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PATENTED SEPT. 1, 1908.

E. H. BALLOU.
LOOM DOBBY.

APPLICATION FILED DEC. 27, 1905.

Fig. 1.

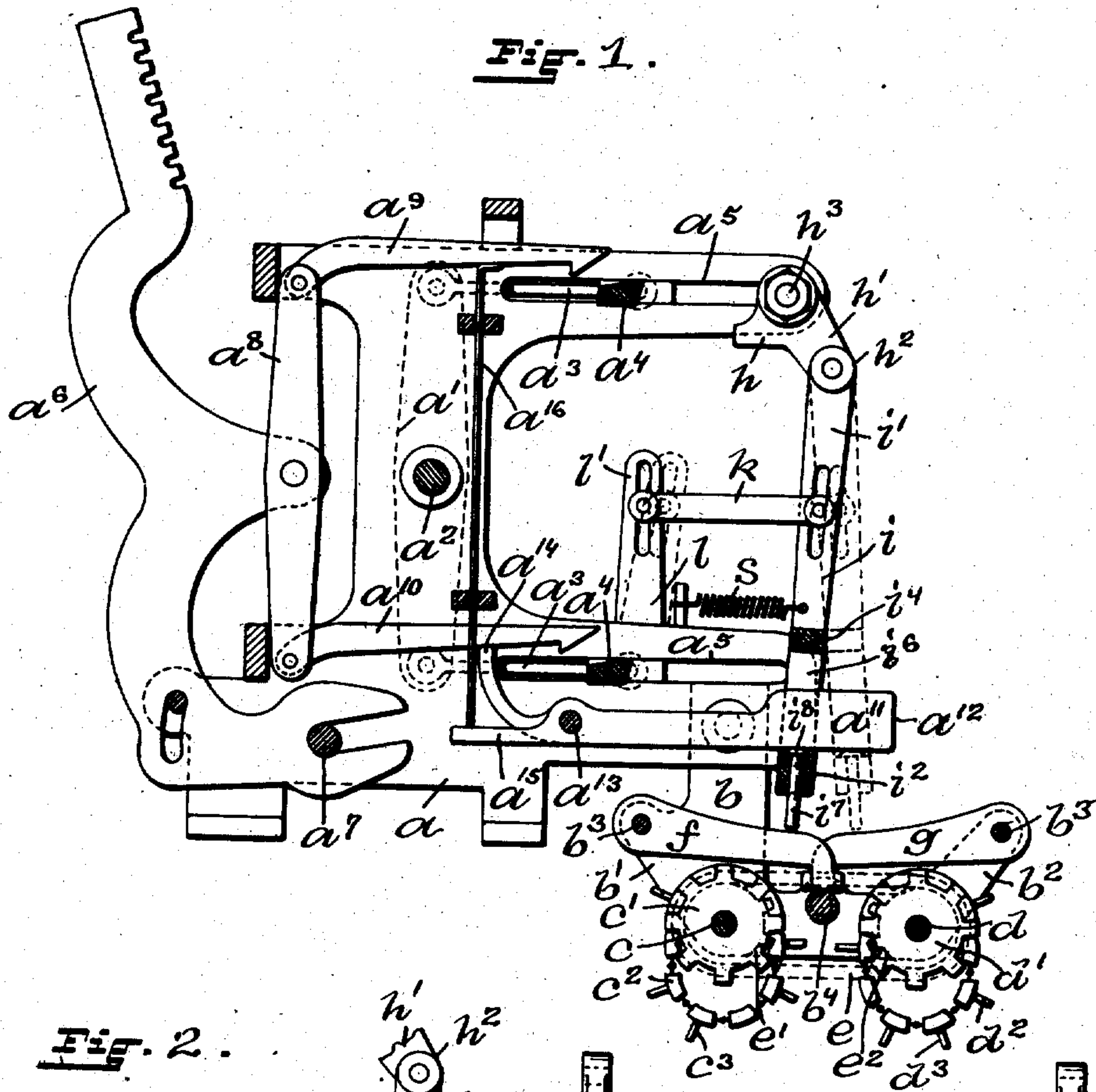
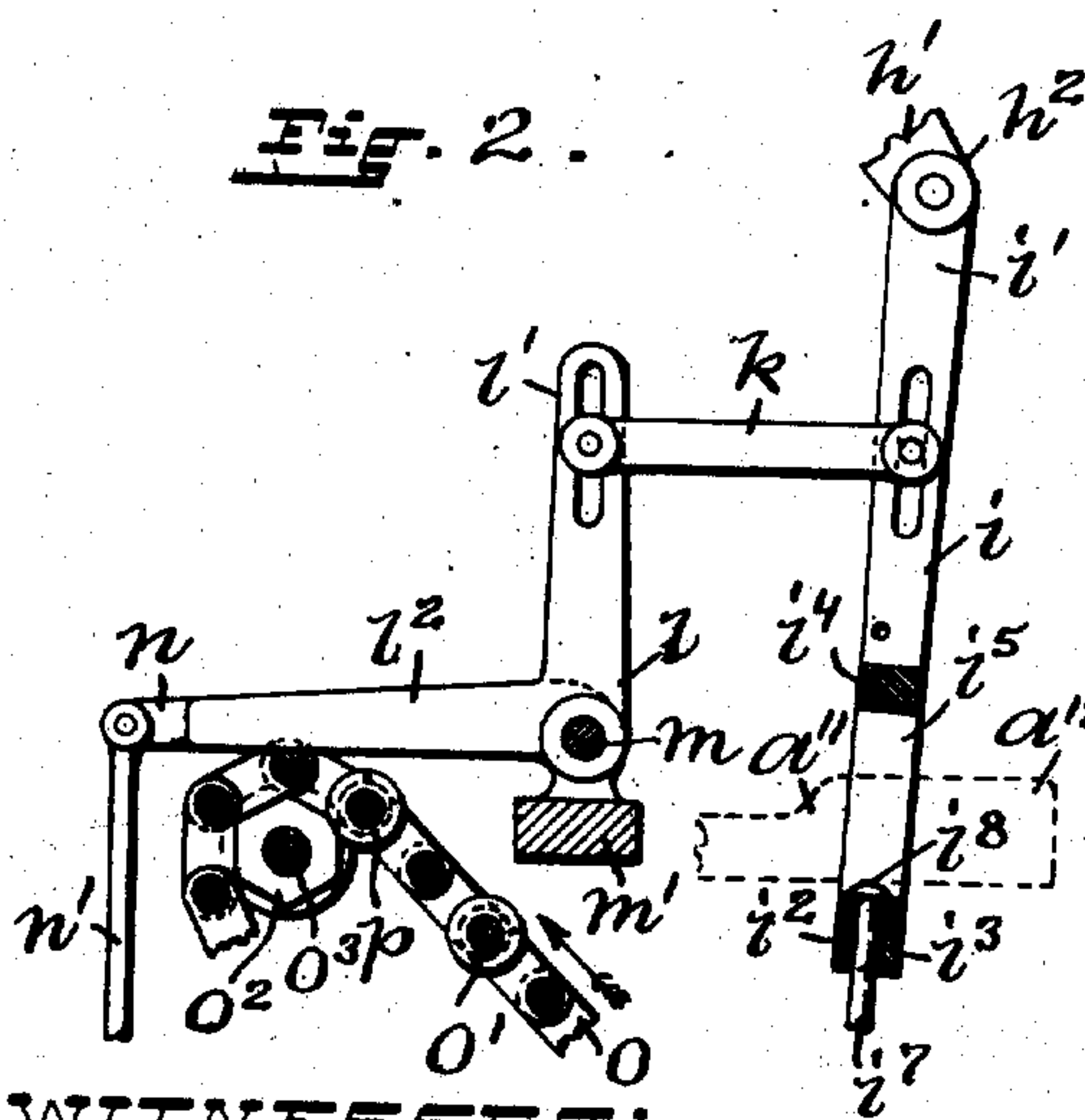


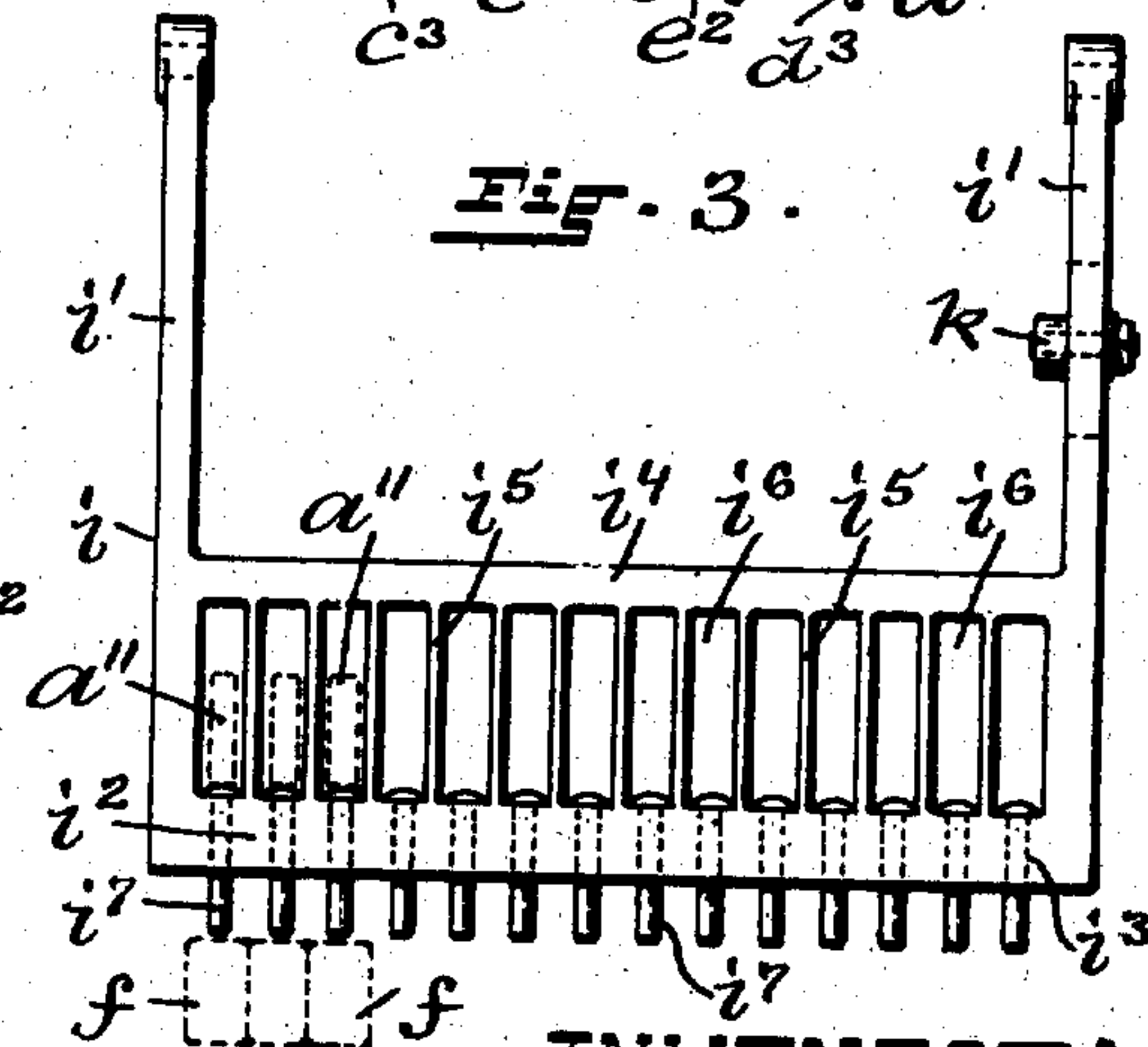
Fig. 2.



WITNESSES:

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Fig. 3.



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LOOM-DOBBY.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, EUGENE H. BALLOU, a citizen of the United States, residing at Pawtucket, in the county of Providence and State of Rhode Island, have invented a new and useful Improvement in Loom-Dobbies, of which the following is a specification.

This invention has reference to an improvement in looms and more particularly to an improvement in the shedding mechanism or dobbies of looms in which one set of jack hooks are operated directly by an alternate indicator finger of the series of indicator fingers acted upon by the pattern chain and the other set of jack hooks operated by alternate indicator fingers through the usual lifting needles.

In the usual construction of the harness operating mechanism of a loom, known as the dobby, each bar of the pattern chain has two rows of pegs. One alternate series of indicator fingers are operated from one row of pegs and the other alternate series from the other row of pegs on the same bar. The first alternate series of indicator fingers operates the lower jack hook directly and the second alternate series of indicator fingers operates the upper jack hooks through the lifting needles in the usual way. The lifting knives move alternately at each successive pick of the loom and when the jack hooks engage with them the corresponding harness is raised or lowered. One row of pegs on the bar of the pattern chain determines which harness and warp threads shall be raised for a certain pick of the shuttle, and the other row of pegs on the same bar determines the raising of the harness and warp thread for the next succeeding pick of the shuttle. One bar of the pattern chain, therefore, represents two picks in the woven fabric and the pattern chain must have a sufficient number of bars to control the springing of the warp for the pattern of the whole length of the fabric.

In the weaving of a variety of goods such as fabrics having a stripe or plaid effect or fabrics in which a knotted thread is thrown in at intervals, the length of the pattern chain required is objectionable on account of its cost, of labor and pegging, and the mechanism and power required to carry and operate it.

The object of my invention is to improve the construction of a loom dobby whereby fabrics having a stripe or plaid effect or in which a knotted thread or a peculiar weave

or pattern is followed or preceded by a field of a plain weave or another pattern, can be produced with a short length of pattern chain.

Instead of using each bar of the pattern chain to control the warp threads on two successive picks, as is the usual method heretofore used, in the pattern chains used in carrying out my invention, each bar controls the springing of the warp for one pick only, and yet by the use of a controlling mechanism, which will be more fully described hereinafter, a short pattern chain or, for some weaves, a cylinder provided with a pattern surface, will be sufficient to weave fabrics of any desired length in which two kinds of patterns or weaves are used at predetermined intervals.

My invention consists in the peculiar and novel construction of mechanism operatively connected with a loom dobby, whereby the indicator fingers are operated by a short pattern chain for one weave and then operated by another short pattern chain for another weave, thereby eliminating the use of a long pattern chain and the consequent cost and power required to drive the same, as will be more fully set forth hereinafter.

Figure 1 is a vertical sectional view of a loom dobby provided with my improved indicator finger operating mechanism. Fig. 2 is a detail sectional view, showing the means for operatively connecting the indicator finger mechanism with the shuttle box operating mechanism of the loom, and Fig. 3 is a face view of the indicator finger grate frame of my improved indicator finger operating mechanism.

In the drawings, *a* indicates the end frame of a loom dobby usually secured to or forming a part of the side frame of a loom, *a'* a vibrator arm secured to a shaft *a²* supported in bearings in the end frame *a*, *a³* *a³* rods pivotally secured to the ends of the vibrator arm *a'*, *a⁴* *a⁴* knives pivotally secured to the ends of the rods *a³* *a³* and having a sliding reciprocating movement in ways *a⁵* *a⁵* in the end frame *a*, and *a⁶* *a⁶* harness levers of the number required to weave the patterns. In the position shown in Fig. 1 all the other harness levers are directly back of the one shown and all are pivotally secured to the shaft *a⁷* supported in the end frame *a*. Each of the harness levers have a connector arm *a⁸* pivotally secured at its center to the harness lever. Upper and lower jack hooks *a⁹* and *a¹⁰* are

pivotaly secured to the ends of the connecting arm a^8 in a position for the hooked ends of the jack hooks to engage with the knives $a^4 a^4$. A double series of indicator fingers a^{11} a^{11} having the outer ends $a^{12} a^{12}$ are pivotaly secured to the shaft a^{13} supported in the end frame a . In one alternate series of the indicator fingers $a^{11} a^{11}$ each has the upwardly-bent inner end a^{14} adapted to engage with a lower jack hook a^{10} and the other alternate series of indicator fingers each has the straight inner end a^{15} adapted to engage with a needle a^{16} which in turn engages with an upper jack hook a^9 , the needles being supported in the usual way in bars secured to the end frame a . So far as now described the construction is the usual construction of a dobby harness operating mechanism.

In carrying my invention into practice I secure the L-shaped frames $b b$ to the lower outer ends of the end frames $a a$ of the dobby by bolts, as shown in Fig. 1. These frames are each constructed to have bearings for the sprocket shafts c and d of the pattern chain sprocket c' and the auxiliary pattern chain sprocket d' and the upwardly-extending arms b' and b^2 . The cross rods $b^3 b^3$ are secured in the ends of the arms b' and b^2 and a supporting bar b^4 is secured to the frame $b b$ intermediate the shafts c and d . The sprockets c' and d' secured to their respective shafts, and the pattern chains c^2 and d^2 with their pegs c^3 and d^3 are of the usual construction. The sprocket shaft c is revolved by a worm and gear (not shown) forming a part of the loom mechanism, and the sprocket shaft d is revolved by a sprocket chain e connecting the sprocket e' on the shaft c with the sprocket e^2 on the shaft d , as shown in broken lines in Fig. 1.

A series of spaced indicator levers $f f$ are pivotaly secured to the rod b^3 on the arm b' above the pattern chain c^2 in a position for the inner ends of the levers to rest on the bar b^4 and for the pegs on the pattern chain to engage with the levers, and a series of alternately-spaced auxiliary indicator levers $g g$ are pivotaly secured to the rod b^3 on the arm b^2 above the auxiliary pattern chain d^2 in a position for the inner ends of the levers to rest on the bar b^4 and for the pegs on the auxiliary pattern chain d^2 to engage with the levers. The bar b^4 holds the levers f and g in their normal position free of the pattern chains and prevents the same from wearing on the pattern chains. Two brackets $h h$, each having the downwardly-extending arm h' with the bearing h^2 , are secured to the upper outer end of the frame a of the dobby by the bolt h^3 in a position to bring the bearing h^2 on a vertical line with the bar b^4 or centrally with the inner ends of the indicator levers f and g . A swinging grate frame i having the arms $i' i'$ supporting the lower cross bar i^2 in which is a series of vertical holes $i^3 i^3$, the

upper cross bar i^4 and the series of vertical connecting bars $i^5 i^5$ forming the series of openings $i^6 i^6$ for the outer ends $a^{12} a^{12}$ of the indicator fingers $a^{11} a^{11}$. The holes $i^3 i^3$ are drilled centrally with the openings $i^6 i^6$ and a series of pins $i^7 i^7$ having the heads $i^8 i^8$ extend through the holes in the bar in which they are held by the heads of the pins, as shown in Fig. 3. The frame i is pivotaly secured at the upper end of the arms $i' i'$ to the bearings $h^2 h^2$ on the brackets $h h$ in a position for the ends $a^{12} a^{12}$ of the indicator fingers $a^{11} a^{11}$ to pass through the openings $i^6 i^6$ in the frame and rest on the heads of the pins and for the indicator levers f or g to engage with the pins. A link k is pivotaly secured at one end to the rear arm i' of the frame i and at the other end to the vertical arm l' of a bell crank lever l having the horizontal arm l^2 . This bell crank lever l is pivotaly secured to a shaft m supported in a bracket m' which is secured to a part of the loom frame. A series of levers $n n$ are pivotaly secured to the shaft m , and the rods $n' n'$ are pivotaly secured to the free ends of the levers, as shown in Fig. 2. These rods $n' n'$ are operatively connected to the shuttle box operating mechanism of the loom (not shown). The chain o controlling the shuttle box operating mechanism has a series of collars o' adapted to engage with the levers $n n$ and one or more off-set collars p adapted to engage with the horizontal arm l^2 of the bell crank lever l . The chain o (only a part of which is shown in Fig. 2) is continuous and is moved in the direction of the arrow by revolving the sprocket o^2 on the shaft o^3 which is revolved by the usual worm and gear forming part of the loom mechanism. A coiled spring s is secured at one end to the rear arm i' of the frame i and at the other end to the frame a of the dobby, as shown in Fig. 1. The spring s holds the frame i in its normal position with the pins $i^7 i^7$ over the indicator levers $f f$, as shown in full lines in Fig. 1.

In the operation of my improved loom dobby the pattern chain c^2 , the auxiliary pattern chain d^2 and the shuttle box controlling mechanism chain o are revolved by the loom mechanism, as described. The pegs $c^3 c^3$ on the bars of the pattern chain c^2 may be set to weave a plain pattern and the pegs $d^3 d^3$ on the bars of the auxiliary pattern chain d^2 may be set to weave a fancy pattern. The pins $i^7 i^7$ in the swinging grate frame i are held in their normal position over the indicator levers $f f$ by the tension of the spring s , as shown in full lines in Fig. 1, or so long as there is an absence of the off-set collars $p p$ on the shuttle box controlling mechanism chain o . With the mechanism in this position a plain weave may be woven by the pegs $c^3 c^3$ on the bars of the pattern chain c^2 engaging with and raising

the indicator levers ff alternately and through the pins $i^7 i^7$ raise the ends $a^{12} a^{12}$ of the indicator fingers at $a^{11} a^{11}$ and allow a jack hook a^9 or a^{10} to engage with the knives $a^4 a^4$ to operate the harness levers $a^6 a^6$ and raise the harnesses in the usual way. At the end of the plain weave an off-set collar p on the shuttle box controlling mechanism chain o engages with and raises the arm l^2 of the bell crank lever l and through the arm l' of the bell crank lever and the link k moves the frame i and the pins i^7 over the indicator levers $g g$, as shown in broken lines in Fig. 1, against the tension of the spring s . A fancy weave is now woven through the operation of the pegs $d^3 d^3$ on the bars of the auxiliary pattern chain d^2 engaging with and raising the auxiliary indicator levers $g g$ which, acting on the pins $i^7 i^7$, raise the ends $a^{12} a^{12}$ of the indicator fingers $a^{11} a^{11}$, which allows the jack hooks to engage with the knives and operates the indicator harness as described. When an off-set collar p on the shuttle box controlling mechanism chain o passes the arm l^2 of the bell crank lever l , the frame i assumes its normal position by the tension of the spring s and the plain weave commences again, and thus operations may be repeated indefinitely with short pattern chains, thus eliminating the cost, labor in pegging and mechanism and power required to carry and operate a long pattern chain.

Having thus described my invention, I claim as new and desire to secure by Letters Patent;—

1. In a loom dobby comprising dobby frame indicator fingers and a swinging frame i having the arms $i' i'$ supporting the lower cross bar i^2 in which are the vertical holes $i^3 i^3$, said frame also provided with an upper cross bar i^4 and vertical connecting bars i^5 between the upper and lower cross bars forming the openings $i^6 i^6$ for the indicator fingers of the dobby, pins $i^7 i^7$ in the holes $i^3 i^3$ and having the heads $i^8 i^8$ in the openings $i^6 i^6$, means for pivotally securing the swinging frame i to the dobby frame, means for swinging the frame at predeter-

mined intervals, the pattern chain, the auxiliary pattern chain, and means for alternately connecting the pins $i^7 i^7$ with a pattern chain or an auxiliary pattern chain.

2. The combination with a loom dobby, of frames $b b$ secured to the dobby frame, rods $b^3 b^3$ supported in the frames $b b$, a bar b^4 supported in the frames $b b$, a shaft c supported in bearings in the frames $b b$, a sprocket wheel c' secured to the shaft c , a pattern chain c^2 on the sprocket wheel c' and having the pegs $c^3 c^3$, a shaft d supported in bearings in the frames $b b$, a sprocket wheel d' secured to the shaft d , an auxiliary pattern chain d^2 on the sprocket wheel and having the pegs $d^3 d^3$, a sprocket wheel e' secured to the shaft c , a sprocket wheel e^2 secured to the shaft d , a chain e connecting the sprocket wheels e' and e^2 , a series of indicator levers ff pivotally secured to the rod b^3 over the pattern chain c^2 , a series of indicator fingers, a series of auxiliary indicator levers $g g$ pivotally secured to the rod b^3 over the pattern chain d^2 , brackets $h h$ secured to the frame of the dobby each having the arm h' with the end bearing h^2 , a swinging frame i having the arms $i' i'$ pivotally secured to the bearing h^2 in the bracket h and supporting the lower cross bar i^2 in which are the vertical holes $i^3 i^3$, said frame also provided with an upper cross bar i^4 , and vertical connecting bars i^5 between the upper and lower cross bars forming the openings $i^6 i^6$ for the indicator fingers of the dobby, pins $i^7 i^7$ in the holes $i^3 i^3$ and having the heads $i^8 i^8$ in the openings $i^6 i^6$, a link k pivotally secured to the rear arm i' of the frame i , a bell crank lever l pivotally connected to the link k , a coiled spring s connected to the frame i and to the frame of the dobby, and means for operating the bell crank lever l at predetermined intervals.

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

EUGENE H. BALLOU.

Witnesses:

ADA E. HAGERTY,
J. A. MILLER.