was treated in the vat *d* until it passes by means of the scooping device into the second sieve *d'* and thence into the third vat, (not shown,) and so on until the fibrous mass is freed completely from the adhering hull remains and chemicals. Pure water is suitably contained in the first vat *d* for washing out and diluting the liquid with which the material has been boiled, whereas suitable additions are advantageously made to the rinsing-water in the subsequent vats for the purpose of bleaching the fibrous mass until the fibrous mass is finally rinsed out in pure water.

The number of wash-vats and sieves can vary as desired, according to the nature of the material to be worked up, and spraying devices and nozzles or the like may be provided and arranged as desired, according to requirements, in the sieves for the purpose of aiding in their action.

The pure cotton or other vegetable fiber won in the described manner is to be freed from the adhering water by means of centrifugal apparatus or draining-rollers and is to be completely dried, whereupon said material is loosened in carding-machines, the short and long fibers being separated from one another.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. Hulling and washing apparatus of the type described, comprising in combination, a plurality of vats, a mixing device in each of said vats, means for operating said mixing devices, a shaft passing over said vats, means for rotating said shaft, a plurality of sloping sieves and a corresponding number of scooping devices mounted on said shaft, one scooping device being adjacent to each sieve and each sieve being arranged in proximity to two vats, and each scooping device being adapted to dip into a vat and transfer material therefrom into its neighboring sieve which delivers the solid material to another vat, substantially as described.

2. Hulling and washing apparatus of the type described, comprising in combination, a plurality of vats, a mixing device in each of said vats, means for operating said mixing devices, a shaft passing over said vats, means for rotating said shaft, a plurality of conical sieves and a corresponding number of scoop-

ing devices mounted on said shaft, one scooping device being adjacent to each sieve and each sieve being arranged in proximity to two vats, and each scooping device being adapted to dip into a vat and transfer material therefrom into its neighboring sieve which delivers the solid material to another vat, substantially as described.

3. Hulling and washing apparatus of the type described, comprising in combination, a plurality of vats, a mixing device in each of said vats, means for operating said mixing devices, a shaft passing over said vats, means for rotating said shaft, a plurality of sloping sieves and a corresponding number of bent tube-shaped scooping devices *c* in the form of hollow arms open at their outer and at their inner ends mounted on said shaft, one scooping device being adjacent to each sieve and each sieve being arranged in proximity to two vats, and each scooping device being adapted to dip into a vat and transfer material therefrom into its neighboring sieve which delivers the solid material to another vat, substantially as described.

4. Hulling and washing apparatus of the type described, comprising in combination, a plurality of vats, a mixing device in each of said vats, said mixing device comprising a substantially vertical shaft, and a screw fixed thereon, means for operating said mixing devices, a shaft passing over said vats, means for rotating said shaft, a plurality of sloping sieves and a corresponding number of scooping devices mounted on said shaft, one scooping device being adjacent to each sieve and each sieve being arranged in proximity to two vats, and each scooping device being adapted to dip into a vat and transfer material therefrom into its neighboring sieve which delivers the solid material to another vat, substantially as described.

5. Hulling and washing apparatus of the type described, comprising in combination, a plurality of vats, a mixing device in each of said vats, said mixing device comprising a substantially vertical shaft, a screw fixed thereon, and a conical sleeve surrounding the same, means for operating said mixing devices, a shaft passing over said vats, means for rotating said shaft, a plurality of sloping sieves and a corresponding number of scooping devices mounted on said shaft, one scooping device being adjacent to each sieve and each sieve being arranged in proximity to two vats, and each scooping device being adapted to dip into a vat and transfer material therefrom into its neighboring sieve which delivers the solid material to another vat, substantially as described.

6. Hulling and washing apparatus of the type described, comprising in combination, a plurality of vats, a mixing device in each of said vats, said mixing device comprising a substantially vertical shaft, a screw fixed



thereon, a conical device surrounding the same and having vertical ribs *f* on its inner surface, means for operating said mixing devices, a shaft passing over said vat, means for rotating said shaft, a plurality of sloping sieves and a corresponding number of scooping devices mounted on said shaft, one scooping device being adjacent to each sieve and each sieve being arranged in proximity to two vats, and each scooping device being adapted to dip into a vat and transfer material therefrom into its neighboring sieve which delivers the solid material to another vat, substantially as described.

7. Hulling and washing apparatus of the type described, comprising in combination, a plurality of vats, a mixing device in each of said vats, said mixing device comprising a substantially vertical shaft, a screw fixed thereon, a conical device surrounding the latter, and beaters *l* fixed on said shaft, means for operating said mixing devices, a shaft passing over said vats, means for rotating said shaft, a plurality of sloping sieves and a corresponding number of scooping devices mounted on said shaft, one scooping device being adjacent to each sieve and each sieve being arranged in proximity to two vats, and each scooping device being adapted to dip into a vat and transfer material therefrom into its neighboring sieve which delivers the solid material to another vat, substantially as described.

8. Hulling and washing apparatus of the type described, comprising in combination, a

plurality of vats, a mixing device in each of said vats, a shaft passing over said vats means for rotating said shaft, a plurality of conical sieves and a corresponding number of scooping devices mounted on said shaft, a dish *m* situated under each sieve, one scooping device being adjacent to each sieve and each sieve being arranged in proximity to two vats, and each scooping device being adapted to dip into a vat and transfer material therefrom into its neighboring sieve which delivers the solid material to another vat, substantially as described.

9. Hulling and washing apparatus of the type described, comprising in combination, a plurality of vats, a mixing device in each of said vats, means for operating said mixing devices, a shaft passing over said vats, means for rotating said shaft, a plurality of sloping sieves, a corresponding number of scooping devices mounted on said shaft, one scooping device being adjacent to each sieve and each sieve being arranged in proximity to two vats, and each scooping device being adapted to dip into a vat and transfer material therefrom into its neighboring sieve which delivers the solid material to another vat, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CARL KNOFF.

Witnesses:

JOHANNES EDWARD MEYER,  
CARL LUDWIG BÖDEKER,