No. 610,019. Patented Aug. 30, 1898.

C. H. BARTLETT.

MILL FOR CUTTING TEA.

(Application filed Dec. 22, 1897.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 6.

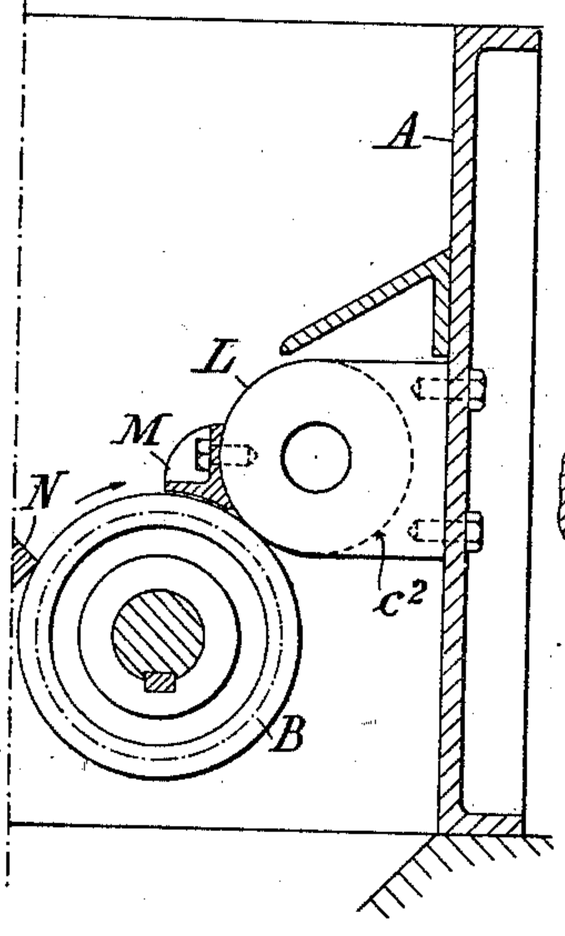

FIG. 5.

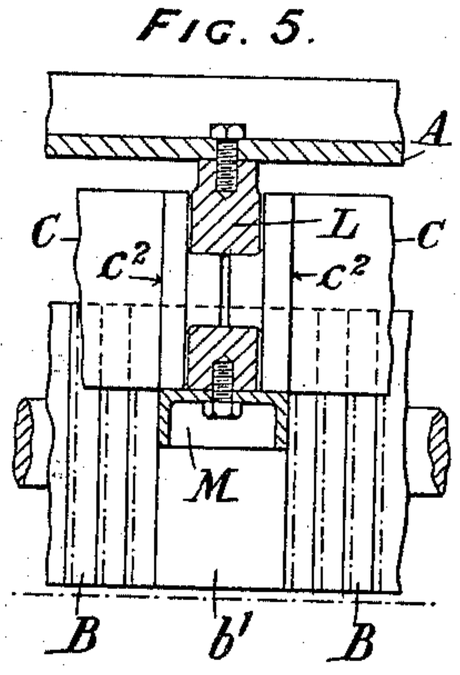

FIG. 4.

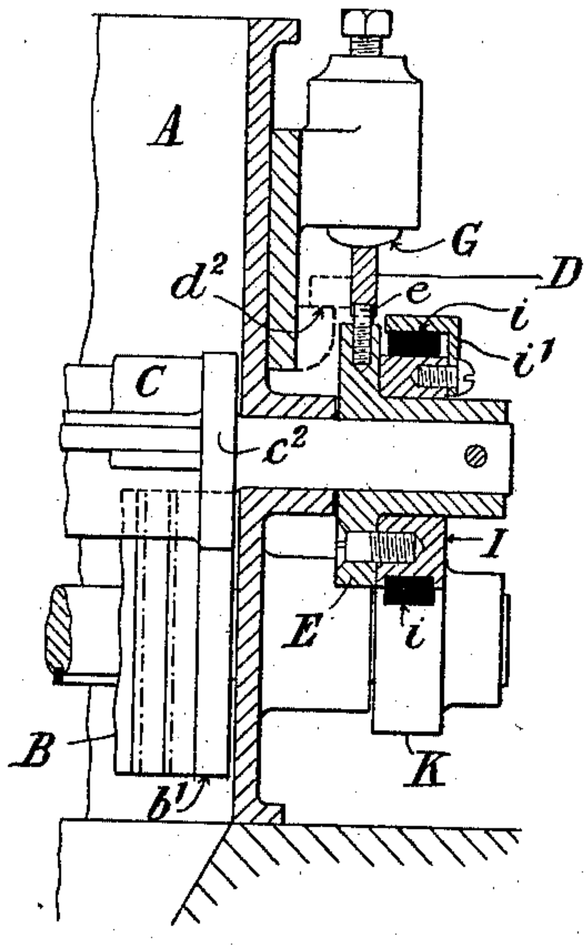

FIG. 1

3

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FIG. 3.

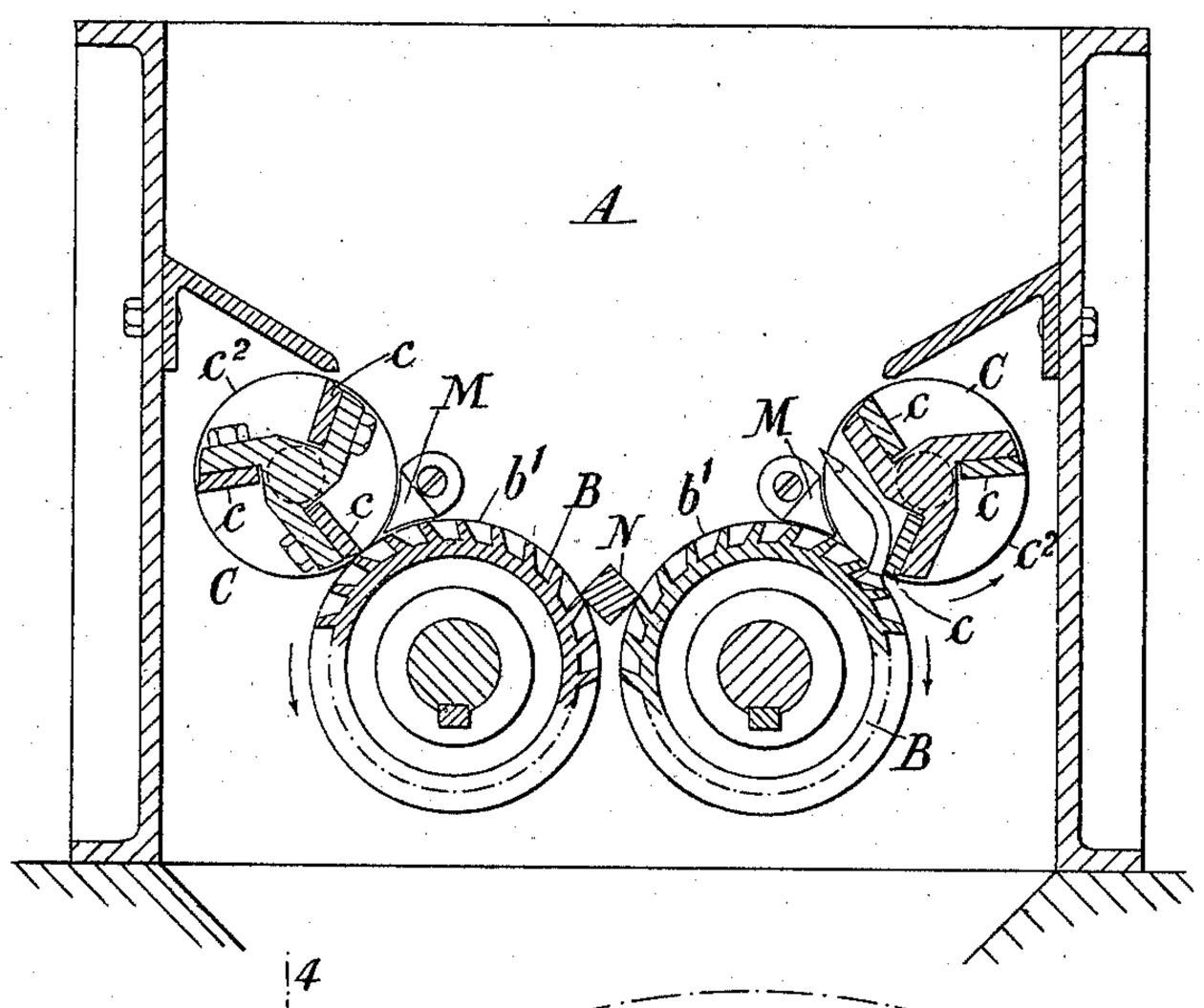
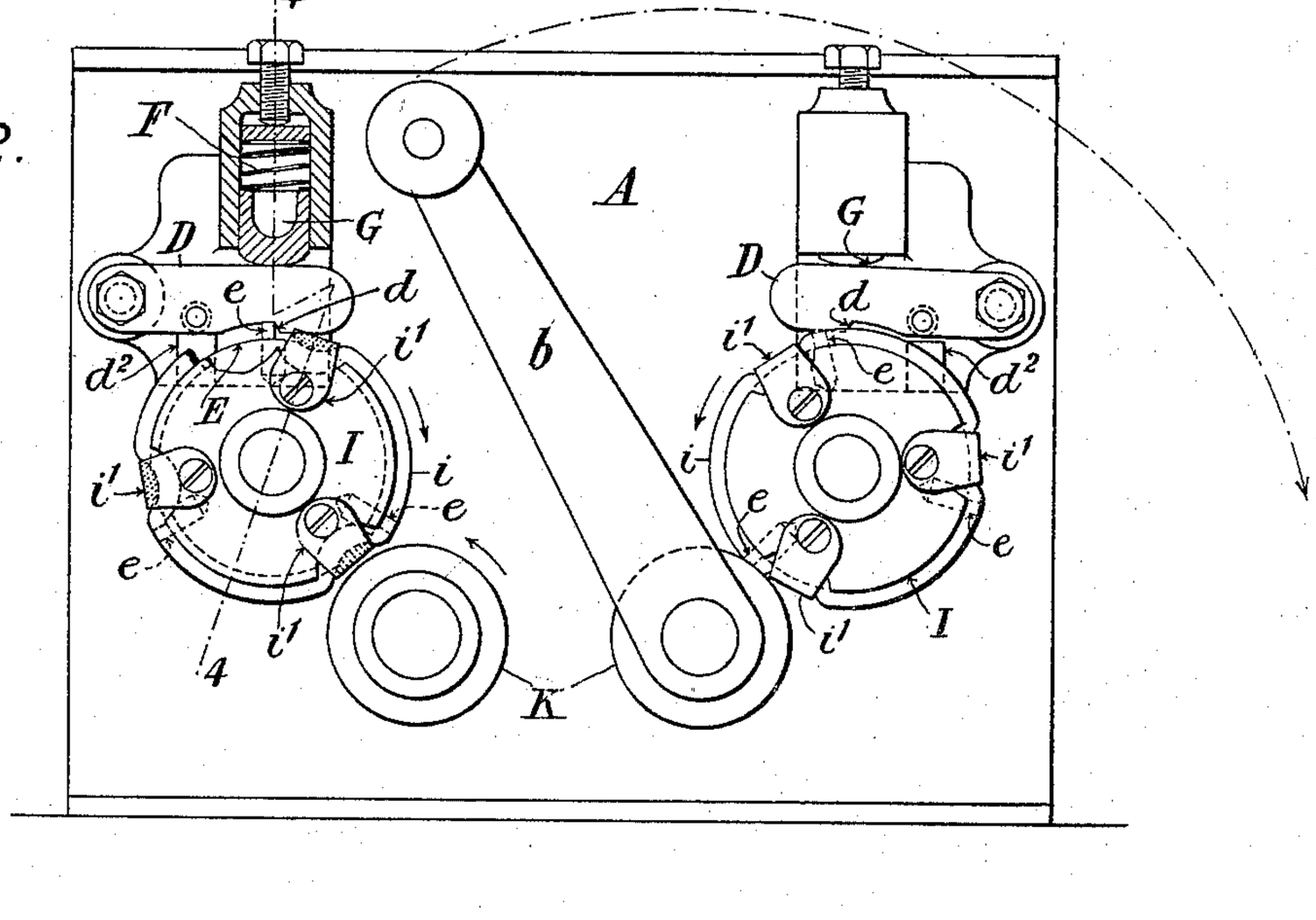


FIG. 2.



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UNITED STATES PATENT OFFICE.

CHARLES HENRY BARTLETT, OF BRISTOL, ENGLAND.

MILL FOR CUTTING TEA.

SPECIFICATION forming part of Letters Patent No. 610,019, dated August 30, 1898.

Application filed December 22, 1897. Serial No. 663,012. (No model.) Patented in England November 4, 1893, No. 20,982.

To all whom it may concern:

Be it known that I, CHARLES HENRY BARTLETT, scale-maker, of Bristol, in the county of Gloucester, England, have invented new and useful Improvements in Mills for Cutting Tea, (for which I have obtained Letters Patent in Great Britain dated November 4, 1893, No. 20,982,) of which the following is a full, clear, and exact description.

This invention relates to mills for cutting tea, which consists, essentially, of a revolving cylinder presenting cutting edges acting in conjunction with a stationary knife; and the invention has for its object to avoid the injury to the cutting edges of the cylinder and the knife, which is frequently caused by nails and other hard substances accidentally mixed with the tea.

The invention consists, essentially, in the combination, with a knife mounted to revolve upon journals, of a spring-actuated detent by which the knife is normally retained in operative position, but which is free to yield to excess of pressure, and of friction-gear adapted to come into operation after the detent has so yielded, the yielding of the detent allowing the knife to recede from the obstruction to which the excessive pressure is due and the friction-gear continuing the motion until the knife-blade is returned to operative position with regard to the cylinder. During this receding motion of the knife the nail or other obstruction is carried round by the cylinder until it falls out of the machine, so that no injury is done by it either to the revolving or stationary cutting edges.

In order, however, to reduce to a minimum the amount of tea which may pass through uncut while the cylinder is revolving inoperatively during the yielding motion of the knife and its return to operative position, it is preferred to mount a number of such knives around a common axis, so that they shall come into operative position successively, the peripheral face of the friction-gear being interrupted at points corresponding to the respective blades, so as to move the knife round only the distance from one blade to the next.

Reference is to be had to the accompanying drawings, forming a part of this specification, wherein—

Figure 1 represents a plan view with parts broken away, and Fig. 2 a part sectional end elevation of a tea-cutting mill provided with two cutting-cylinders and two sets of yielding stationary knives. Fig. 3 is a cross-section of the same on line 3 3, Fig. 1. Fig. 4 is a sectional elevation of the friction-gear and knife-holding detent mechanism, taken on line 4 4, Fig. 2. Figs. 5 and 6 show details of an intermediate bearing for the stationary knives when the latter are divided into independent lengths separately controlled and operated by detent and friction-gear from both ends of the machine.

The same letters of reference indicate the same parts in all the figures.

A is the box or chamber of the mill, in which the cutters are mounted.

B B are two cutting-cylinders journaled in the ends of box A, geared together so as to be rotated in opposite directions by the revolution of a single winch-handle *b* or equivalent mechanism and each constructed in the usual way of a number of cast-iron disks juxtaposed upon a shaft, each disk presenting a number of peripheral cutting edges with intermediate cells, whose size and depth regulate the length to which the tea is cut by the said cutting edges acting in conjunction with the two sets of stationary but yielding knives C C. As the detent and friction-gear are alike for both sets of knives, it will be sufficient to describe one set.

Each set of stationary knives is composed of preferably three cutting-blades *c*, attached by bolts or screws to wings cast on a common boss or shaft; but there may be a greater or less number of cutting-blades, the detent and friction-gear being modified accordingly.

The detent mechanism by which any one of the knives is held in operative position for the cylinder to act against consists of a lever D, having a notch *d*, in which engages any one of a series of lugs *e*, fixed to disk E, fast on the knife-shaft, the portions of the lugs around the edge of the disk E being of course in proper relation to the respective knives and to the detent D, so that when a lug is engaged in the notch *d* the corresponding knife will be presented in operative position to the cylinder B. The detent-lever D is pressed

upon by a strong spring F, acting through a plunger G, sliding in the spring-box, and the face of the notch *d*, against which the lug *e* abuts, is not radial to the knife-axis, but inclined at such an angle that although it will resist the tendency of the knife-axis to revolve under the normal pressure of cutting tea an excess of pressure, due to a nail or other obstruction caught in the cells of the cylinder being brought against the stationary knife, as shown at the right-hand side of Figs. 2 and 3, will cause the lug *e*, acting against the inclined face of the notch *d*, to raise the detent-lever D against pressure of the spring and so allow the lug to escape. When the lug is thus disengaged from the detent, the latter offers no further obstruction to the rotation of the knife-shaft, the detent resting clear of the disk E on a stationary ear d^2, fixed to the frame, until the next lug comes round into position of engagement with the notch *d*.

I is a "mutilated" friction-wheel fast on the knife-shaft, having as many peripheral notches as there are knives on the shaft, located in such relation to the knives and to a friction-pinion K on the cylinder-shaft that when a knife is in operative position a depression of the friction-wheel I will be opposite to the friction-pinion K, as shown at the left-hand side of Fig. 2, so that the latter will then be out of frictional contact with the wheel I. The frictional surface of the wheel I is formed by an encircling band of india-rubber *i*, which is depressed into each of the peripheral notches of the wheel by a metal strap *i'*, screwed to the wheel, the part of the strap which lies in the depression being of the form indicated by the dotted section-lines, its outer surface being within the circle of the outer face of the friction-band *i*. The partial revolution of the knife-axis consequent on the yielding of a knife to an obstruction, as above described, brings the rubber-faced periphery of the friction-wheel I into operative contact with friction-pinion K, as shown at the right-hand side of Fig. 2, so that the receding motion of the knife in the direction of the arrow, Figs. 2 and 3, is continued by the action of the friction-gear until another knife has come into operative position, whereupon the knife-axis will be reëngaged with the detent and the friction-wheel will be out of contact with the pinion by which it was rotated.

When the cutting-roller is of such length that the resistance of the detent necessary to hold the stationary knife normally up to its work is considerable, it is preferred to make the knives and their shafts in two independent sections of equal length, the inner ends of the shafts being journaled in an intermediate lug L, fixed to the casing, as shown in plan in Fig. 5 and in transverse sectional elevation in Fig. 6. Each section of the knife-shafts is provided at its outer end with detent and friction-gear, as above described, so that either section may turn independently of the others. In this way the mill is rendered as sensitive as possible to obstruction, and risk of injury to the cutting edges as well as loss of efficiency in the mill on account of tea passing through uncut are reduced to a minimum.

It will be understood that wherever a knife-shaft is furnished with a flange c^2 for the support of the wings carrying the knife-blades the cylinder should be furnished with a plain or non-cellular disk *b'* of a breadth corresponding to that of such flange, so as to prevent any tea passing through the mill uncut, while in order to prevent tea or other substances becoming wedged between the said flange and disk and thus stopping the mill a fence or packing-block M should be applied, as shown, a somewhat similar fence consisting of a rectangular bar being applied, as at N, for the purpose of preventing uncut tea dropping between the cylinders at any point in their length.

I am aware that it has heretofore been proposed to mount the stationary knife so that it might be made to recede from the cutting-cylinder by partial rotation about its own axis in order to give passage to an obstruction; but only a single knife-blade has been so employed, such blade being returned backward to operative position by a spring or weighted lever, there being no continuous rotary movement away from the obstruction nor any provision by the use of two or more knives mounted upon the same shaft for reducing the amount of tea passed through uncut. Moreover, hitherto it has not been found possible in practice to effectually preclude the possibility of the blade returning to its operative position before the obstruction has been entirely ejected, so that the risk of damage to the machine by the obstruction being retained between the cutting edges of the knife and cylinder has not been obviated. In my machine, as above described, the obstruction must necessarily press first more or less against the face of the knife and so cause the knife to recede before the obstruction can get between the cutting edges, and since, when the knife-shaft has once been released from the detent, no further obstruction is offered to its continued receding motion, but it is in fact caused to recede still further by the friction-gear, the obstruction is liberated without ever actually coming between the cutting edges at all.

I claim—

1. In a tea-mill the combination, with the revolving cutting-cylinder and with a stationary knife or set of knives journaled upon an axis parallel to the cylinder and with detent mechanism for retaining the same yieldingly in operative position, of friction-gear adapted to come into operation after the knife has been moved out of engagement with the detent mechanism, and to impart a continued motion to the knife in the same direc-

tion so as to move it farther from the cylinder and return it or bring another knife into operative position by such continued rotation, substantially as and for the purpose specified.

2. In a tea-mill, the combination with a revolving cutting-cylinder and with a stationary knife or set of knives journaled upon an axis parallel to the said cylinder, of yielding detent mechanism for retaining the knife in operative position and consisting of a lug on the knife-axis and a detent held yieldingly in engagement with said lug, the contacting surfaces of the lug and detent being adapted to act as a cam whereby a turning movement applied to the knife-axis substantially in excess of the normal will overcome the load on the detent and force it back so as to permit the escape of the lug and the revolution of the knife-axis.

3. In a tea-mill the combination with a revolving cutting-cylinder and with a stationary knife or set of knives journaled upon an axis parallel to the said cylinder, of yielding detent mechanism for retaining the knife in operative position and consisting of a lug on the knife-axis, a spring-pressed detent-lever pivoted to a fixed point and adapted to engage with the lug, and means of regulating the stress of the spring, the lug and detent engaging by a surface oblique to the path of the lug so as to act as a cam whereby a turning movement of the knife-shaft substantially in excess of the normal, will be applied to overcome the stress of the spring, and force the detent out of engagement with the lug, substantially as specified.

4. In a tea-mill the combination with a revolving cutting-cylinder, of a set of two or more knives on the same shaft, lugs on the shaft corresponding one to each knife, a spring-pressed detent adapted to enter into engagement with any one of said lugs and to yield thereto under a turning movement of the knife-shaft in excess of the normal, and of friction-gear adapted to transmit partial rotary motion from the cutting-cylinder shaft to the knife-shaft when the latter escapes from the detent, said friction-gear consisting of a friction-pinion on the cutter-shaft and a mutilated friction-wheel on the knife-shaft, having friction-segments in correspondence only with the inoperative positions of the knives so that when the knife-shaft is partially rotated to move one knife out of operative position, another will by the engagement of the pinion with a segment of the mutilated wheel be simultaneously brought into operative position by the same motion of the shaft, substantially as and for the purpose specified.

5. A tea-mill having, in combination with the revolving cylinder, a set of knives divided into independent lengths or sections, each length or section being journaled upon an axis and combined with detent mechanism adapted to engage with lugs on the knife-shaft and to yield thereto under an excessive turning movement of the knife-shaft, and of friction-gear consisting of a friction-pinion on the cutter-shaft and a mutilated friction-wheel on the knife-shaft, the adjacent ends of the two sections being journaled in an intermediate bearing, substantially as and for the purpose specified.

CHARLES HENRY BARTLETT.

In presence of—
W. B. MULERFALL,
DAVID THOMAS MAY.