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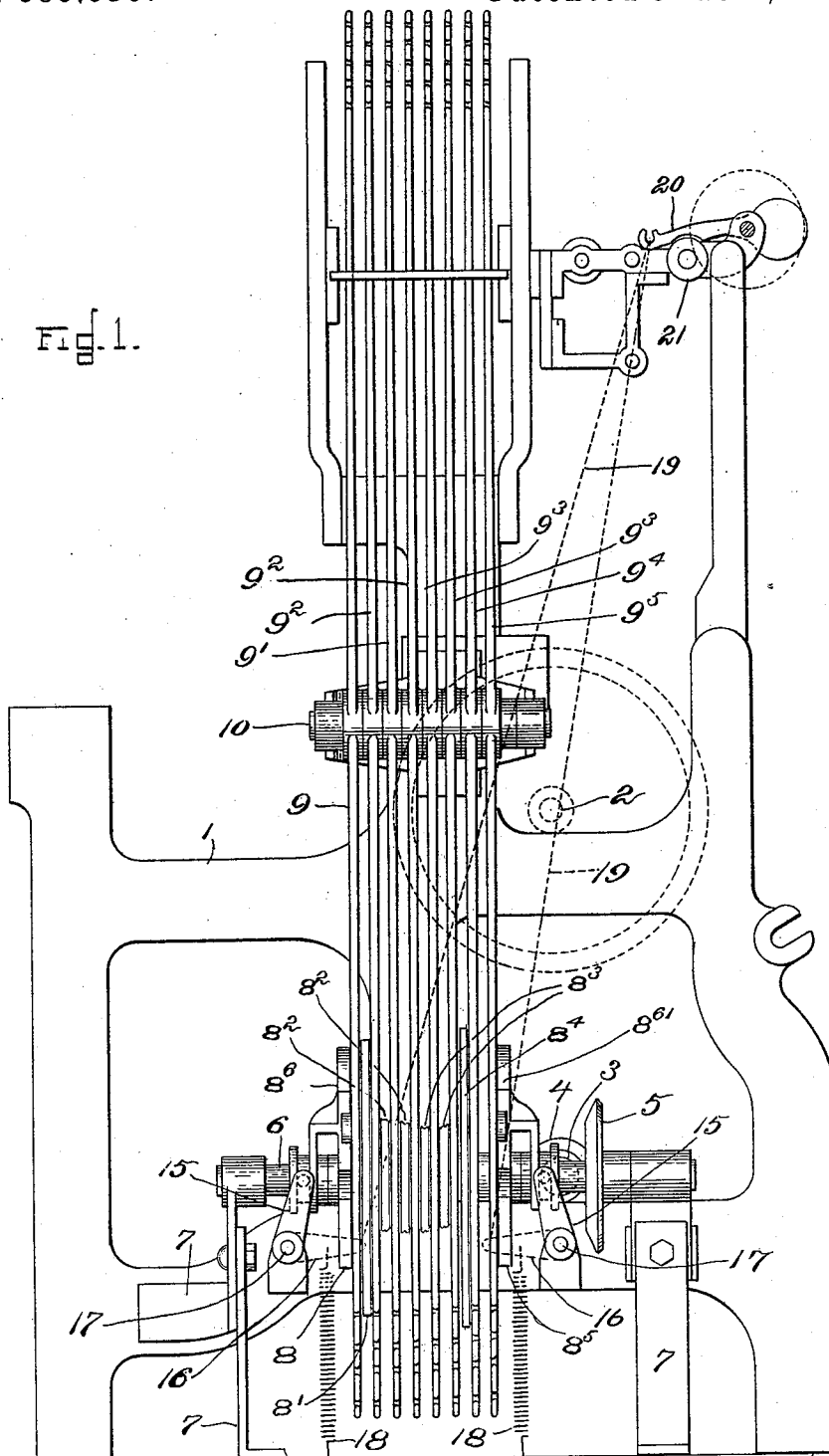
3 Sheets—Sheet 1.

J. A. KNIGHT.  
LOOM FOR WEAVING BAGS.

No. 583,650.

Patented June 1, 1897.

Fig. 1.



Witnesses.

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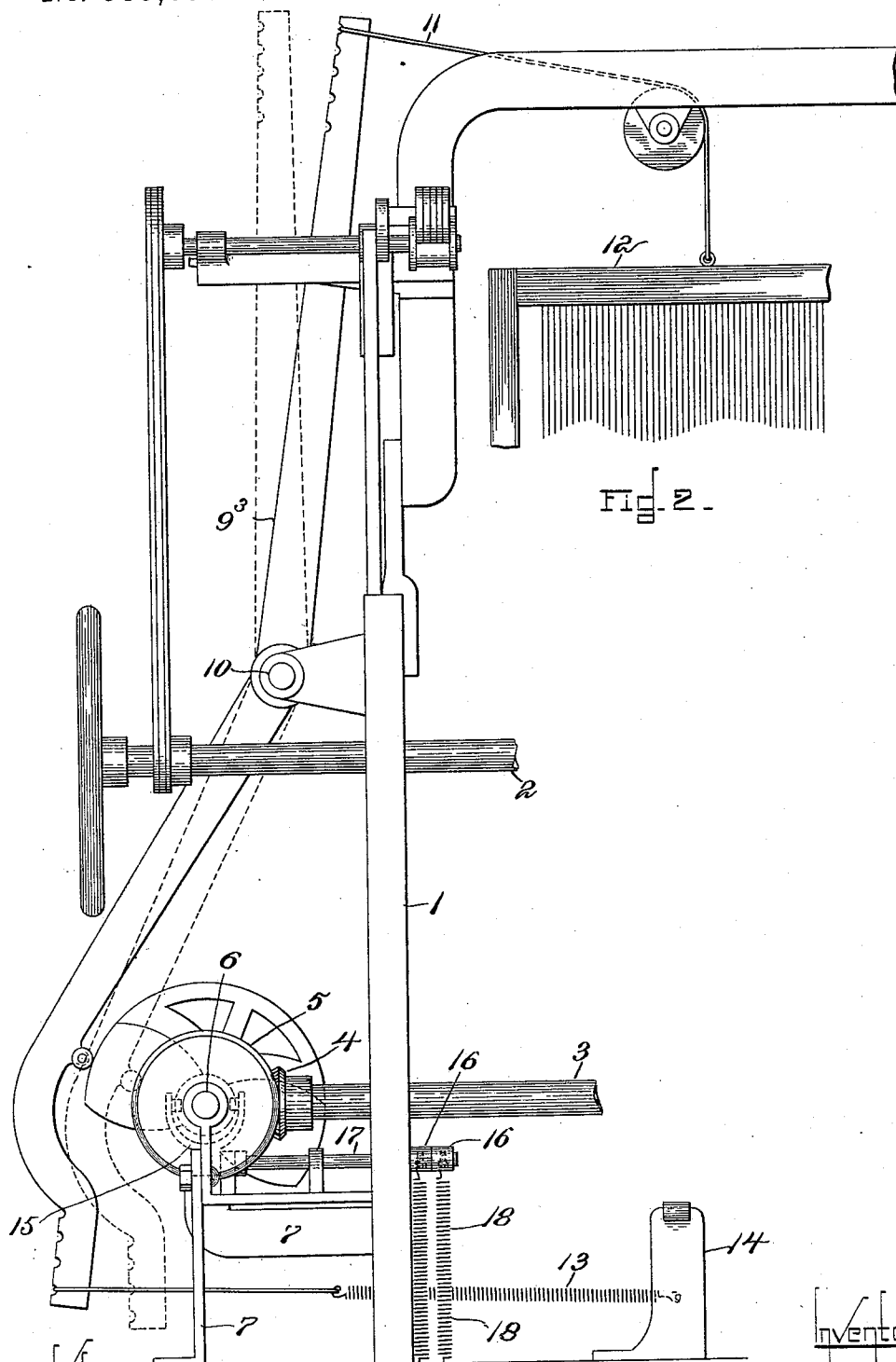
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(No Model.)

3 Sheets—Sheet 3.

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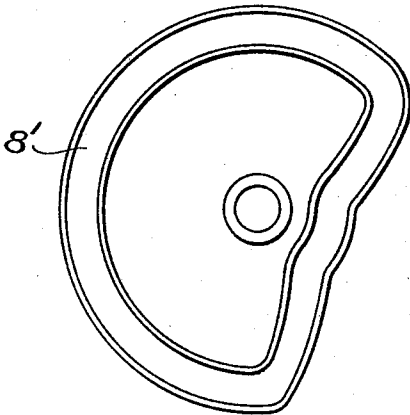


Fig. 3.

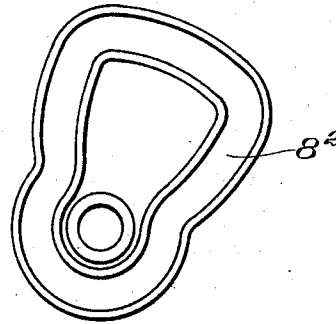


Fig. 4.

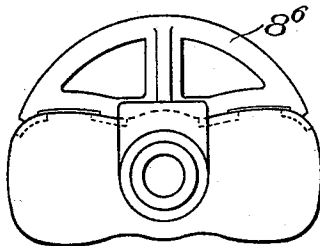


Fig. 5.

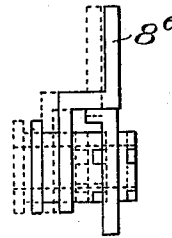


Fig. 6.

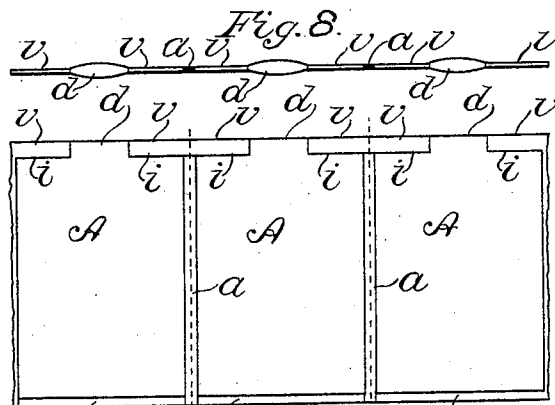


Fig. 7.

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# UNITED STATES PATENT OFFICE.

JESSE A. KNIGHT, OF COVENTRY, RHODE ISLAND.

## LOOM FOR WEAVING BAGS.

SPECIFICATION forming part of Letters Patent No. 583,650, dated June 1, 1897.

Application filed January 16, 1897. Serial No. 619,429. (No model.)

*To all whom it may concern:*

Be it known that I, JESSE A. KNIGHT, a citizen of the United States, residing at Coventry, in the county of Kent and State of Rhode Island, have invented certain new and useful Improvements in Looms for Weaving Bags, of which the following is a specification, reference being had therein to the accompanying drawings.

10 The Letters Patent of the United States which were granted to me October 27, 1896, No. 570,174, show, describe, and claim a novel and useful form of bag designed for the reception of merchandise of various sorts, such, 15 for example, as raw sugar. The form of bag which is covered by the said Letters Patent has the cloths composing the two sides of the same woven together along the sides and bottom, and also woven together along the top 20 thereof for a portion of the width of the bag, whereby an open mouth is formed, the mouth in some cases being surrounded by a neck projecting from the top of the bag.

In some cases, in the manufacture of seamless bags in general, it is desired to produce 25 a bag-web in which two bags shall be formed side by side in the direction of the width of the web, that is to say, crosswise thereof, the said bags having the mouths thereof located 30 at the selvages of the web.

The aim of my present invention is to provide a simple, durable, and convenient form of mechanism for use either in weaving bags of the character which is presented in my 35 Letters Patent aforesaid or webs having the two bags formed therein side by side, as just explained, and by the aid of which the said bags or bag-webs shall be produced economically and expeditiously.

40 The invention consists in a novel construction and combination of parts intended for use in a loom, and, first, will be described fully with reference to the accompanying drawings, in which is represented the best embodiment 45 of the invention which I have yet contrived, after which the distinguishing characteristics of the invention will be pointed out particularly in the claims at the close of this specification.

50 In the drawings, Figure 1 is a view in end elevation showing the frame of a loom with

the said embodiment of the invention applied thereto. Fig. 2 is a view looking from the right-hand side in Fig. 1, that is, the said figure represents the parts in rear elevation. 55 Figs. 3, 4, 5, and 6 are detail views of the various cams, and are referred to hereinafter. Figs. 7 and 8 are plan and edge views of one form of bag-web which may be produced by the aid of the mechanism hereinafter described as embodying my present invention. 60

1 is the frame of a loom. 2 is the crank-shaft of the said loom.

3 is the cam-shaft thereof.

4 is a bevel-pinion that is mounted on one 65 end of the cam-shaft 3.

5 is a large bevel-gear that engages with the bevel-pinion 4.

6 is a short shedding-cam shaft located adjacent to the end of the loom-frame, it having 70 the bevel-gear 5 fast thereon. The said shedding-shaft extends in a direction from front to rear of the loom and is mounted in bearings that are supported on stands and brackets 7 7, which are applied to the loom-frame 75 and to the flooring on which the latter rests. Two revolutions of the cam-shaft 3 are required in order to occasion one revolution of the shedding-cam shaft 6. 8 8', &c., are the shedding-cams, which are mounted on the said 80 shedding-shaft 6 and rotate therewith. 9 9', &c., are the harness-levers, which are actuated by the said cams 8 8', &c., the said levers being mounted in usual manner upon a pivotal support at 10. 85

11 is the harness-cording, which is connected with the upper ends of the harness-levers.

12 is the series of harness-frames, which respectively are connected to the respective 90 harness-levers by the cording 11, there being one such harness-frame to each harness-lever.

Upon the shedding-cam shaft 6 I employ two sets of cams, each set adapted for the production of a complete bag-weave. 95

In order the more clearly and explicitly to indicate the nature and working of the remaining particulars of my improved mechanism, I will proceed to describe the same with more especial reference to their employment 100 in the production of bags embodying the invention which is covered by my Letters Pat-

ent aforesaid. It is to be understood, however, that I do not intend to restrict the invention to use in this precise connection.

My improved bag aforesaid as produced in a loom has the length thereof extended crosswise of the loom—that is to say, the mouth portion of the bag is located at one side or end of the loom, and the closed end of the bag is located at the other side or end of the loom. For the purpose of weaving that portion of the bag which begins with and includes the closed end thereof and extends to the line on which the contracted neck of the mouth portion joins the body of the bag I employ one set of harness-frames, harness-levers, and one of the sets of shedding-cams which I have referred to above as being mounted on the shedding-cam shaft 6, while for the purpose of weaving the remainder of the bag, including the contracted neck portion and the closed and preferably solid portions at each side thereof in the width of the bag, I employ a second set of shedding-cams on the shedding-cam shaft 6. The number of harness-frames and corresponding parts that are employed in each set will vary according to the weave which is desired. Usually I shall adopt a simple and ordinary bag-weave requiring four harness-frames in each set. Thus in the drawings I have indicated that eight harness-frames are to be employed. The harness-levers 9, 9', 9<sup>2</sup>, and 9<sup>3</sup>, together with their actuating-cams 8, 8', 8<sup>2</sup>, and 8<sup>3</sup>, are supposed to pertain to one set of harness-frames—for example, that which is utilized to weave the closed end and body portion across to the neck—while the harness-levers 9<sup>3</sup>, 9<sup>4</sup>, 9<sup>5</sup>, and 9<sup>6</sup>, together with their actuating-cams 8<sup>3</sup>, 8<sup>4</sup>, and 8<sup>5</sup>, are supposed to pertain to the second set of harness-frames—namely, that which is utilized to weave the part of the bag containing the neck. The cams 8', 8<sup>2</sup>, 8<sup>3</sup>, and 8<sup>4</sup> are of the ordinary grooved construction in common use. (See Figs. 3 and 4.) Cam 8' is of the form that is represented in Fig. 3, it operating to hold the corresponding harness-frame down during three picks and raised for one pick. Cams 8<sup>2</sup> 8<sup>2</sup> are of the form that is represented in Fig. 4, each thereof operating to hold the corresponding harness-frame raised for three picks and depressed for one pick. Cams 8<sup>3</sup> 8<sup>3</sup> will be of the form that is represented in Fig. 4 and will act in the manner just stated of cams 8<sup>2</sup> 8<sup>2</sup>, while cam 8<sup>4</sup> is of the form that is represented in Fig. 3 and will act in the manner just stated of cam 8'. Cams 8 and 8<sup>5</sup> are of a compound construction, each having a main part which is shaped to cause the corresponding harness-frame to be raised for alternate picks and to be depressed for the intervening picks, and a sliding piece 8<sup>6</sup> or 8<sup>61</sup>, (see Figs. 5 and 6,) which is adapted to be moved laterally along the shedding-shaft 6 either into line with the corresponding harness-lever, so as to govern the working thereof, or into an inoperative position to one side of the said

lever. The said sliding piece is shaped so as that when occupying its normal position in the same plane with the other raised portions of the cam to which it pertains the said cam shall be enabled to act to hold the corresponding harness-frame depressed during three picks and raised for one pick. This is the working while the two sides of the body of the bag or the solid parts of the neck portion are being woven. As is well understood, certain portions of the bag-web require to be woven solid—as, for example, in order to close along the lateral edges of the bag. Those portions pertaining to the neck portion which are at each side of the contracted mouth also are woven solid. When solid weaving is required along the lateral edges of the body of the bag, the sliding piece 8<sup>6</sup> pertaining to the compound cam 8 is moved laterally far enough (see dotted lines in Fig. 6) to clear the adjacent harness-lever. This changes the order of movements and causes the two sides of the bag to become tied together in the weaving so long as the said sliding piece remains in the dotted-line position. A corresponding movement of the sliding piece 8<sup>61</sup> of the cam 8<sup>5</sup> causes the production of solid weaving in the neck portion of the bag adjacent to the contracted mouth thereof.

For the purpose of automatically sliding the pieces 8<sup>6</sup> and 8<sup>61</sup> along the shedding-shaft 6 at the required times I combine therewith pattern devices and connections on the order of what I am about to describe. Thus 15 is an arm that is forked and provided with pins to enter a groove which is formed in the hub of each sliding piece, the said arm being fast on a rock-shaft 17, carrying a second arm 16, having connected thereto one end of a spring 18, the other end of which spring is connected to some fixed part. The spring acts through the devices described to hold the said sliding piece in the same plane with the raised acting portions of the cam 8 or 8<sup>5</sup>. For the purpose of moving the sliding pieces in opposition to the action of the springs 18 each arm 16 has joined thereto one end of a connection 19, the other end of the latter extending to a lever or finger 20, resting on the surface of a pattern-cylinder 21 of usual or suitable character. The indicators on the said pattern-cylinder determine the positions which shall be assumed by the sliding pieces pertaining to the compound cams. Separate actuating connections are required in the case of the two shifting portions 8<sup>6</sup> 8<sup>61</sup> of the compound cams, inasmuch as independent movements of the respective shifting portions are necessitated by the fact that the weaving of solid web in the neck portion of the bag continues for greater distances than where required for uniting the sides along the lateral edges of the bags. Cams 8 and 8<sup>5</sup> are surface-cams and therefore act to occasion movements of the harness-levers 9 and 9<sup>5</sup> in only one direction. For the purpose of holding the said levers in proper contact with

the surfaces of the said cams at all times I employ in connection with each of the levers 9 and 9<sup>5</sup> a spring 13, one end of which is connected to such lever and the other end thereof to a stand 14. (See Fig. 2.)

I do not limit myself to the construction of compound cams herein described, save where I have indicated otherwise in my claims herein, inasmuch as other and equivalent means of varying the form and action thereof may be adopted.

By way of making more clear the working of the mechanism which has been described I will refer now to Figs. 7 and 8, in which I have represented in plan view and edge view the bag-web which is produced by the aid of the said mechanism. In Fig. 8, A A A represent the successive bags. As indicated, the bags lie lengthwise across the web and are joined together along their sides. The bag-web consists of two plies of cloth or fabric which are woven separate and one above the other throughout the width and length of the body of the bag and interwoven with each other along one edge of the web to form the closed ends or bottoms *a' a'* of the bags, the said plies being also interwoven together in bands *a a*, extending crosswise of the web at distances apart corresponding to the width of the bag. Subsequent to the weaving the bags are separated from one another by cutting or tearing across the web at the middle of each of the said bands *a a*. Along the edge of the web at which the mouths of the bags are produced the webs or plies are left free or unconnected with each other at their edges to form openings or mouths *d d*, each extending partially across the width of a bag, while intermediate the said mouths the webs at and adjacent to the edges are woven together into solid fabric, as at *v v*.

The warp-threads that enter into the formation of the solid portions *v v* and the neck portions surrounding the mouths of the bags are controlled by the rear set of harness-frames, the connected harness-levers 9<sup>3</sup>, 9<sup>3</sup>, 9<sup>4</sup>, and 9<sup>5</sup>, and their actuating-cams 8<sup>3</sup>, 8<sup>3</sup>, 8<sup>4</sup>, and 8<sup>5</sup>, while the warp-threads that are used in weaving the body of the bag from the inner line *i* of the solid portions *v* to the opposite edge of the web are controlled by the front set of harness-frames and their connected harness-levers 9, 9', 9<sup>2</sup>, and 9<sup>2</sup> and the actuating-cams 8, 8', 8<sup>2</sup>, and 8<sup>2</sup>.

Let it be supposed that the weaving has progressed to a point at which the open mouth *d* is being formed. While the said mouth is in course of formation the sliding pieces of the compound cams are in line, respectively, with the body portions of the said cams and the front set of harness-frames are actuated by the cams corresponding therewith, so as to produce open or two-ply weaving across the body of the bag except along the closed edge *a'*. During this time also the rear set of harness-frames is actuated by the cams pertaining thereto to produce open or two-ply

weaving in the neck portion of the mouth of the bag. On arriving at the point at which the weaving of the open mouth has to be discontinued the sliding piece 8<sup>61</sup> of the cam 8<sup>5</sup> is shifted out of line with the body of the said cam, so that the said body acts thereafter in connection with the other cams pertaining to the rear set of harness-frames to produce solid weaving, as required for the production of the portion *v*. The other set of harness-frames continues to weave open or two-ply web until the point is arrived at at which band *a* of close or single-ply weaving should be formed, 80 whereupon the sliding piece 8<sup>6</sup> of the cam 8 is shifted so as to cause the body portion of the said cam 8 to cooperate with the other cams pertaining to the front set of harness-frames, as required in the production of single-ply or solid weaving. The band *a* having been woven to the requisite width, the said sliding piece 8<sup>6</sup> is restored to its normal working position, and the weaving of two-ply or open web in the body of the bag is proceeded with. The weaving of solid or single-ply web by the rear set of harness-frames is continued after this until the point is reached at which the portion *v* should terminate and the open mouth of the next bag should be begun. As will be obvious from inspection of Figs. 7 and 8, each solid portion *v* begins at an intermediate point in the width of one bag—namely, at the end of the open-mouth of such bag—and extends across to an intermediate point in the width of the next bag—namely, to the beginning of the open mouth of such bag—whereas the small band *a* which crosses the bag-web does so at mid-length of the portion *v*.

The manner of utilizing my improved mechanism in the production of a web containing two bags formed side by side crosswise of the web, and having the mouths at the selvages of such web, will be obvious to those skilled in the art in the light of the foregoing.

I wish it to be understood that I do not confine myself to the use of my mechanism in the production of bags of the precise form which is presented in my Letters Patent aforesaid.

I claim as my invention—

1. The combination with two sets of harness-levers and connected harness-frames, of two sets of operating-cams, each set fitted to produce a bag-weave, and each set of cams containing a compound or shifting cam by the action of which to vary the order of shedding, and means whereby separately to control the working of the respective compound or shifting cams, substantially as described.

2. The combination with two sets of harness-levers and connected harness-frames, of two sets of operating-cams, each set fitted to produce a bag-weave, and each set of cams containing a compound cam, as 8, 8<sup>6</sup> or 8<sup>5</sup>, 8<sup>61</sup>, and pattern connections whereby separately to determine the positions of the shifting portions 8<sup>6</sup> and 8<sup>61</sup>, substantially as described.

3. The improved mechanism for weaving a  
seamless bag comprising in combination har-  
ness-frames, harness-levers, a set of harness-  
cams constructed to produce a bag-weave, and  
5 means for supporting and rotating the said  
cams in unison, one of the said cams having  
the main or body portion thereof shaped to  
actuate the corresponding harness-lever ac-  
cording to one order of shedding and also hav-  
10 ing the laterally movable or sliding piece  
which, when in one position, acts upon the  
said harness-lever to modify the order of shed-  
ding and in another position leaves the har-

ness-lever free to be acted upon by the main  
portion or body of the cam, and means where- 15  
by to move or slide the latter portion into and  
out of position to act upon the harness-lever,  
substantially as and for the purposes as set  
forth.

In testimony whereof I affix my signature 20  
in presence of two witnesses.

JESSE A. KNIGHT.

Witnesses:

E. H. HOWARD,  
CHAS. F. RANDALL.