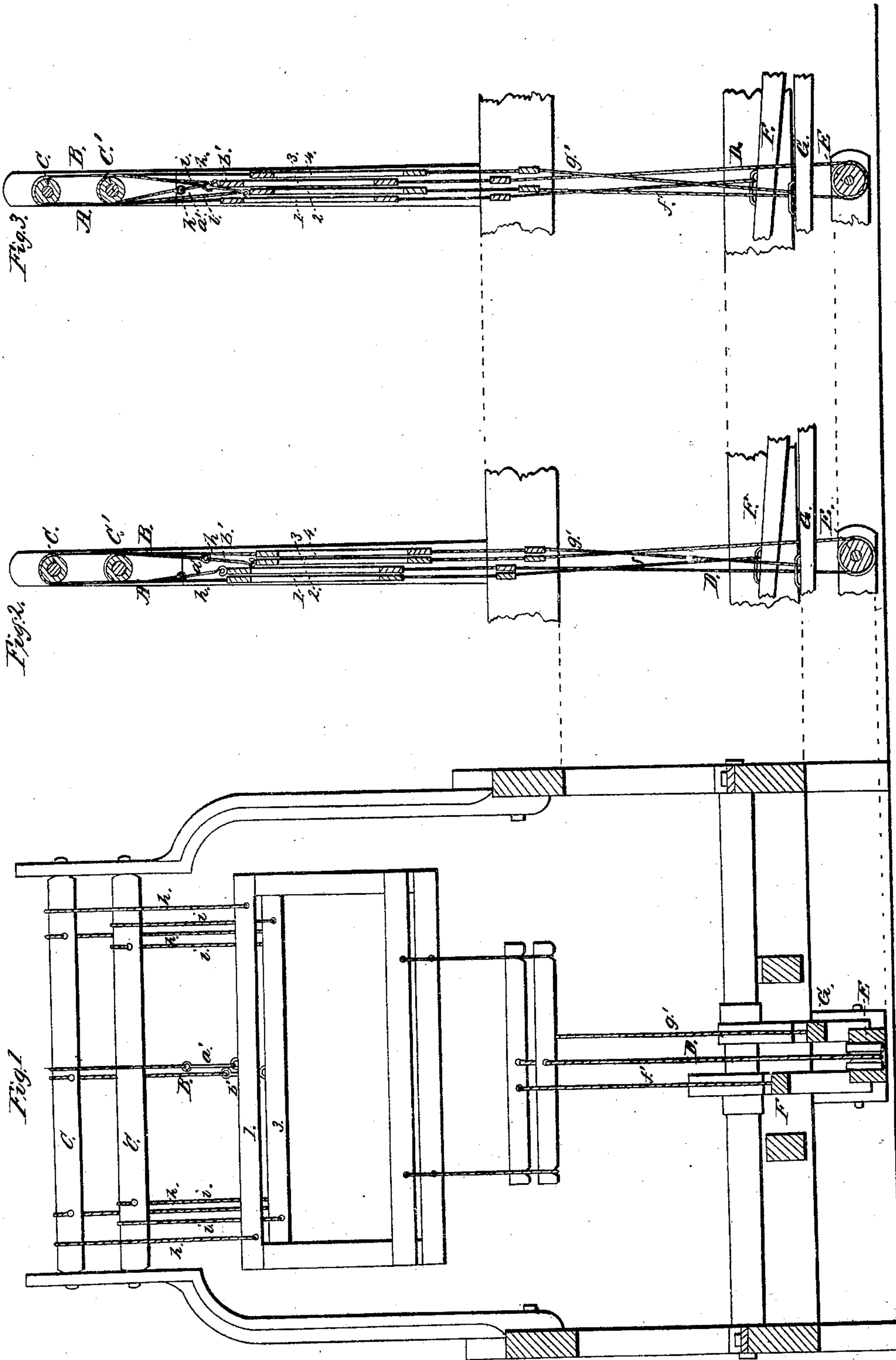


*J. Welsh.*  
*Shedding.*

*N<sup>o</sup> 56,474.*

*Patented Jul. 17, 1866.*



*Witnesses*  
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# UNITED STATES PATENT OFFICE.

JOSEPH WELSH, OF PHILADELPHIA, PENNSYLVANIA.

## IMPROVEMENT IN LOOMS.

Specification forming part of Letters Patent No. 56,474, dated July 17, 1866.

*To all whom it may concern:*

Be it known that I, JOSEPH WELSH, of the city of Philadelphia, in the State of Pennsylvania, have invented a new and useful Improvement in Looms; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a front view, and Figs. 2 and 3 side views, of my said improvement as applied to a loom.

Like letters and numbers of reference indicate the same parts when in the different figures.

The object of my improvement in looms is to afford a more simple and readily-adjustable device, whereby the attendant can at any time, in a few seconds, change the operation of a loom weaving plain cloth so that it will produce either plain or covered fabric alternately, as the said attendant may desire.

The nature of my invention consists, substantially as hereinafter described, in connecting the lower sides of two of the heddle-frames by means of a cord or strap passing under a pulley below them, and the two upper sides of the same heddle-frames by means of two cords or straps, with hooks attached, passing over and fixed to the usual top roller above them, in addition to the usual connecting-cords, whereby the requisite changes, hereinafter described, can be readily and more quickly produced.

In the drawings, 1 2 3 4 are the heddle-frames; A B, the two cords or straps on the top roller, C, with their respective hooks *a' b'*, attached to the upper sides of the heddle-frames 2 and 3. (See Figs. 2 and 3.)

D is the strap or cord passing under the pulley E, and connecting the lower sides of the heddle-frames 2 and 3 together.

F and G are the treadles, and *f' g'* the cords or straps which connect the said treadles with their respective heddle-frames 1 and 4 above, which latter are suspended from the top roller, C, by the fixed cords *h h*; and *i i* are cords which are attached over the roller C', and thus suspend therefrom the heddle-frames 2 and 3, as heretofore.

It will be seen that heddle 1 is attached to

treadle F and heddle 4 to treadle G, and that heddles 2 and 3 have no connection with them, as was heretofore the case, but receive their motions only from the roller C on the top of the loom, by means of the two cords or straps A B on the said roller and the connecting cord or strap D, which passes under the pulley E.

The hooks *a' b'* on the cords A B serve the purpose of connecting the said cords to the heddles 2 and 3, by means of the appropriate staples in the latter, so that when the said hooks are connected to the heddles, as shown in the drawings—*i. e.*, hook *a'* to heddle 2 and hook *b'* to heddle 3—the loom will weave covered fabric, because heddles 1 and 2 will rise and fall together or simultaneously, and heddles 3 and 4 together, in like manner; and when the said hooks are connected to the heddles, as shown in Fig. 3—*i. e.*, hook *a'* to heddle 3 and hook *b'* to heddle 2—the loom will produce common plain cloth, because heddles 1 and 3 will rise and fall together or simultaneously, and heddles 2 and 4 together, in like manner. Hence it will be seen that the capabilities of the loom can be thus varied by simply detaching and afterward reattaching in a different manner, as explained, the two hooks *a' b'*, and that this change will require only two or three seconds of time to make it.

By the old mode of producing these two sorts of fabric in the same loom each fabric required a particular "tie-up," causing considerable delay and trouble—so much, indeed, as to render the proceeding impracticable. For instance, suppose the warp-yarn be drawn into the heddles 1 2 3 4, it is repeated all through the web, and the loom being a plain one, having two treadles only, as shown in the drawings, by attaching the heddle-frames 1 and 3 to treadle F, and 2 and 4 to treadle G, the loom will make the common plain cloth, and if the heddle-frames 1 and 2 be attached to treadle F and 3 and 4 to treadle G the loom will make the covered fabric; but it will be readily seen that to change these attachments without a great deal of trouble and loss of time would be impossible, because they are fixed attachments to the treadles under the loom and difficult of access.

Letters Patent dated September 5, 1865, were granted to me for a certain improvement



in looms, whereby the old difficulty of tying up for these purposes was obviated in a comparatively simple manner; but the cost of its application to a common loom is about fifteen or twenty dollars, and it takes from a half to three-fourths of a day to apply it, whereas the present invention will not cost one dollar, and it can be applied in less time than two hours, and it effectually accomplishes the objects of making covered and plain fabrics.

I wish it to be understood that I do not intend to confine myself to the use of the two-hooked straps or cords A B for the purposes specified, as it will be obvious that a small spur-wheel fixed on each of the rollers C C', so that the latter can be either connected together thereby, or separated and reconnected by an intermediate spur-wheel made adjustable for the purpose, will be a perfect equivalent for the two hooked cords A B, and may be substituted for them in operating their two heddles; but as the hooked cords or straps are

cheaper and more simple of application, I prefer them for the purpose, as described. Nor do I intend to confine the attachments of the cords D and A B to the two inner heddles, 2 and 3, as it is obvious that the two outer heddles, 1 and 4, may be substituted, and their treadles F and G then attached to heddles 2 and 3 to produce the same results; but,

Having fully described my improvement in looms, what I claim as new therein, and desire to secure by Letters Patent, is—

Giving the described different motions to the heddles of the loom, for the purposes specified, by means of the hooked cords or straps A B on the roller C, or their equivalents, operating, in combination with the pulley E or its equivalent, substantially as and for the purposes described.

JOSEPH WELSH.

Witnesses:

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