G. A. COBURN.

TAKE-UP MECHANISM FOR LOOMS.

APPLICATION FILED APR. 4, 1911.

1,023,994.

Patented Apr. 23, 1912.

2 SHEETS—SHEET 1.

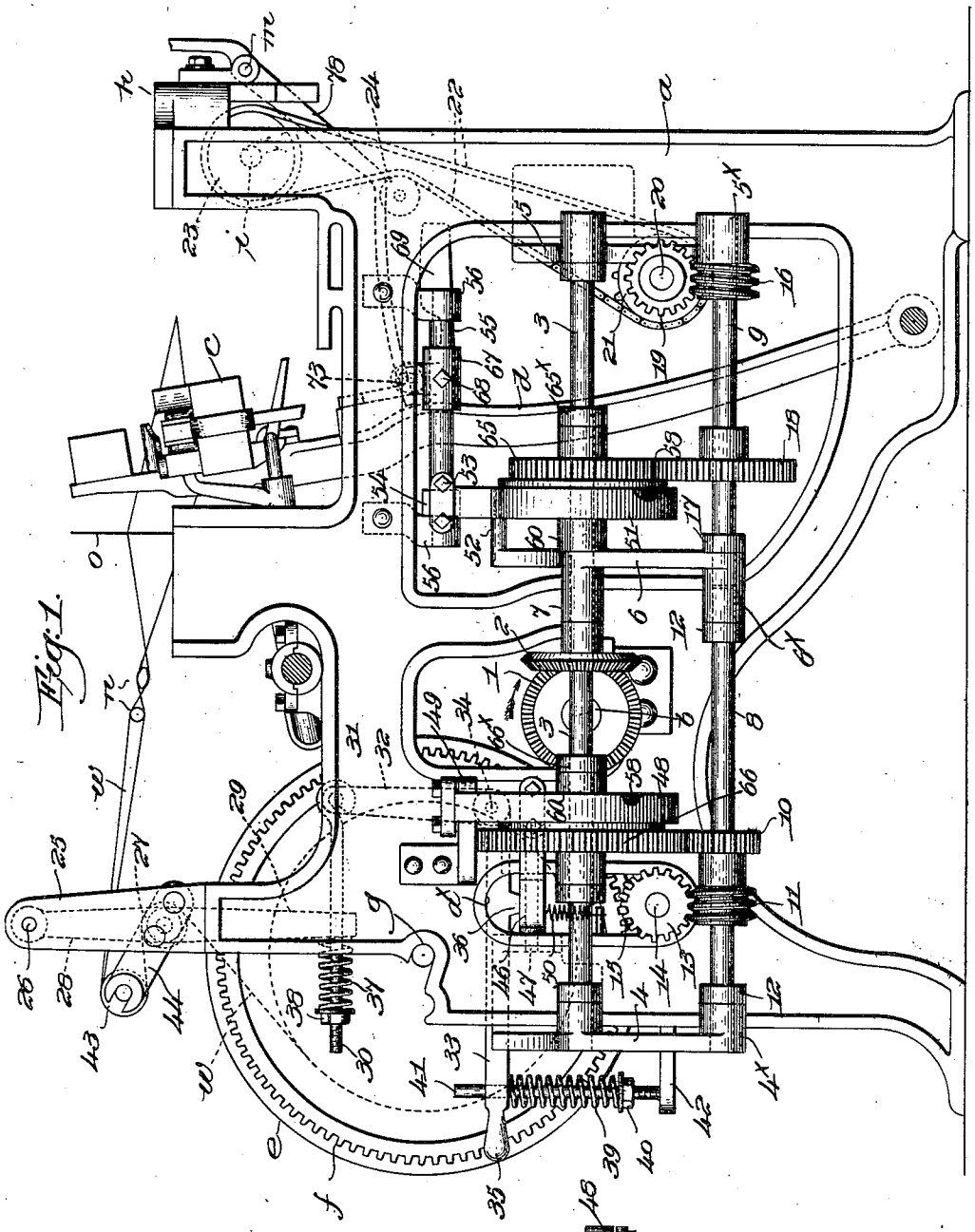

Fig. 1.

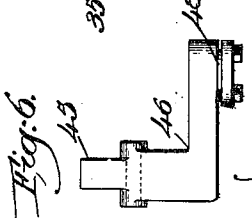

Fig. 6.

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2 SHEETS—SHEET 2.

Fig: 2.

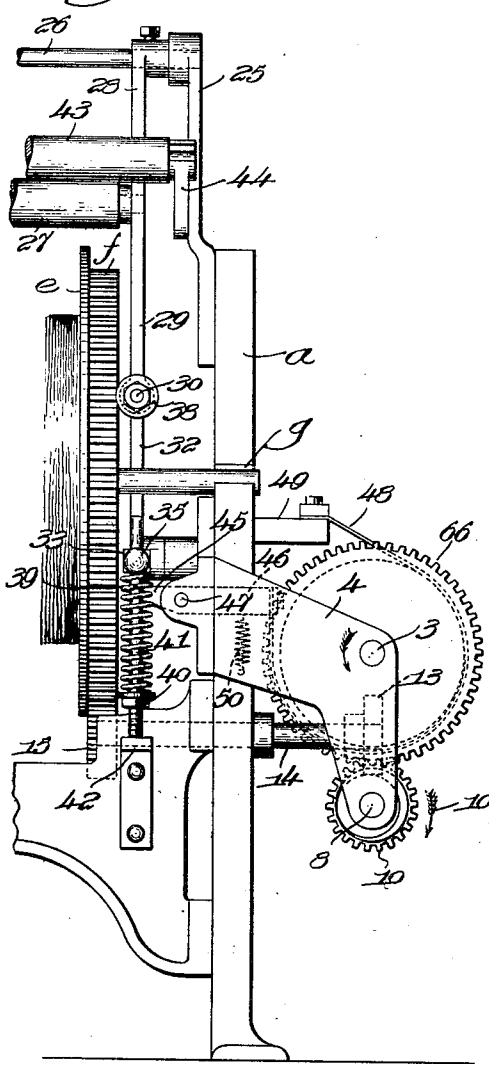


Fig: 3.

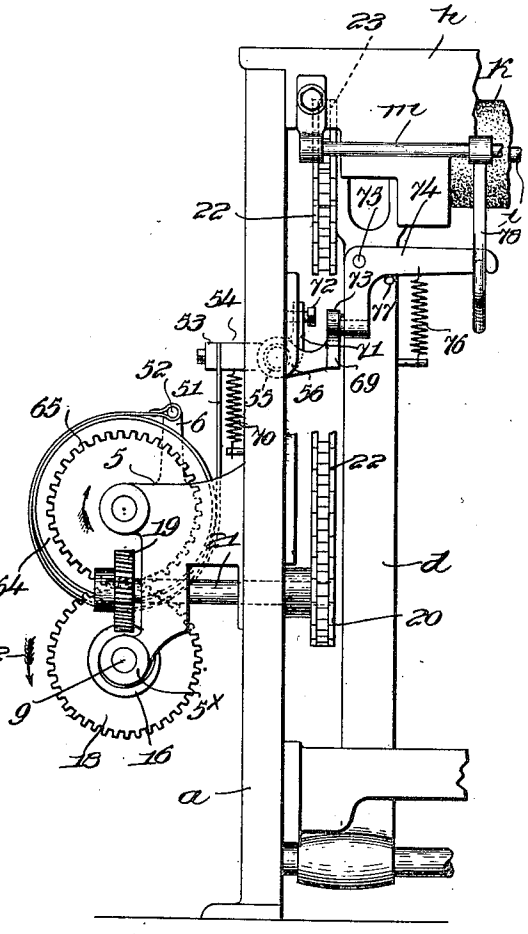


Fig: 4.

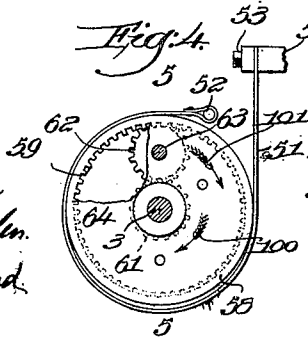
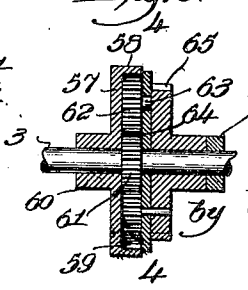


Fig: 5.



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Edward G. Allen.
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UNITED STATES PATENT OFFICE.

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TAKE-UP MECHANISM FOR LOOMS.

1,023,994. Specification of Letters Patent. Patented Apr. 23, 1912.

Application filed April 4, 1911. Serial No. 618,850.

To all whom it may concern:

Be it known that I, GEORGE A. COBURN, a citizen of the United States, and resident of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Take-Up Mechanism for Looms, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention has for its object the production of novel mechanism for taking up the cloth as it is woven in a loom, and herein I have shown both the let-off and take-up devices as driven by a continuously moving actuator with which they are operatively connected intermittingly, and when the said devices are so connected with the common actuator let-off and take-up will be effected positively.

A peculiar form of frictionally controlled but positively acting connector is interposed between the actuator and each of the devices referred to, the intermittent connection between the let-off device and the actuator being governed by or through variations in the warp tension, while the intermittent connection between said actuator and the take-up device is governed by a regularly moving member of the loom, and herein such member is one of the lay-swords.

The two connectors are alike in construction, mode of operation, and frictional control, so that I have herein shown and described in detail but one of them, and as will appear hereinafter the connectors face in opposite directions in the loom structure.

While I have shown and described herein the let-off mechanism as well as the take-up mechanism the claims annexed to the specification are restricted to the take-up mechanism, no claim herein being made to the let-off mechanism, *per se*, nor to the same in connection with the take-up mechanism.

The various novel features of my invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a left hand side elevation of a sufficient portion of a loom, with one embodiment of my invention applied thereto, the position of the various parts being such that neither the let-off nor the take-up are in active operation; Fig. 2 is a rear elevation of the let-off device as it would appear viewing Fig. 1 from the left; Fig. 3 is a front elevation of the take-up device and adjacent parts, viewing Fig. 1 from the right; Fig. 4 is a detail, partly in section on the line 4—4, Fig. 5, of one of the connectors; Fig. 5 is a diametral sectional view of the connector taken on the line 5—5, Fig. 4; Fig. 6 is a top plan view of a rocking member governed as to its position by the warp tension, to effect the control of the connector interposed between the take-up device and the actuator.

Referring to Fig. 1, the loom side *a*, cam shaft *b*, lay *c*, and lay sword *d*, the warp beam *e* having a ring gear *f* attached to one of its heads, the seats, as *g*, for the beam journals, the breast-beam *h*, rotatable shaft *i* beneath it, on which shaft is mounted the usual take-up or sand roll *k*, Fig. 3, and the controlling rock-shaft *m*, to effect a change in the operation of the loom upon the occurrence of a filling fault, may be and are all of well known construction and perform usual functions.

The change in the operation of the loom, above referred to, may be stoppage of the loom or an automatic replenishment of the running filling, both changes being familiar in the art.

The cam-shaft *b*, omitted in Figs. 2 and 3 for the sake of clearness, is shown in Fig. 1 as provided with a bevel gear 1 which meshes with a like gear 2 fast on a horizontal shaft 3 constituting an actuator common to both the take-up and let-off devices, said shaft being laterally offset from the loom-side *a* and rotatably supported at its ends in bearings on brackets 4, 5 fixed on the loom side, and an intermediate bracket 6, Fig. 1, also mounted on the loom side, has a sleeve bearing 7 through which the shaft is extended. Said shaft or actuator 3 is thus rotated continuously while the loom is running, and it extends from the back of the loom to near the front thereof, as shown.

The three brackets project laterally from the loom side and depend below the actuator, and they are provided with bearings $4^{\times}$, $5^{\times}$, $6^{\times}$, in alinement with each other and parallel to the actuator, to rotatably support let-off

and take-up transmitting shafts 8, 9, Fig. 1, the adjacent ends of said shafts entering the intermediate bearing 6^x.

The shaft 8 has fast upon it a pinion 10, a worm 11, and collars 12, which latter prevent longitudinal movement of the shaft in its bearings, the worm meshing with a worm gear 13 fast on a transverse shaft 14 having thereon a pinion 15 adapted to engage the beam gear *f*, as shown in Fig. 2. Whenever the shaft 8 is rotated, the intermediate gearing described will rotate the beam *e* to let off the warp, as will be obvious.

The transmitting shaft 9 has fast upon it a worm 16 adjacent the bearing 5^x, a collar 17 adjacent the intermediate bearing 6^x, and a gear 18, the worm meshing with and driving a worm gear 19 on a short transverse shaft 20, mounted in the lower part of the loom frame near the front thereof.

A sprocket gear 21 on the shaft 20 is connected by a suitable chain 22 with a sprocket-gear 23 fast on the take-up shaft *i*, whereby the said shaft and the take-up roll *k* thereon will be positively driven whenever the transmitting shaft 9 is rotated.

As shown in Fig. 1 by dotted lines the rear run of the chain 22 is acted upon by an idler 24 to hold it out of the way of other parts of the mechanism.

An upright stand 25 is erected on each loom side at the back, the upper ends of the stands being connected by a transverse rod 26, and a swinging roll 27 is suspended therefrom between the stands by depending arms, as 28, and herein the arm at the left hand side of the loom is prolonged at 29, and apertured to receive loosely a link 30. The forward end of the link is pivotally connected at 31 with the arm 32 of a bell-crank 32, 33, fulcrumed at 34 inside the loom side *a*, the rearwardly extended arm 33 projecting behind the loom at one side of the warp beam and having a handle 35, and a depending lug 36.

As shown in Fig. 1 a spring 37 is coiled around the link 30 between the extension 29 and a nut 38 adjustably mounted on the rear end of the link, and a similar spring 39 is interposed between the crank arm 33 and nut 40 adjustable on an upright guide-rod 41 passing loosely through a hole in the arm 33 and supported at its lower end on a bracket 42 fast on the loom side.

When roll 27 is swung rearward, Fig. 1, the extension 29 acts through the spring 37 and link 30 to rock the bell-crank against the action of the spring 39, depressing the arm 33 and the lug 36 thereon, to effect the operative connection between the actuator 3 and the let-off transmitting shaft 8, as will be explained later. By adjusting the tension of the springs the resistance to rearward movement of the roll 27 can be increased or diminished, so that the force necessary to effect such movement must be greater or less, as the case may be, such force being due to warp tension.

The warp *w* passes from the beam *e* upward to and around the roll 27, at the front thereof, and leads thence rearwardly to a second guiding or directing roll 43 mounted rotatably in fixed arms 44 on the stands 25, and after the warp travels around the roll 43 it is carried forward to the usual leasing means *n*, Fig. 1, and the harnesses *o*, in the ordinary manner.

On every beat-up of the lay the warp is drawn forward, and the tension thus put upon the warp is transmitted to the roll 27 to swing it rearward, and by the means described the lug 36 is forced downward. The roll 27 is thus the movable whip-roll, swung rearward by or through variations in the warp tension and swung frontward by the expansive action of the springs 37, 39, which also serve to cushion or soften the motion transmitted to the bell-crank, thereby preventing a harsh action of the parts.

The lug 36 coöperates with a toe 45 extended beneath it from an L-shaped rocking lever 46, Fig. 6, fulcrumed on the loom side at 47, the portion of the lever opposite the toe extending outward through the opening a^x, Fig. 1, in the loom side, the frontwardly turned extremity of the lever being attached to the free end of a flexible friction-band or brake member 48, the other end thereof being attached fixedly to a bracket 49 on the loom side. A spring 50 attached at one end to the outer end of the lever 46 and fixed at its other end serves to hold the toe 45 up against the lug 36, and to depress the outer end of the lever, thereby slackening the brake member 48. The brake member 48 is a part of the connector between the shaft 8 and the actuator 3, and in general structure it is the same as the brake member 51 for the other connector between the actuator and the shaft 9, this latter connector being shown in detail in Figs. 4 and 5, and one description will serve for both connectors, different reference characters being used only when necessary for proper identification.

The fixed end of the brake member 51 is attached to a lug 52 conveniently made as a part of the bracket 6, and the other end of said member is attached at 53 to an outwardly extended arm 54 on a rock-shaft 55 mounted in bearings 56 on the loom side, as best shown in Fig. 1.

Each brake member 48, 51, is in practice a flexible steel band, lined with leather if desired, a common construction in friction bands, the tightening of the brake band setting its connector into action.

Each connector comprises an annularly

flanged disk 57, Figs. 4 and 5, the interior of the flange 58 being toothed to form an internal gear 59, the hub 60 of the disk being mounted rotatably on the actuator 3.

A concentric pinion 61 is fixed on the said actuator 3 within the flanged disk, and meshes with a second pinion 62 rotatable on a stud 63 carried by a face plate 64 which incloses the gearing, as shown in Fig. 5, the pinion 62 also meshing with the internal gear 59.

The face plate is pinned or otherwise secured to a gear loose on the actuator 3. For the take-up connector this gear is indicated at 65, and meshes with the gear 18 fast on the transmitting shaft 9, Figs. 1 and 3, while the face plate of the let-off connector is attached to a gear 66 loose on the actuator 3 and meshing with the pinion 10 fast on the transmitting shaft 8, Figs. 1 and 2.

It will be seen that as the gears 65 and 18 are of the same diameter the shaft 9 will be rotated at the same rate of speed as the actuator 3 when the take-up connector is in action, but as the gear 66 is of much larger diameter than the pinion 10 the shaft 8 will be rotated at a higher rate of speed than the actuator when the let-off connector is in action.

As shown in Fig. 1 the take-up connector is mounted on the actuator 3 between a collar $65^{\times}$ fast thereon and the bearing 7, while the let-off connector is mounted between collars $66^{\times}$ on the actuator.

The flange 58 constitutes a normally rotating member of the connector, for viewing Fig. 4 the pinion 61 must always rotate with the actuator in the direction of arrow 100, and in turn it will revolve the pinion 62 oppositely on its stud 63, for the face plate 64 and attached gear will be held at rest by the normal friction and inertia of the let-off or take-up device, as the case may be. Consequently the revolving pinion 62 will cause the internal gear 59 and the disk 57 to turn in a direction opposite to the arrow 100. If, however, the flexible brake member is tightened it will coöperate with the periphery of the flange 58 and stop rotation of the disk 57, holding the gear 59 stationary, and now as the pinion 62 continues to revolve on its axis 63 it must roll around the gear 59 and hence will be moved bodily, with its face plate and the attached gear, in the direction of arrow 101, Fig. 4. Hence the gear 65 will rotate in the same direction, Fig. 3, and the transmitting shaft 9 will be revolved in the direction of arrow 102 as long as the brake member 51 is held taut, to actuate the take-up device.

When the brake member 48 is tightened the let-off connector will be thrown into action in a similar manner, and the gear 66 will be revolved with the actuator 3, and the pinion 10 will revolve the transmitting shaft 8 oppositely, in the direction of arrow 102, Fig. 2, to actuate the let-off device. Both the transmitting shafts 8 and 9 are thus rotated in the same direction, but at different rates of speed.

From the foregoing description it will now appear that when the lay beats up and increases the tension on the warp the whip-roll 27 will be swung to operate the bell-crank 32, 33 and depress the lug 36, whereby the rocking lever 46 will be turned on its fulcrum to tighten the brake member 48 upon the coöperating member 58 of the let-off connector, throwing the latter into action and effecting rotation of the transmitting shaft 8. The latter through the intervening gearing rotates the beam *e* and lets off the warp, the slackening of the warp causing the brake member 48 to loosen and thereby render the connector inactive. Thus the beam *e* will be rotated intermittingly and positively to let off the warp, and as long as the tension of the warp is sufficient to keep the toe 45 depressed the connector will continue active.

While the connector is frictionally controlled its operation is positive to effect the rotation of the warp beam.

Returning now to the rock-shaft 55 connected with the brake member 51, a hub 67 adjustably fixed on the rock-shaft by a set-screw 68, Fig. 1, has an inwardly extended arm provided with a cam 69 within the loom side adjacent the path of the lay sword *d*, the cam being held in the position shown in Figs. 1 and 3 by a spring 70 attached to the loom side and to the rocker arm 54. An arm 71, Fig. 3, fast on the rock-shaft, carries an adjustable stop 72 which is held by said spring against the loom side, to thereby regulate the height at which the upper edge of said cam 69 shall be maintained by the spring. The lay sword *d* carries a roll 73 which is adapted to engage and depress the cam as the lay swings forward, to thereby rock the shaft 55 and lift its arm 54 to tighten the brake band 51, thus setting into action the take-up connector and effecting rotation of the transmitting shaft 9 on every forward beat of the lay. This operates the take-up roll *k* through the connections previously described, and the cloth is taken up on the beat-up, as it should be.

When the controlling shaft *m* is turned to effect a change in the operation of the loom, such as the replenishment of the filling automatically, take-up should be arrested, and to provide for it I mount the roll 73 on a bell-crank 74 fulcrumed at 75 on the lay sword, Fig. 3, a strong spring 76 normally holding the bell-crank against a stop 77 with the roll in operative position. A depending and rearwardly extended arm 78 fast on the controlling shaft *m* is extended under the longer lateral arm of said

bell-crank, and when said shaft *m* is turned the arm 78 rocks the bell-crank 74 against its spring 76 and moves the roll 73 to one side of the cam 69, so that the latter will not be depressed on the beat-up.

While the take-up and let-off devices are in themselves independent of each other, and are separately thrown into and out of operation each by its own connector, it will be seen that said connectors are driven by a common member, the shaft or actuator 3 which is continuously rotated, and the main control of each connector is effected by the forward beat of the lay, in the one case through the increased tension of the warp and in the other case by the movement of the cam 69 due to engagement by the depressing roll 73. By adjusting said cam frontward or rearward the amount of take-up at each beat is decreased or increased, respectively.

If for any reason it is desired to provide an additional or more extended operation of the let-off device than is due to the automatic mechanism described the weaver can depress the handle 35 and thereby maintain the let-off connector in action as long as may be necessary.

Various changes or modifications in details of construction and arrangement may be made by those skilled in the art without departing from the spirit and scope of my invention as set forth in the claims hereto annexed.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a loom, in combination, a take-up device, a transmitting shaft positively connected therewith, a continuously rotating actuator, a connector concentric with said actuator and comprising a normally quiescent member geared to the transmitting shaft, a member normally rotating with the actuator, and gearing intermediate said members, a friction device to coöperate with the normally rotating member and stop rotation thereof, the intermediate gearing then acting to rotate the normally quiescent member and the transmitting shaft, and means governed by a moving member of the loom to control said friction device and through it effect intermittent operation of the take-up.

2. In a loom, in combination, a take-up device, a transmitting shaft positively connected therewith, a continuously rotating actuator, a lay, a positive and normally inactive connector between said shaft and the actuator, friction controlling means for the connector, a roll movable with the lay, a cam intermittingly engaged and moved by said roll, and a connection between the cam and said controlling means, to act through the latter and render the connector active on each forward beat of the lay and thereby cause take-up.

3. In a loom having a controlling rock-shaft to effect a change in the operation of the loom, in combination, a lay, a take-up device, a transmitting shaft operatively connected therewith, a continuously rotating actuator, a positively acting and normally inactive connector between said transmitting shaft and the actuator, friction controlling means for the connector, a roll, a support therefor fulcrumed on the lay, a spring acting through said support to maintain said roll normally in operative position, a cam adapted to be engaged intermittingly and moved by the operatively positioned roll, a connection between the cam and said controlling means, to act through the latter and render the connector active on each forward beat of the lay and thereby cause take-up, and means governed by the loom controlling rock-shaft to move the roll-support and roll into inoperative position when said rock-shaft is turned to effect a change in the operation of the loom, whereby take-up will be prevented at such time.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

GEORGE A. COBURN.

Witnesses:
CHARLES F. MERRILL,
E. D. OSGOOD.