

After an hour the gum has settled to the bottom sufficiently to allow the liquid part to be drawn off. The gummy produce is then placed in brass or copper pans well tinned, and so fixed that steam made to ply underneath will gradually cause evaporation and leave the gum in a sufficiently solid state to handle. When a sufficient quantity has been obtained, and it is desirable to bring it to a perfect degree of purity, the mass so obtained may be made to undergo the same process by reboiling, as before described, with pure water. Solid blocks of gum, nearly transparent, and of great commercial value, are thus produced and for this purpose and result.

CLASS II., *Sub-Class B.*—CHARLES JAMES POWNALL, of Auckland. (Dated 7th November, 1866.) This invention consists in preparing and cleansing vegetable fibres by first submitting them to the action of dry superheated or wet steam for the purpose of softening the gummy, resinous and other matters contained therein, and then passing them through grooved rollers cut in manner herewith specified.

To effect this object the *Phormium tenax* is placed in a suitable vessel of wood, iron, or other material made steam tight and connected by pipes with a boiler or other steam generator, and in this it is allowed to remain for about four hours subject to a moderate pressure of steam sufficient to percolate thoroughly all through and into the flax, and it is then passed through rollers.

The novelty and peculiarity of these rollers consist in their grooved surfaces and their adaptation for this purpose. Each roller may be about three feet long by one foot diameter and the top roller is cast in solid metal with the addition of weights, levers, or springs attached to it to be used when required. They may be driven by hand, horse, water, or steam power, with any of the well-known mechanical arrangements for that purpose. The grooves upon each roller correspond to each other, and the distance best adapted for the purpose is 1-32 inch apart, and 1-16 inch deep, but may be varied to suit the coarser or finer qualities of fibre. Over the top roller flows a continuous stream of fresh water for the purpose of washing away these gummy and resinous matters as by the pressure they are discharged from the flax.

The flax or other fibre being now thoroughly softened by the action of the stream is passed four times through one pair of these rollers or once through four pair connected together, and undergoes in this operation two distinct processes. 1st, The removal by pressure and a stream of water of the gummy resinous and other matters softened and set free by the action of the steam as hereinbefore described; and 2ndly, an opening or hackling process by passing the flax longitudinally through the grooved surfaces cut into and upon the rollers as before described.

It will now be found, when dried, to have lost about 75 per cent. of its weight in the removal of these resinous gummy and other matters; and the flax or other fibres being well separated into threads by the hackling process before described, is fit for manufacturing into any coarse purposes, such as rope-making, wool lashing, &c., &c.

If the flax or other fibres are required for finer purposes, this operation may be repeated or it may be submitted to the action of cold or warm fermentation or any chemical agents having an affinity for resinous and colouring matters, such as alkalies, caustic soda, chloride of lime, &c., by which means any of the said foreign matters still remaining may be removed.

The combined action of submitting the *Phormium tenax* or other vegetable fibres to the action of steam in a close chamber for the purpose of solving their gummy, resinous, and other matters, and then passing them through rollers as herein described, or other mechanical pressure, with a stream of running water for the purpose of pressing out, opening, or hackling and washing away these gummy, resinous and other matters, contained therein.

CLASS II., *Sub-Class C.*—MICHAEL MURRAY, of Papakura Bridge, near Auckland.—(Dated 29th April, 1867.)

THE green flax first goes through a boiling process; it is then placed in a shoot, and from thence in single leaves (four single leaves at a time) is put between the feeding rollers, and whilst passing through these rollers the hackles of the drum, together with the brush or brushes, clears the glutinous or gummy substance from the plant.

CLASS II., *Sub-Class D.*—LUKE NATTRASS, of Nelson.—(Dated 18th February, 1870.)

THE mode of operation consists of the chemical preparation of the plant (*Phormium tenax*, &c.), afterwards passed through a machine invented for the purpose. By boiling the plant for a sufficient time in a solution of ferro-cyanate of potassa, prussiate of potash, or by subjecting it to steam generated from the same, the plant becomes softened and the non-fibrous portions disposed to separate from the fibrous portions when subjected to friction under water.

The machine consists in principle of a horizontal wood roller, furnished with metal teeth placed lengthwise, to be furnished with a handle for manual use, if necessary, with or without a fly-wheel. Under the said roller are fixed in a frame a sufficient number of teeth from end to end of the said roller, but placed obliquely at a proper angle with the teeth of the said roller.

The fixed teeth under the roller being nearly semicircular and placed obliquely, as before stated, the friction on the plant between them will be perfect. The softened plant, therefore, being dropped *breadthwise*, will be carried downwards by the teeth of the roller, and subjected to pressure and friction in water above, but close to the oblique teeth, and the fibrous parts only forced out *breadthwise*, and fall over into another trough of water. The teeth of the roller are not allowed to touch the oblique teeth, but their closeness to each is regulated by weighted levers resting on metallic bushes placed on each end of the spindle of the toothed roller. The fibre, after being taken out and pressed, is laid out to dry (or bleached if required), passed once through the hackles, when it is ready for pressing into bales.