

(196.)—T. KELLY, Esq., M.H.R., to Dr. HECTOR.—18th November, 1871.

I have the honor to acknowledge the receipt of your letter of the 16th instant, in which you state that the Flax Commissioners will devote a sum not exceeding £70 for the purpose of testing my improvements in flax machinery. I beg to state that I accept the offer of the Commissioners, and will, on my return to Taranaki, proceed with the construction of the machine.

(255.)—T. KELLY, Esq., M.H.R., to Dr. HECTOR.—4th June, 1872.

I beg to acknowledge the receipt of your letter respecting the machine, and I have concluded to forward the model to you, as I find that I will not have time to go to Auckland to get the machine made before the General Assembly meets, while, if it is made in Wellington, it will not much delay it, and I can look after its construction while there.

(271.)—T. KELLY, Esq., M.H.R., to Dr. HECTOR.—Wellington, 20th July, 1872.

I beg to furnish you with a description of the improved machine for dressing *Phormium*, a full sized model of which I have placed in the Museum, together with sectional drawings showing two modes of differential adjustment, also sectional drawing of machine, with my improvements applied to machines which beat on a bar, showing composition bar of improved construction.

I may state that this model is merely illustrative of the principle on which my improvements are based, so that I do not confine myself to the actual size of the stripping drum or other parts of the machine.

These improvements were suggested to me by observing the practical difficulties which I encountered in working Price's small machines. These difficulties were occasioned—first, by faults in construction; second, in faults of design; and third, in faults of material used in the construction of the machine.

The faults of construction I found to be want of length of the bearings of the feed roller, and difficulty of oiling, causing the journals to wear loose very rapidly, thus rendering it practically impossible to secure that control over the adjustment of the space between the surface of the rollers and the beating bars of the drum, so necessary to good dressing. The mode of securing the cast iron collar of the feed rollers to the wrought iron shaft or spindle was also very defective. This was effected, in the first instance, by drilling two holes through both collar and spindle at right angles to each other, and driving in an iron pin. The excessive vibration to which the rollers were subjected invariably loosened these pins, and they were a constant source of delay and loss. Subsequently the collars were keyed on in the ordinary way in which pulleys were keyed to shafting, but these also are constantly working loose. The mode in which I propose to key the collars will overcome those difficulties, and at the same time offer greater facilities for the removal of an old collar and the substitution of a new one.

The mode of fixing the scraping plate to the surface of the lower roller was another defect, being merely a piece of wood having a piece of hoop iron on its upper edge, and retained in its place by being wedged between the frame of the machine below the roller. This scraper was continually working loose, and necessitated the stoppage of the machine to replace it. I remedy this by having a transverse bar cast in the frame below the position of the roller, to which a steel plate with slots to receive bolts is secured, being easily adjusted to the surface of the roller, and retained there by tightening the nut.

Defects of the construction in the gearing of the feed motion I will not describe, as the defects have been, in a great measure, overcome in the large machines more recently constructed.

Defects of Design.

With regard to the defects of design, the first is the position in which the indiarubber springs are placed which press the bearings of the lower roller towards the beating bars of the drum. As these springs are placed in immediate contact with the bearings of the roller it is difficult to put in rubber of sufficient thickness, and it necessitates the removal of both rollers and all connecting gearing to replace worn-out springs. Being liable to be saturated with oil from the bearings, the rubber soon loses the indispensable property of firm elasticity, and thus entails unnecessary expense in keeping up the efficiency of the machine.

I remedy this by placing the springs outside the standards which hold the roller bearings in position, when they can be speedily and conveniently replaced without interfering with other parts of the machine. As regards adjustment, the design is faulty in consequence of the impossibility of easily and satisfactorily effecting it while the machine is running. If the rubber springs are in the proper state of compression, that is, just keeping the lower roller up to its work with sufficient firmness to insure the fibre being dressed without being unduly cut, yielding backward only when a greater abundance of fibre comes between the roller and the beating bars, the machine, if in good order, dresses well; but to insure good dressing under a variety of conditions it is found necessary in practice that the space between the face of the roller and the beating bars shall be capable of adjustment when the machine is running. This is effected in Price's by loosening the bearing of the stripping drum, so that it will admit of being moved by a set screw to or from the roller. This cannot be done satisfactorily or with accuracy.

I propose to remedy this by means of a pair of differential screws, working in the end of the machine communicating independently with the bearings of the lower roller. This adjustment includes the means of roughly adjusting before the action of the differential screw is brought into operation. The adjustment can be applied by means of a male screw, $\frac{7}{16}$ in. diameter, working into a plate nut fixed by bolts to the end of the machine. Within this male screw a $\frac{1}{2}$ in. screw works, to the end of which is attached a rod which communicates motion to the bearers by means of a lever, which has the effect of moving the roller from the beating bars, or by reversing the screw, allowing it to come closer; by this mode one turn