(No Model.) 2 Sheets—Sheet 1.

M. MUSGRAVE & C. E. COOPER.

FEEDING DEVICE FOR COTTON OPENERS, &c.

No. 547,934. Patented Oct. 15, 1895.

Fig. 1.

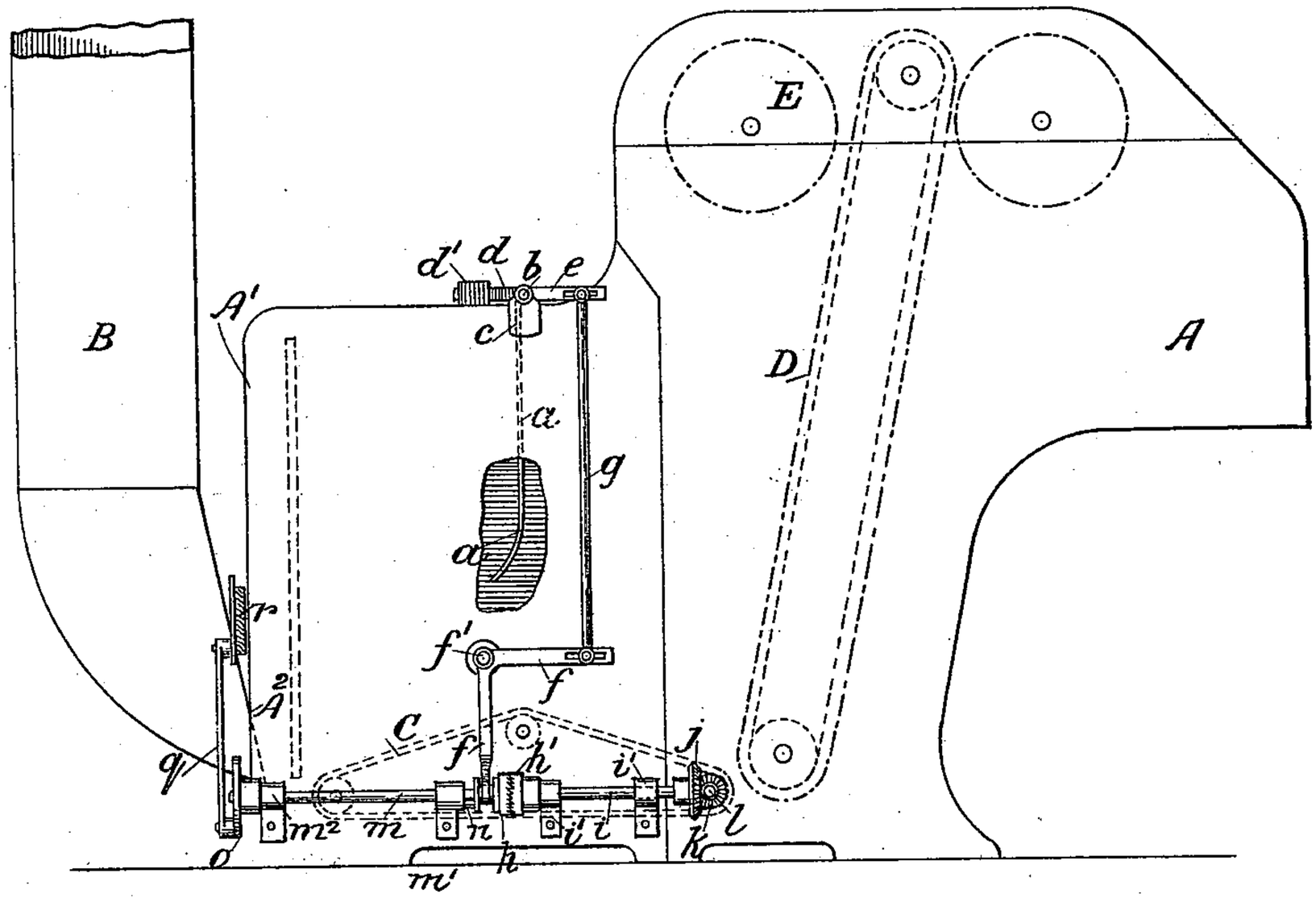
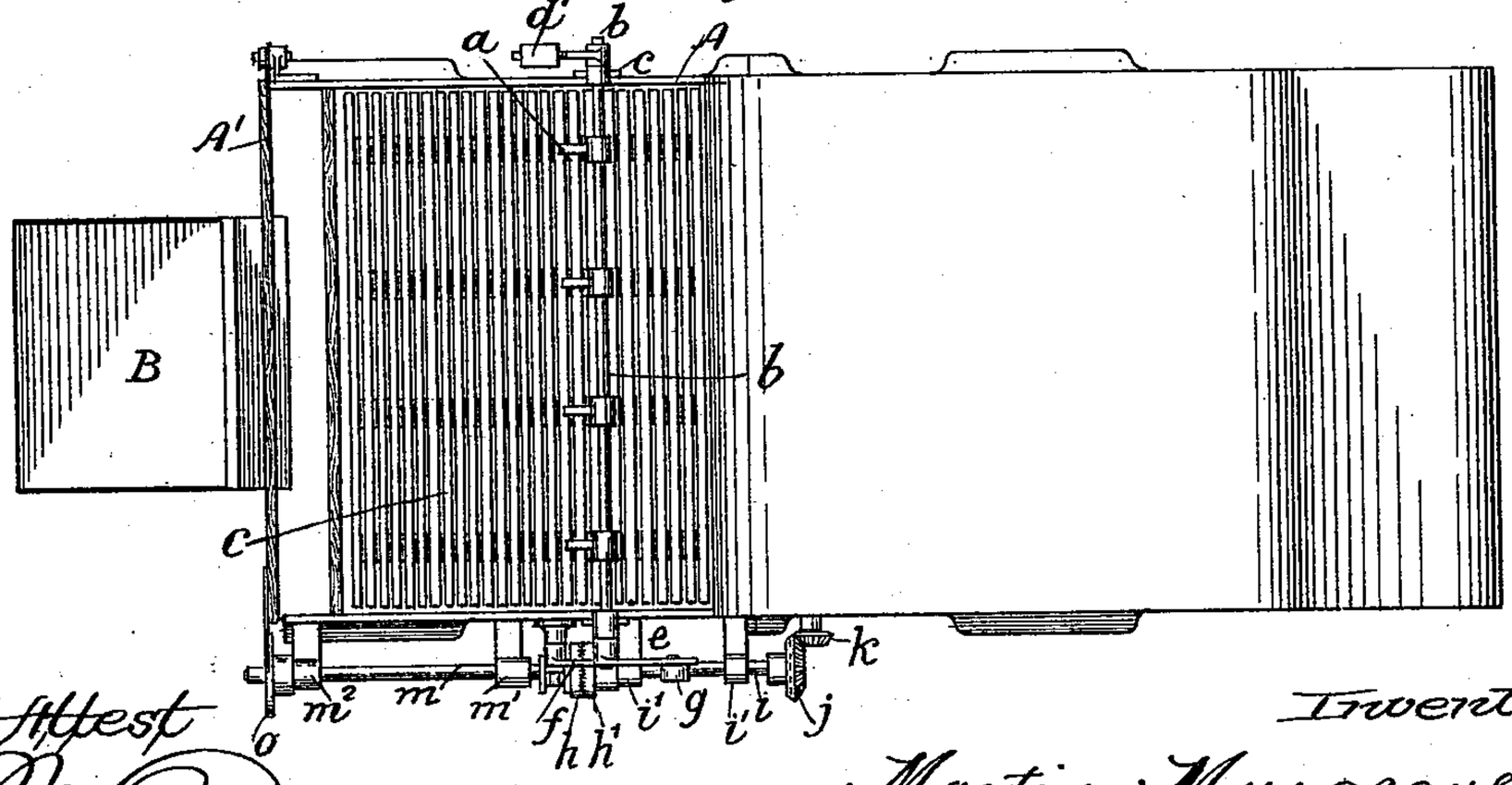


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 4.

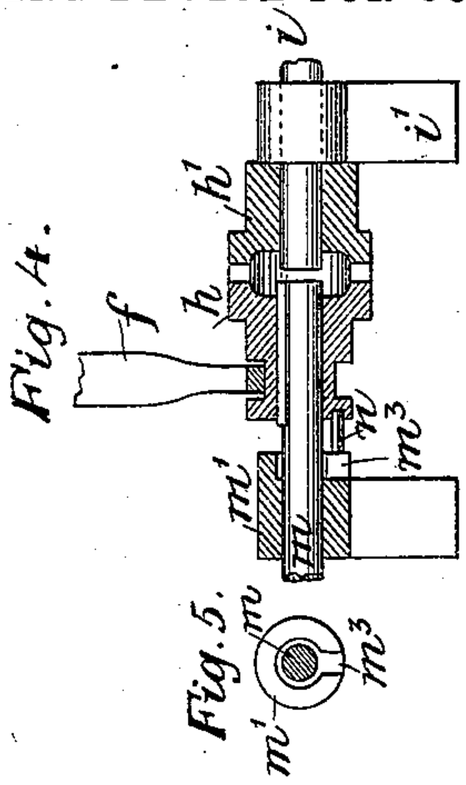
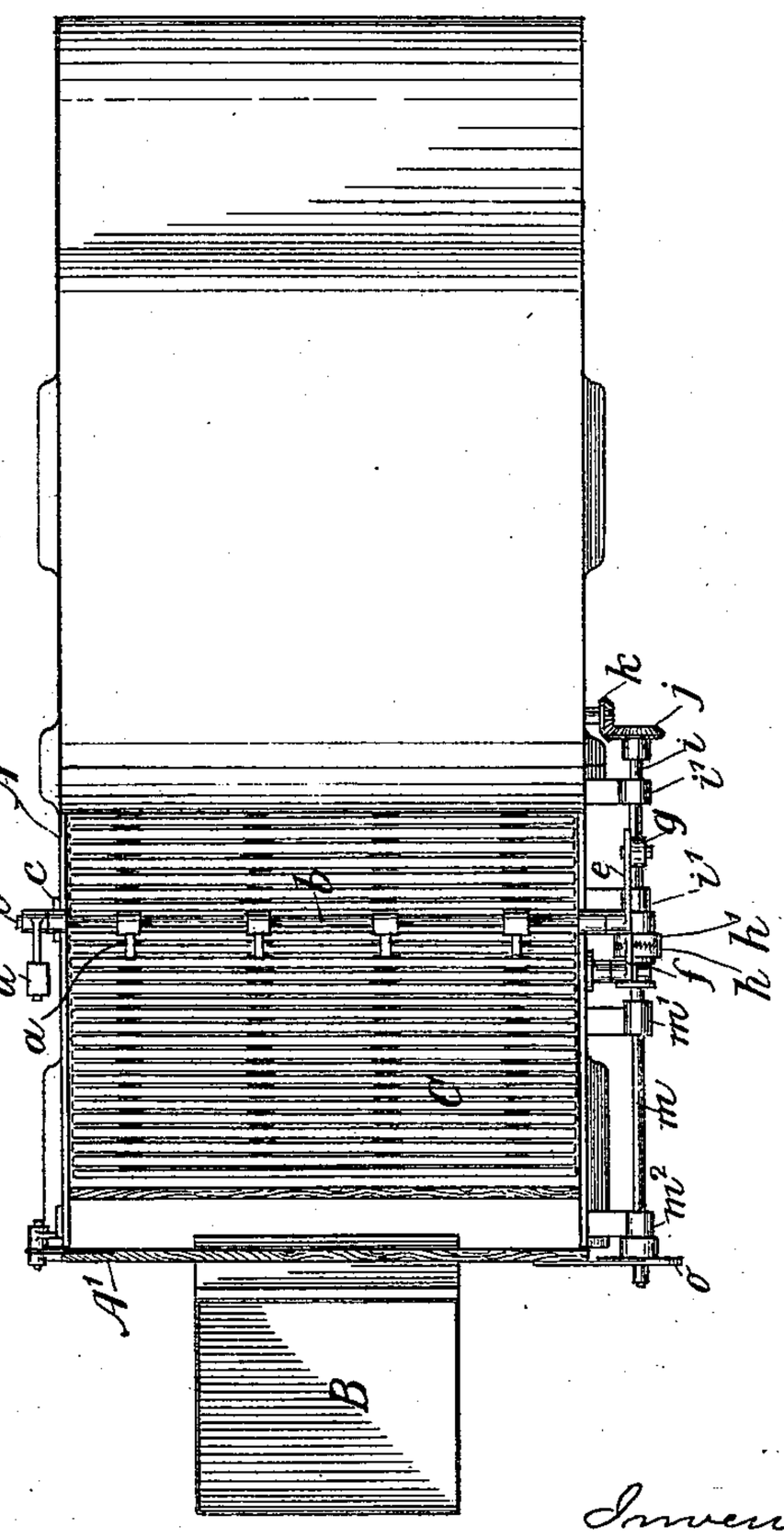


Fig. 5.

Fig. 3.



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by Richardson & Co
attorneys.

UNITED STATES PATENT OFFICE.

MARTIN MUSGRAVE AND CHARLES EDWIN COOPER, OF BOLTON, ENGLAND,
ASSIGNORS TO DOBSON & BARLOW, LIMITED, OF SAME PLACE.

FEEDING DEVICE FOR COTTON-OPENERS, &c.

SPECIFICATION forming part of Letters Patent No. 547,934, dated October 15, 1895.

Application filed April 10, 1895. Serial No. 545,230. (No model.) Patented in England June 20, 1894, No. 11,918.

To all whom it may concern:

Be it known that we, MARTIN MUSGRAVE and CHARLES EDWIN COOPER, subjects of the Queen of Great Britain, residing at Halliwell, Bolton, in the county of Lancaster, England, have invented certain new and useful Improvements in Feeding Devices for Cotton-Openers, &c., (for which we have obtained Letters Patent in Great Britain, No. 11,918, bearing date June 20, 1894,) of which the following is a specification.

This invention relates to improvements in or relating to combined feeders and openers employed in the preparation of cotton and other fibrous materials, and is designed to automatically regulate the working of the same according to the weight or amount being supplied thereto. In the hopper are mounted prongs, against which the cotton or other fibrous material operates, and when below a certain quantity or weight the apparatus is set in motion to feed the machine. When the quantity or weight is in excess, it operates against the prongs and stops the feeding apparatus; and in order that our invention may be fully understood and readily carried into effect we will describe the accompanying three sheets of drawings, in which—

Figure 1 is a side elevation of one arrangement of a hopper-feed made in accordance with our invention and in which the cotton or other fiber is supplied to the hopper through a trunk. Fig. 2 is a plan of Fig. 1. Fig. 3 is an end elevation at the feed end. Figs. 4 and 5 are details on a larger scale of part of the mechanism.

The side of the hopper is marked A, the hopper front A′, the feeding-trunk B, the bottom lattice C, and the spiked apron D. These are of the usual construction and arrangement, and in the following description we will confine ourselves to those parts which are directly affected by our invention.

Within the hopper we suspend a series of prongs *a*, which are secured to a shaft *b*, extending across the top of the hopper and supported in bearing-brackets *c*. As clearly seen in Fig. 1, the prongs *a* descend to within a certain distance from the traveling lattice C, the cotton or other fibrous material being carried by the lattice C beneath and between the prongs *a*. In Fig. 1 a portion of the hopper side A is shown removed to allow the curved end of the nearest prong to appear. At one end of the prong-shaft *b* we fix a lever *d* and counterbalance-weight *d′*, and upon the other end we mount a lever *e*. Beneath this lever and pivoted upon a stud *f′* to the side of the hopper or to an auxiliary fixed bracket we mount a bell-crank lever *f*. A rod *g* connects the lever *e* and the horizontal arm of the bell-crank lever *f*, the connected arms of the respective levers being slotted for the purpose of adjustment. The extremity of the vertical arm of the bell-crank lever *f* is formed as a clutch-fork to engage with the sliding half *h* of a toothed clutch *h h′*. The enlarged section of this toothed clutch (shown at Fig. 4) will render its construction more clear. The constantly-revolving half *h′* of the clutch is fixed on one end of a shaft *i*, carried in bearings *i′*, secured to the side of the hopper. Upon the other end of the shaft *i* is fixed a bevel-wheel *j*, which gears with a bevel-wheel *k* on the rear roller-shaft *l* of the lattice C. The result of this arrangement is that the shaft *i* and half-clutch *h′* revolve uninterruptedly. The shaft *m*, which carries the half-clutch *h*, lies in line with the shaft *i* and is supported in similar bearings *m′* *m*². The half-clutch *h* is secured to the shaft *m* by a feather-key and groove, so that the half-clutch *h*, while compelled to revolve with the shaft *m*, is also capable of sliding to and fro thereon for the requisite extent. Therefore, by operating the bell-crank lever *f* the half-clutch *h* can be slid out of driving contact with the half *h′*, although to prevent such slipping out of contact, except at the arranged times, we fix a peg *n* in the boss of the half-clutch *h*, which bears against the face of the boss of the bearing-bracket *m′*, so that the half-clutch *h* can only be slid out of gear with the half *h′* at the times when this peg *n* comes opposite to the slot or recess *m*³, formed in the face of the bearing-bracket boss. (See Figs. 4 and 5.) The opposite end of the shaft *m* carries a crank-disk *o*, and the crank-pin of the said disk is connected by a rod *p* to a slotted bracket *q*, fixed on the end of the shutter or damper *r* in the case of a pipe or trunk feed, and the slot in the bracket *q* is intended to

make provision for the adjustment of the damper *r*. The opposite end of the said damper is pivoted at *s*, so that as the crank-disk *o* revolves the damper *r* is vibrated up and down across the opening A^2 in the end of the hopper A, through which the material is fed from the trunk B.

When the machine is in operation, the cotton or other fibrous material fed to the hopper in this arrangement by the trunk B is carried forward by the lattice C to the spiked apron D, which lifts it in the usual manner to the spiked clearing-cylinder E. The cotton thus struck or cleared from the spiked apron D accumulates at the foot and is apt to pack and disorganize the proper working of the feeder unless the feed-supply is diminished or cut off, so as to permit the apparatus to overtake and deal with the material already supplied. Our invention effects this diminution or interruption of the supply automatically in the following manner: As the cotton cleared from the spiked apron D accumulates behind the prongs *a*, the weight of the material presses upon the prongs sufficiently to turn the prong-shaft *b*, raising the counterbalance-weight and lever *d* and turning the lever *e* downward, so that by means of the connecting-rod *g* it operates the bell-crank lever *f* and slides the half-clutch *h* out of gear with the half *h'*, so as to arrest the rotation of the shaft *m* and crank-disk *o*, thereby closing the feed in this case by stopping the movements of the damper *r*. As the object of stoppng the damper *r* is to diminish or arrest the supply of material to the hopper, the parts require to be so arranged that the damper will be stopped only when in its lowered position. This is the function of the peg *n*, extending from the half-clutch *h* and acting in combination with the slot or recess m^3 in the boss of the bearing-bracket *m'*, as already described. The peg *n* is set to synchronize in its movements with the crank-pin of the disk *o*. Consequently, when the crank-pin is in its lowest position the peg *n* is similarly situated. The slot or recess is therefore cut in the lower side of the face of the boss, as shown in Fig. 5, so that if the back pressure of the cotton should begin to act on the prongs before the peg *n* is opposite to the slot the shaft *b* cannot yield nor can the half-clutch *h* be slid out of driving contact until the peg *n* has come opposite to the slot, at which time the damper *r* is also at the foot of its stroke, and therefore in a position to retard or cut off the feed. When the arrest of the feed has enabled the apparatus to deal with and remove the surplus behind the prongs, the counterbalance-weight moves the prongs back to their normal position, and the bell-crank lever *f* is operated to slide the half-clutch *h* again into driving contact with the half *h'*, whereby the damper *r* is vibrated, as before, and the feed is re-established. We thus obtain such automatic regulation of the feed that the inconveniences and drawbacks inseparable from unregulated feeding are entirely obviated.

We do not confine ourselves to the form of damper described and shown, as a sliding instead of a vibrating damper or any other suitable means for controlling the feed-supply might be adopted and used in conjunction with our regulating mechanism.

We wish it to be clearly understood that we do not limit ourselves to the exact construction and disposition of parts comprising the mechanism for transmitting the motion of the pivoted prongs or their equivalent, such as a door or shutter, to the means for controlling the feed-supply, where such details are capable of modification by a competent mechanic familiar with the class of machines to which our invention relates.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim, and desire to secure by Letters Patent of the United States, is—

1. In combination, the hopper, the damper, the shaft *m* with means for oscillating the damper, the shaft *i*, the clutch connecting the shafts, means for throwing out the clutch when the hopper becomes packed with material and means for maintaining the members of the clutch in contact against the action of the clutch throw out means until the damper is in closed position, substantially as described.

2. In combination, the hopper, the damper, the shaft *m*, the connection between the shaft and damper, the shaft *i*, the clutch between the shafts *i*, and *m*, means for throwing out the clutch when the hopper becomes packed with material and means for maintaining the clutch members in contact against the action of the clutch throw out means consisting of the pin *n* on one member and the bearing having a recess to receive the pin, substantially as described.

In witness whereof we have hereunto set our hands in presence of two witnesses.

MARTIN MUSGRAVE.
CHARLES EDWIN COOPER.

Witnesses:
JAMES MUSGRAVE,
JOHN ORMEROD NUTTALL.