

UNITED STATES PATENT OFFICE.

JAMES P. HERRON, OF WASHINGTON, DISTRICT OF COLUMBIA.

IMPROVEMENT IN THE PROCESSES FOR MAKING PAPER-PULP FROM VARIETIES OF PALM.

Specification forming part of Letters Patent No. **151,662**, dated June 2, 1874; application filed May 18, 1874.

To all whom it may concern:

Be it known that I, JAMES P. HERRON, of Washington city, in the District of Columbia, have invented certain new and useful Improvements in Making Pulp and Paper; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it.

My invention relates to a process of making paper-stock from varieties of palm, known as *Chamarops serulata*, or *Hystrix*; *Sable Adansonii*, or *pumilla*; and *Corypha palmetto*, all of which are found in southern portions of the United States. My invention consists in the following steps or procedures, executed in the order and in the manner substantially as hereinafter set forth and claimed.

It should be first understood that I do not limit myself to the varieties of palm, &c., above enumerated, as other fibrous plants and grasses may be found, that, if subjected to the same process, will produce a similar stock, possessing like distinctive features. The above varieties are those that I have experimented with.

The following is a description of my process: The material is first prepared by tearing up, cutting, or breaking into convenient size, to be easily manipulated, and is admitted into a boiler, or suitable vessel for digesting. It is then put into the digester, which is a close vessel, capable of withstanding a considerable pressure. I admit into this digester a solution of caustic alkali, not of sufficient strength to act as a solvent, in destroying or eating out the resinous and albuminous substances that unite the fibers together, with the talco-silicious properties, but simply of sufficient strength to render the mass slippery for easy agitation. A jet of steam is admitted into the digester, and is maintained until a considerable pressure is obtained. A very high degree of pressure is not essential. When pressure is used it is principally for mechanical purposes—for example, to aid in conducting or propelling the stock through the machine. When the mass has become well softened, by cooking, with agitation, the products of the digester are expelled into a grinding-

machine which is steam-tight, and the mass is ground while under the direct action of steam, which is injected into the mass, commingling with it in passing through the mill or grinding-machine, so that, as the parts are separated by grinding, the steam will act to assist in a speedy steeping of the freshly-exposed portions, and will thus reduce or set free the coloring matter. After passing through the grinder, the mass will be found to possess rough branchy fibers with gluey resinous talco-silicious properties in a pulpy consistency, naturally combined for good strong paper, and this product can be employed at once, as a whole stock, for the manufacture of a coarse grade of paper, or can be advantageously employed as a part stock, in mixing with other fibrous pulps in the manufacture of different grades of paper.

For finer grades of paper-stock, I do not stop the process at the end of the first grinding operation, but discharge the mass, as ground, again into a digester like the first, where it is again thoroughly agitated as before, and is passed thence into and through another grinder, and subjected to commingling with the steam, in passing through as before, producing a very much finer stock, which can be still improved by one or more succeeding repetitions of the foregoing operations.

The pulpy products that are obtained after the second and following grinding, can each of them be employed as a whole stock, and made into fine grades of paper.

The stock prepared by this process from the material named possesses excellent felting properties, as seen under the microscope, is of unusually fine long fibers, irregular, serrated, and branchy, having silicious-ivory or pearly-talcous appearance, and is, to the natural eye, entirely distinctive from other pulps, and the papers that are made therefrom possess the same distinguishable characteristics, equal in texture to the finest India paper, and having the smooth wearing character of parchment, my process retaining the natural properties of the palm, which are of a fine, smooth, glossy, and even texture, ordinarily given by artificial sizing, &c., to papers. At the same time, the strength of the fiber having been in

no degree injured by the alkali, the paper therefrom produced is of a very fine, tough, strong, and durable character.

Instead of employing alkali in solution in the first operation, which, it will be remembered, was such a weak solution as not to act upon and destroy the resinous and glutinous substances that bind the fibers together, or any of the other natural paper-making properties, different ingredients may be employed for like purpose, such as naphtha, benzine, ammonia, soap, &c. The digester, into which the material is first placed, should be of such character as possesses the means of thoroughly agitating the entire mass while it is subjected to the heat and pressure, and similar agitation of the mass should take place in each succeeding digester that may be employed. In the grinding-engine a strong current of steam should be made to pass through and intermingle with the mass in grinding, to act on the freshly-separated fibers, greatly assisting disintegration, and also reducing the coloring matter.

After the grinding is accomplished the mass is thoroughly washed from soluble foreign matter, preserving the substantial paper-making properties, and the pulp may be bleached to the most perfect whiteness, without injuring materially the very fine desirable paper-composing ingredients (in natural proportion peculiar to the aforesaid varieties of palm) by the ordinary bleaching process.

I am aware that a patent has been issued to J. W. Dixon, May 1, 1866, for a treatment of dwarf-palm by highly-heated water under pressure, for preparing it for spinning and making paper-pulp. Such treatment and preparation I do not claim. I am also aware that it is said that in Africa, "dwarf-palm has been

beaten into half-stock, of which specimens of paper were made." These specimens, or any others made of palm, I have not been able to see.

The beating process I do not claim; but I do believe myself to be the first to make a whole-stock pulp and paper, having the properties described, from the varieties of palm named, spontaneously growing in inexhaustible quantities in southern portions of the United States.

The machinery that I prefer to employ in my process forms a subject-matter of a separate application for Letters Patent filed by me March 26, 1874, in the Patent Office of the United States.

What I claim in this case is—

1. The within-described process of making a whole-stock paper-pulp from varieties of palm, wherein the material is cut or torn into pieces of suitable size, then cooked in a close digester, with thorough agitation and under steam-pressure, in a weak solution of alkali, naphtha, benzine, or soap, as set forth; then completely ground while steam passes freely through the grinder and intermingles with the stock, reducing and bleaching it, and finally washed, all substantially as set forth and described.

2. A whole stock paper material made from palm, possessing the peculiar talcky-silicious ivory appearance and distinguishable properties, as described, and shown in specimens.

In testimony that I claim the foregoing I have hereunto set my hand this 18th day of May, A. D. 1874.

JAMES P. HERRON.

Witnesses:

THOMAS C. CONNOLLY,
OCTAVIUS KNIGHT.