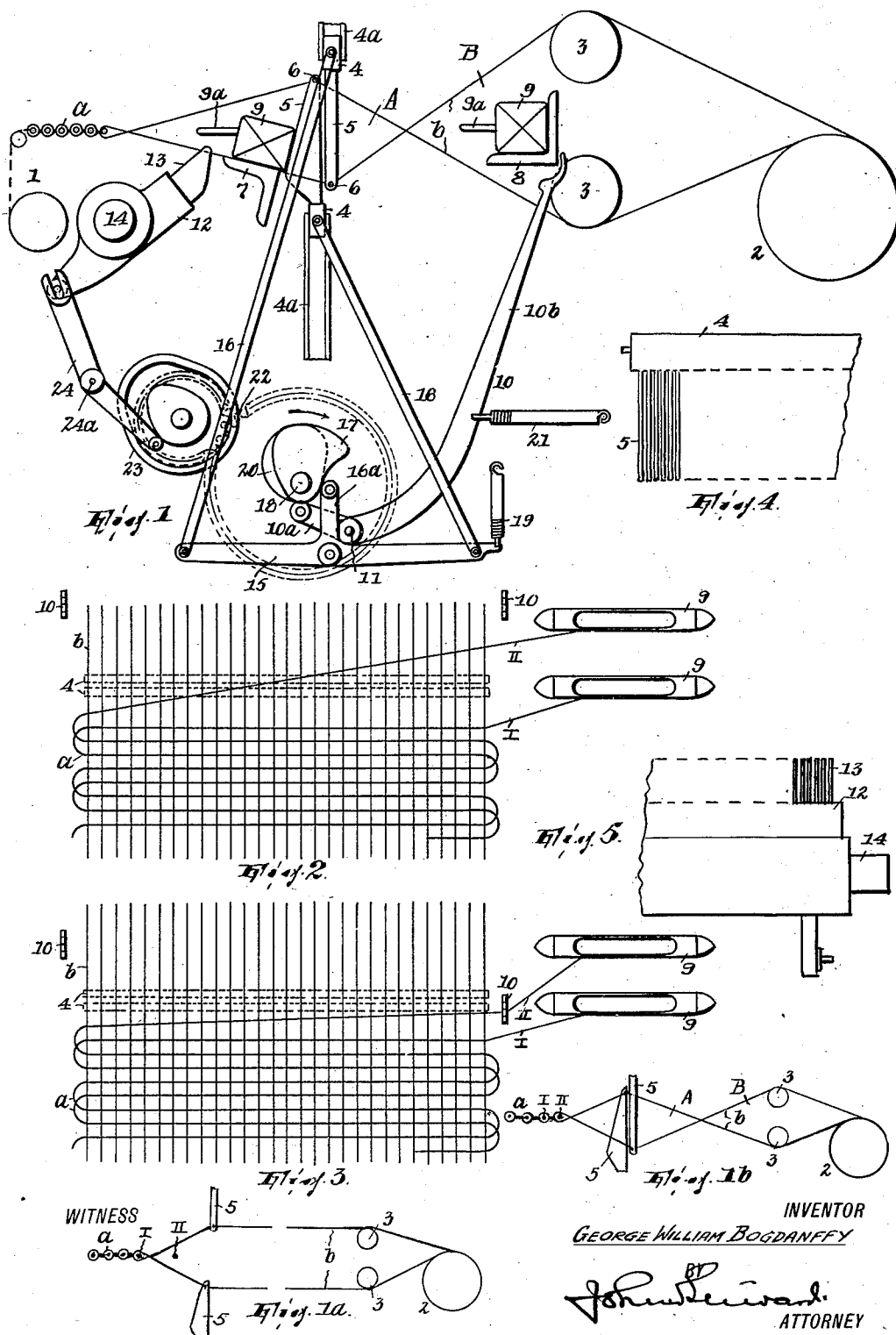


**1,859,952**

Filed April 8, 1930



## UNITED STATES PATENT OFFICE

GEORGE W. BOGDANFFY, OF CLIFTON, NEW JERSEY, ASSIGNOR OF ONE-FOURTH TO  
BENJAMIN EASTWOOD, OF PATERSON, NEW JERSEY

## LOOM AND METHOD OF WEAVING

Application filed April 8, 1930. Serial No. 442,526.

This invention has for its object to provide for an increase in output in weaving. The invention has been devised particularly with reference to the weaving of wire, but it is applicable to the weaving of other materials.

In carrying out the invention two filling carriers are employed, shedding means operates, between the cloth and guides for separating the warp into two shed-forming sections, to alternately form and eliminate a cross between the guides and shedding means composed of the sections and consequently produce sheds forward and back of the cross and through which, respectively, the carriers may pass, and after the carriers pass and the cross is eliminated, thus incidentally establishing a secondary cross rearward of the forward filling, forwarding means operates on the rearward filling to place it in advance of the shedding means, and consequently in position to be forward of a third cross which forms on the ensuing re-formation of the first-named or primary cross, which now occurs and completes a cycle of the operation. Preferably the advance of the two fillings into their positions as actual components of the fabric does not depend on the crossed warp sections but is effected independently of them and positively, as by beating up means which acts first on the forward filling and then, receiving the rearward filling from the forwarding means, on such rearward filling. The forwarding means is preferably two-part, one forwarding part or member at each side of the sheet of warp and fabric, and they act to forward on alternate cycles or picks of the loom, that is, one or the other at that side of the warp-and-fabric sheet where the carrier for the rearward filling happens to be.

The drawings illustrate the invention diagrammatically.

Fig. 1 showing those parts of a loom which are essential to the invention and the warp-and-fabric sheet in side elevation, the warp sections being crossed as at the commencement of a cycle;

Figs. 1a and 1b showing certain of the parts and said sheet respectively when the

cross has been eliminated and when the cross has been re-established;

Figs. 2 and 3 showing in plan the said sheet, shedding means, forwarding means and the two carriers, to wit, Fig. 1 before and Fig. 2 after the forwarding means has operated; and

Figs. 4 and 5 show in front elevation and plan one of the shedding members and the reed, respectively.

Let *a* designate the fabric and *b* the warp. The fabric is of course subject to any take up means, shown at 1, and the warp is delivered from any let-off means, as 2, such means acting as usual to maintain the sheet of fabric and warp tensioned.

Guides 3 maintain the warp in two sections, i. e., alternate strands or threads of the warp passing over the upper guide and the remainder under the lower guide; by "alternate" I do not of course necessarily mean one for one. Between the guides and the fabric is the shedding means consisting of shedding members 4 one of which is equipped with upwardly and the other with downwardly projecting dents 5 apertured as shown at 6 for reception of the warp threads and having free ends. In their positions illustrated in Fig. 1 they coact with the guides to maintain what I have termed the primary cross in the two warp sections which they respectively control, to wit the cross shown between them and the guides in Figs. 1 and 1b. But they are movable from these positions, the lower one down and the upper one up, to eliminate this cross, that is to say, so that in place of the two existing sheds A and B shown there will remain but a single shed (Fig. 1a). How their motion, back and forth between these two positions indicated, may be accomplished will be later described. They may be kept upright by suitable guide ways 4a in which they travel.

Forward and back of this cross are two structures 7 and 8 (which I hereinafter term lays, though they are not herein shown as carrying, as usual, reeds or equivalent beating-up devices) which may be fixed, and arranged to travel on each lay is a shuttle or other filling carrier 9 having a filling deliv-

ery guide at 9a. How these filling carriers are reciprocated is not material. The lay 8 is in such position as to be within the shed B. But lay 7 is in position to be below or exterior of shed A; further, its top or carrier-guiding surface is about level with the bottom forward stretch of shed A and in order to omit any possible obstruction to forwarding of the filling delivered by the carrier on lay 8 lay 7 has no upstanding carrier-guiding back, as has lay 8, but a back guide for the carrier is afforded by the lower shedding member 4 whose dents 5 have their forward surfaces rearwardly inclined, i. e., perpendicular to the inclined top surface of lay 7, this member at the time when the carrier is to pass being up and positioned to perform this guiding function, or as in Fig. 1.

Each forwarding member consists of a lever 10 fulcrumed at 11 and having an actuating arm 10a and a forwarding arm 10b which extends upwardly and terminates in a hook so positioned that when this arm swings forward the hook will displace forwardly the filling deposited on the lay 8; its forward movement is sufficient to carry its hook end, and hence such filling, between the two members 4 (then retracted so that the cross has been eliminated) and deposit it forward of them. The forwarding members preferably act alternately on successive cycles.

At 12 is a reed whose upstanding dents 13 have free upper ends and which is of the rocking type, its axis 14 being below the warp and fabric sheet and close to the fell. The reed performs two movements to beat up on every cycle.

For reciprocating the shedding members 4, the forwarding members 10 and the reed there is the following mechanism: A rocker 15 has its opposed arms pivotally connected by links 16 with the respective members 4; and it has an actuating arm 16a which is held against a cam 17 on the rotary shaft 18 by a spring 19. Each forwarding member 10 has its arm 10a held bearing against one of a pair of cams 20 on shafts 18 by a spring 21; and in order to obtain the mentioned alternate movements of these two members it will be understood (though it is not shown) that the cam 20 for one will be offset relatively to the other 180 degrees. Shaft 18 is connected by gearing 22 with a rotary cam 23 so as to rotate this cam at a 2-1 ratio, and said cam through a lever 24, fulcrumed at 24a, actuates the reed.

*Operation.*—Assume the parts to be in the positions shown at what I take to be the commencement of a cycle. The shuttles at that time are passed through the sheds A—B, depositing their fillings I, II therein, whereupon, shaft 18 being in rotation, the shedding members 4 move apart to eliminate the cross and such sheds and (due to the

conformation of cam 17) remain apart for a comparatively short time. During such time, a second cross (as distinct from the first or primary cross) having as a matter of course (Fig. 1a) formed back of filling I so that that filling is bound in, the filling II is by the forwarding means shifted forward of the shedding members as in Fig. 1a, and the reed first beats up thus bound-in filling I (deposited ahead of it, when back, by the guide 9a). Upon the advance of filling II and return of the shedding members so that the primary cross is again formed back of this filling II the reed also beats up that thus bound-in filling. The foregoing operations are due to cam 23 causing two strokes of the reed to one of the forwarding means and being so timed with respect to cam 17 that the reed's return movement to beat up filling II occurs of course after the forwarding means has placed that filling II in position to be caught by the reed on its second forward beat and also after the shedding means has formed anew the primary cross back of filling II. It will be noted that the reed when back permits the rearward filling to be shifted forward past it, because in its motion backward it at least clears the top of the shed. It has been indicated that in the example the forwarding members act alternately, and it may be said that forwarding member is in that case active on any pick of the loom which is at that side of the fabric-and-warp sheet which the carrier for filling II last reached. The limit of forward motion of each member 10 is not that necessarily shown by Fig. 3; such limit may be further forward, in order to take up any slack in filling II not otherwise taken up by means therefor existing in the shuttle, for instance.

Having thus fully described my invention what I claim is:

1. In a loom, the combination of a fabric take-up means, means spaced from the fabric to hold apart two sections of the warp each comprising alternate warp strands extending from the fabric, means alternately to form and eliminate crosses of said sections between the fabric and second means, lays arranged one forward and the other rearward of each cross when formed, filling-carrying shuttles movable on the lays through the respective sheds existing forward and rearward of each such cross, a dentate beating-up device reciprocating to and from the fabric fell and having free-end dents penetrating one wall of the forward shed and in the retracted position of said device extending short of the other wall and back of the filling deposited by the forward shuttle, and means, when each cross is eliminated, to forward the relatively rearward filling ahead of said dents, and mechanism to cause said device to perform two beating-up strokes to each for-

warding movement of the last named means.

2. The hereindescribed method of weaving which consists in maintaining the warp in two shed-forming sections permanently spaced apart in a plane removed from the fell of the cloth and so that said sections converge toward the fell, moving one section between the fell and said plane into crossing relation to the other, passing a filling between the sections forward of the cross thus formed and while said cross still exists, moving one section to eliminate the cross and thus form a second cross immediately behind said filling, passing another filling between said sections and behind the second cross, repeating the foregoing steps and thereby on each repeat forming a cross immediately behind the second filling, and on each repeat beating up one of the two fillings after the cross immediately behind it has been formed.

3. The hereindescribed method of weaving which consists in maintaining the warp in two shed-forming sections permanently spaced apart in a plane removed from the fell of the cloth and so that said sections converge toward the fell, moving one section between the fell and said plane into crossing relation to the other, passing a filling between the sections forward of the cross thus formed and while said cross still exists, moving one section to eliminate the cross and thus form a second cross immediately behind said filling, beating up the filling after said second cross is formed, passing another filling between the sections and behind the second cross, and repeating the foregoing steps and thereby on each repeat forming a cross immediately behind the second filling and also on each repeat beating up the second filling after the latter cross is formed.

In testimony whereof I affix my signature.

GEORGE W. BOGDANFFY.