

No. 641,434.

Patented Jan. 16, 1900.

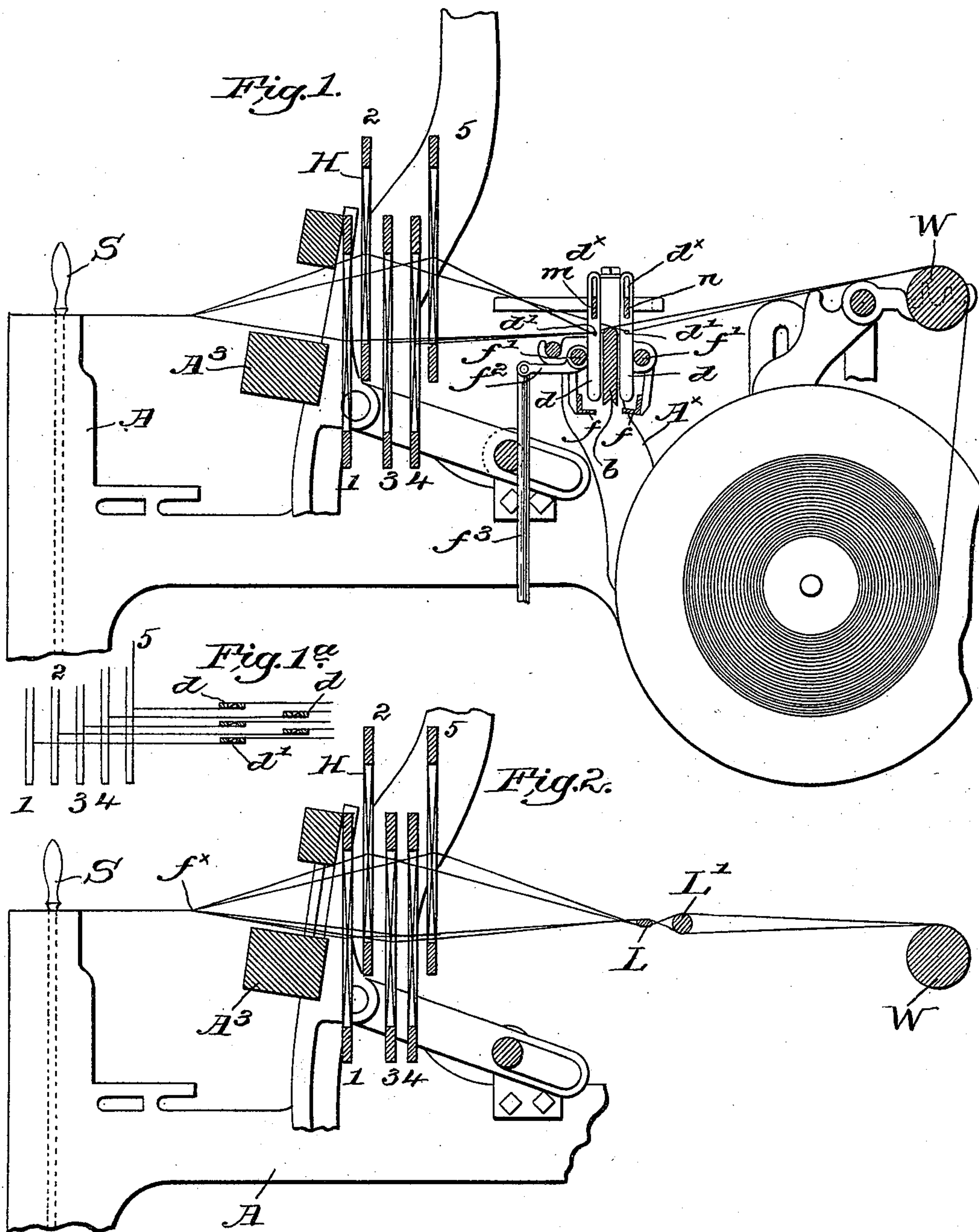
J. L. BURTON.

LOOM.

(Application filed June 21, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses.

Thomas Drummond.
Adolf Kaiser.

Inventor
John L. Burton.
By Crosby Gregory Attys.

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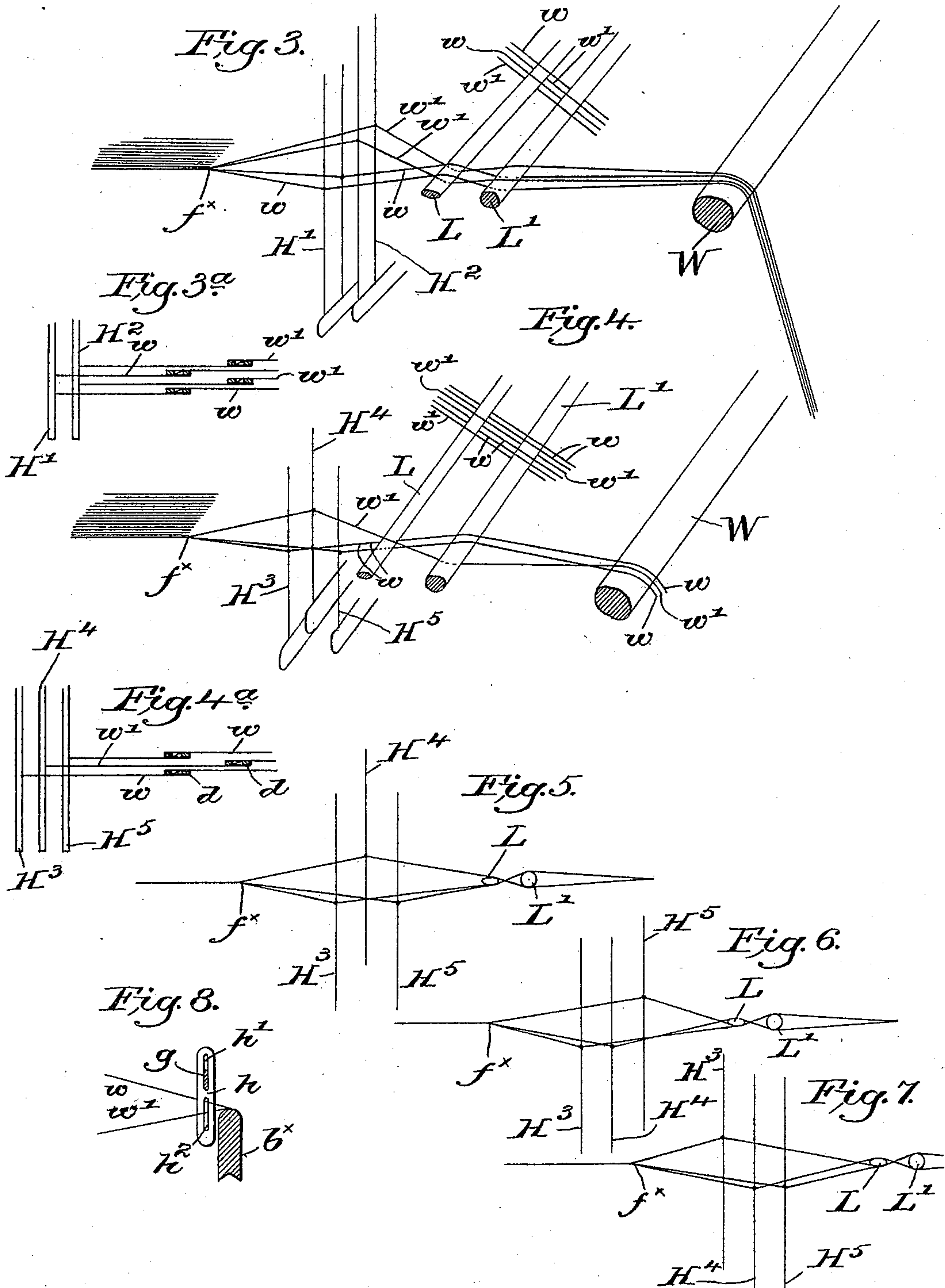
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

JOHN L. BURTON, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO THE
DRAPER COMPANY, OF SAME PLACE AND PORTLAND, MAINE.

LOOM.

SPECIFICATION forming part of Letters Patent No. 641,434, dated January 16, 1900.

Application filed June 21, 1899. Serial No. 721,274. (No model.)

To all whom it may concern:

Be it known that I, JOHN L. BURTON, of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Looms, of which the following description, in connection with the accompanying drawings, is a specification, like letters and numerals on the drawings representing like parts.

10 This invention has for its object the production of novel leasing means, taking the place of the usual lease-rods, which latter are open to sundry objections, as will be hereinafter set forth; and in accordance with my invention I have provided a loom with leasing means consisting, essentially, of a series of independent members, preferably of metal, which members bear upon the warp-threads and are located in the loom in the place of the usual lease-rods, performing the necessary functions of the latter without their objectionable features, and the leasing members also perform additional functions of great value.

25 The leasing devices in my present invention are similar in form to devices hitherto employed as warp-stop-motion-controlling detectors, and, in fact, they also fulfil such functions in my present invention, so that I not only dispense with the usual lease-rods, but the means which I employ in place thereof performs the twofold function of lease-rods and detectors by or through which the stoppage of the loom is effected upon failure or undue slackness of the warp-threads.

35 In all former weaving lease-rods have been utilized to split or divide the warp into sections in order to separate the neighboring threads which are or may be stuck together, principally by the sizing matter with which they are treated.

40 In practice it has been found that in order to secure the best results the leasing devices should be so located as to bring the crossing of the warp-threads about as far from the harness on the one side as is the fell of the cloth on the other, in order to relieve the yarn from strain as much as possible by making the angles of the warps on each side of the harness as nearly alike as possible.

50 Lease-rods have heretofore been always re-

garded as a necessary element of a loom, and when stop-motion detecting devices have been used various forms thereof have been applied, both at the rear and in front of the lease-rods, such application subjecting the yarn to increased frictional contact and tending to break the same with greater frequency.

55 In carrying out my present invention the warp-threads are separated by the warp-stop-motion detectors themselves, which are preferably located in the loom in the position formerly and usually occupied by the lease-rods, so that while the twofold function of leasing and detection of yarn failure is performed the yarn is relieved of the extra chafing and strain, which is inevitable when such detectors are used in addition to the lease-rods.

60 When the detectors serve as leasing devices in accordance with my invention, very important advantages accrue. In the first place each thread in the preferred embodiment of my invention has an independent leasing device which may give or take up slack, according to the individual requirement of that particular thread, whereas lease-rods serve as a guide for a large number of threads at a time, and the latter must be subjected to the same tension when the shed is opened, so that those threads wound upon the warp-beam with extra tension are liable to breakage. As a matter of fact it has been actually found that the customary amount of warp breakage is greatly reduced by the application of the detectors in the place of lease-rods, thereby enabling the weaver to tend more looms and make more perfect cloth.

75 Another great advantage of the "detector leasing device," as it may be termed, is that its application with an uneven number of harnesses allows the threads to be separated into two equal sections by using two banks or series of the detector-members, while the old leasing-rods by dividing the threads at the shed-openings must make uneven divisions, as the harnesses usually engage equal numbers of threads, so that the difficulty arising from adjoining threads sticking together is not entirely obviated.

90 Under the old system of applying lease-rods to the warp-threads it is often necessary to release the harness-jacks from the cams in

order to divide the sheds as required, for many weaves are so arranged that of several harnesses—five, for instance—but one at a time is raised by the cams, and in order to make a more even division of the threads it would be necessary to lift two or three harnesses by hand after relieving the treadles at the bottom, so as to secure the proper opening. With the detector leasing device, on the contrary, it is only necessary when drawing in the warp to have two banks or series of detectors and to draw the threads through them alternately.

The chafing action of the threads due to the rapid movement of the various parts of the loom which control them wears off the sizing material, thereby allowing the fibers to separate, and their frictional hold on each other is weakened. The contact of the fibers directly with the engaging parts tends to sever them.

Any bunch or knot on the thread greatly increases the difficulty of passing the obstacle—*i. e.*, the engaging part of the loom—so that the elimination of the lease-rods and the employment of the warp stop-motion also as a leasing device is of great importance in and is a great step forward in the art of weaving, more especially since warp stop-motions have become so important an element in general weaving, as the number of obstacles forming part of the loom is reduced.

In the employment of the usual warp-stop-motion detectors, each controlling a warp-thread, they have usually been applied at the rear of the loom near the whip-roll, where it is practically impossible for the weaver to reach them without going to the rear of the loom. When applied in the new position, as in my present invention, the weaver can easily reach them from the front of the loom through the space above the harnesses.

The separation of the individual threads by the detectors at the leasing position also prevents the fault of "reedy" cloth, such as is liable to be woven when the warp-threads are few in number. With the use of lease-rods it was formerly often necessary to use a special reed having a dent-space for each thread in order to divide the threads to secure the equal spacing that the present use of detectors at the lease ensures.

Figure 1 is a sectional view of a sufficient portion of a loom to be understood, taken transversely to the lay, illustrating one embodiment of my invention. Fig. 1^a is a plan detail showing the manner in which the warp-threads are drawn into the detector leasing means represented in Fig. 1. Fig. 2 is a view similar to Fig. 1, but showing the usual lease-rods and with the same number of harnesses illustrated in Fig. 1. Fig. 3 is a perspective view and partly diagrammatic, showing two harnesses and two heddles in each with the threads crossing the lease-rods. Fig. 3^a in plan shows the way in which the threads would be drawn in in accordance with my invention.

Fig. 4 is a view similar to Fig. 3, but showing three harnesses, one heddle of each being represented. Fig. 4^a shows the drawing in of the warps for three-harness work in accordance with my invention. Figs. 5, 6, and 7 are diagrammatic views of three-harness shedding mechanism to show the various positions of the threads relative to the usual lease-rods, and Fig. 8 is a detail view of another embodiment of my invention to be referred to.

Referring to Fig. 2, the loom-frame A, harnesses H, (five being shown,) the lay A³, whip-roll W, shipper-lever S, and the lease-rods L L' may be and are all of well-known or usual construction, the whip-roll forming the last support of the threads on their way to the weaving mechanism, as usual, the lease-rods being so located as to make the angle of the warps between the harnesses and the fell f^x of the cloth as nearly as possible equal to the angle between the harnesses and the lease-rods.

It will be apparent that the lease-rods must subject all of the threads to strain when the sheds are opened, so that those threads wound on the beam with extra tension are liable to break and the uneven division of the threads hereinbefore referred to will be manifest. Supposing that with five harnesses, as shown, Nos. 2 and 5 are up and Nos. 1, 3, and 4 are down, then the threads are not separated into two equal divisions by the lease-rods, as will be obvious, the harnesses usually having equal numbers of threads, for the threads from harnesses 1, 3, and 4 pass under the back lease-rod L' and over the front rod, while threads from 2 and 5 pass under L and over L'. In accordance with my present invention, as hereinbefore stated, I dispense entirely with the usual lease-rods, and in Fig. 1 I have shown one embodiment of my invention, the usual and well-known parts of the loom being lettered as in Fig. 2; but in the place of the lease-rods and substantially at the point usually occupied thereby, I have shown a series of detector lease members d , preferably arranged in two banks or series, one of such members for each warp-thread. Referring to Fig. 1^a, the members d are shown in horizontal section and the drawing in of the threads is manifest, the threads from harnesses 1, 3, and 5 passing through the members in the front bank, while the threads from harnesses 2 and 4 are led through the members in the rear bank, each member independently controlling its own individual warp-thread. Whatever the number of harnesses employed, the drawing in of the threads is always the same—that is, the threads will be drawn through the detector lease members in the two banks alternately, the said members thus separating or leasing the warp-threads.

The members d are preferably made of thin flat sheet metal, and they are shown as provided with warp-receiving eyes or openings d' and longitudinally slotted at d^x , and through these slots are passed supports $m n$, fixedly

mounted in suitable brackets A^x , secured to the loom sides, a bar or plate b , set on edge and extended from one to the other bracket, serving to separate the lower ends of the two banks of detectors d . The supports $m n$ are of less depth than the length of the slots d^x , the tension of the warp-threads normally maintaining the detectors substantially in the position shown in Fig. 1, with their lower ends out of range of feelers f , suitably connected with rock-shafts f' , mounted in front of and at the back of the plate or bar b , the feelers being moved toward and away from the detectors in any suitable manner, as by meshing segmental gears (not shown) on the rock-shafts, a similar form of mechanism being shown in United States Patent No. 596,443, dated December 28, 1897. One rock-shaft is provided with an arm f^2 , having pivotally connected therewith a link f^3 , which may be moved longitudinally in any suitable manner—as, for instance, in United States Patent No. 621,310, dated March 14, 1899—to effect a vibrating movement of the feelers when the loom is running properly.

The function of the detectors, in so far as relates to the stop-motion mechanism, is similar to that performed by the detectors in the patents hereinbefore referred to, a dropped detector or one abnormally positioned, due to failure or undue slackness of its warp-thread, engaging the cooperating feeler and through such engagement effecting the actuation of the stopping means for the loom, the shipper-lever S being the only member of such means herein shown. Thus the function of the detectors is twofold—viz., to lease or separate the warp-threads, as set forth, and also to serve as actuating or controlling members for stopping means for the loom to effect the operation of such means upon failure or undue slackness of a warp-thread. It is not necessary, however, to employ two banks or series of detectors to properly lease the threads, as will appear hereinafter; but the construction hereinbefore described is preferable, as it avoids undue crowding of the detectors, and each thread has its own detector. The leasing of the warp-threads by the detectors in no way interferes with their operation as a part of the warp-stop-motion mechanism, as will be manifest, and the converse is also true.

Referring to Fig. 8, I have shown how a single series of detectors may be utilized to lease the threads, the detector h having an elongated slot h' , through which the support g is extended, two warp-threads being led through a second longitudinal slot h^2 , the thread w belonging to one group being led in from one side of the detector, while the thread w' of the other group is led in from the opposite side, the plate b^x , which forms the back-stop for a detector when engaged by the feeler, also serving as a support for the warp-threads back of and adjacent to the detectors, the latter being located at the point of decussation.

The form of detector shown in Fig. 8 is substantially that shown in United States Patent No. 554,605, dated February 11, 1897, the detecting operation taking place whenever a thread in the upper plane of the shed breaks or becomes unduly slack.

From the foregoing it will be manifest that I have completely obviated the use of lease-rods while properly leasing the threads and without any of the disadvantages attendant upon the use of lease-rods, as hereinbefore set forth.

In Fig. 3 two harnesses $H^1 H^2$ are provided, the threads w from the former passing over lease-rod L and under rod L' , while the threads w' from harness H^2 pass under L and over L' , the threads alternating, and in Fig. 3^a the thread of a two-harness mechanism is shown as drawn in in accordance with my invention, the leasing-detectors d being shown in cross-section. Referring to the upper part of Fig. 3, it will be seen that with two harnesses the threads are separated, even by the usual lease-rods; but when the number of harnesses is increased the threads are not separated nearly so well, as is manifest in Fig. 4, wherein harnesses H^3 and H^5 are down and H^4 up. The threads w from H^3 and H^5 pass under rod L and over L' , while the warp-thread w' from harness H^4 passes over L and under L' , and so on, and as shown in the diagrammatic part of the figure two threads are together under one rod and over the other, so that there are twice as many threads at one side of the rod as there are at the other side, crowding the threads together, with greatly-increased liability to stick together. On the contrary, when my invention is used, as shown in Fig. 4^a, the threads from the several harnesses pass through the detector members d in the front and back row alternately, and the threads are completely and thoroughly separated, just as in the use of two harnesses.

The bending of the threads about the front lease-rod is shown in Figs. 5, 6, and 7 with three harnesses H^3 , H^4 , and H^5 , and in Fig. 5 H^4 is up and the other two harnesses down, while in Fig. 6 H^3 and H^4 are down and H^5 up, and, finally, in Fig. 7 H^3 is up and H^4 and H^5 down, the bending of the threads about the rod L being very clearly shown in Figs. 6 and 7 when compared with Fig. 5. All of this bending of the threads is overcome by the use of my invention, and the consequent strain and friction upon the threads is avoided.

My invention is not restricted to the particular construction or arrangement herein shown, for, so far as I am aware, it is broadly new to provide means for not only detecting the failure or undue slackness of the warp-threads, but also serving to effectually lease the threads.

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

1. A loom provided with leasing means comprising a series of independent, movable mem-

bers in engagement with and separating the warp-threads from each other.

2. A loom provided with leasing means comprising a series of independent, movable members in engagement with and separating the warp-threads from each other, the number of said members being equal to at least one-half of the number of threads to be leased.

3. In a loom, a series of independent movable members in engagement with the warp-threads and separating the latter from each other, to constitute the sole leasing means for the threads, said members also serving as stop-motion-controlling detectors and being held in normal position by the warp-threads, and stopping means for the loom operated by or through a detector in abnormal position due to failure or undue slackness of a warp-thread.

4. In a loom, two banks or series of independent members each having a thread-receiving opening, the warp-threads being engaged by members of the two series in alternation, the banks or series being located between the shed-forming mechanism and the whip-roll, and the independent members composing the banks or series constituting the sole leasing means for the threads.

5. In a loom, the following instrumentalities in combination, viz: harnesses, a whip-roll, warp-stop-motion-controlling detectors located between the whip-roll and harnesses, the threads passing directly over the roll to the detectors and thence to the harnesses, whereby the detectors constitute means for leasing the threads, and stopping means for the loom, operated by or through abnormal positioning of a detector due to failure or undue slackness of a warp-thread.

6. In a loom, a series of detectors mounted upon and dividing the warp-threads at the point of decussation into groups which are to form the planes of the shed, thereby constituting the means for leasing the threads, and stopping means for the loom, actuated by or through abnormal positioning of a detector due to failure or undue slackness of a warp-thread.

7. In a loom, a series of vertically-movable stop-motion detectors controlled as to their vertical position by and mounted upon the warp-threads and dividing the same at the point of decussation into the two groups which are to form the planes of the shed, a fixed support for and relative to which the detectors have a limited longitudinal movement individually, and stopping means for the loom, actuated by or through abnormal positioning of a detector due to failure or undue slackness of a warp-thread.

8. In a loom, two parallel and adjacent series of stop-motion detectors controlled as to their position by and mounted upon the warp-

threads and dividing the same into the two groups which are to form the planes of the shed, to thereby lease the threads, and stopping means for the loom, actuated by or through abnormal positioning of a detector due to failure or undue slackness of a warp-thread.

9. In a loom, two parallel and adjacent series of stop-motion detectors controlled as to their position by and mounted upon the warp-threads and dividing the same into the two groups which are to form the planes of the shed, to thereby lease the threads, a support for each series of detectors and relatively to which the detectors have a limited longitudinal movement individually, and stopping means for the loom, actuated by or through abnormal positioning of a detector due to failure or undue slackness of a warp-thread.

10. In a loom, shed-forming mechanism, the warp-beam, vertically-movable stop-motion detectors mounted on the warp-threads intermediate said mechanism and the beam at the point of decussation and dividing the warp-threads thereat into the two groups which are to form the planes of the shed, thereby leasing the threads, and stopping means for the loom, actuated by or through abnormal vertical positioning of a detector due to failure of a warp-thread.

11. In a loom, vertically-movable stop-motion detectors mounted on the warp-threads at the point of decussation and dividing the threads into the groups which are to form the planes of the shed, to thus lease the warp-threads, a support for and relative to which the detectors have a limited longitudinal movement individually, and stopping means for the loom, actuated by or through abnormal positioning of a detector due to failure of a warp-thread.

12. In a loom, two parallel, adjacent series of thin, flat stop-motion detectors provided with eyes through which the warp-threads are passed, to divide the said threads into the groups which are to form the planes of the shed, thereby leasing the warp-threads, the latter controlling the vertical position of the detectors, supporting means for the detectors, relative to which the latter have a limited vertical movement, said means preventing movement of the detectors in the direction of travel of the warp-threads, and stopping means for the loom, actuated by or through abnormal positioning of a detector due to failure or undue slackness of a warp-thread.

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

JOHN L. BURTON.

Witnesses:

GEO. OTIS DRAPER,
ALBERT H. COUSINS.