E. F. HATHAWAY.

MECHANISM FOR CONTROLLING OR RELEASING AND FEEDING INDEPENDENT, DETACHED HEDDLES.

APPLICATION FILED DEC. 12, 1904.

1,190,760.

Patented July 11, 1916.

2 SHEETS—SHEET 1.

Fig. 1.

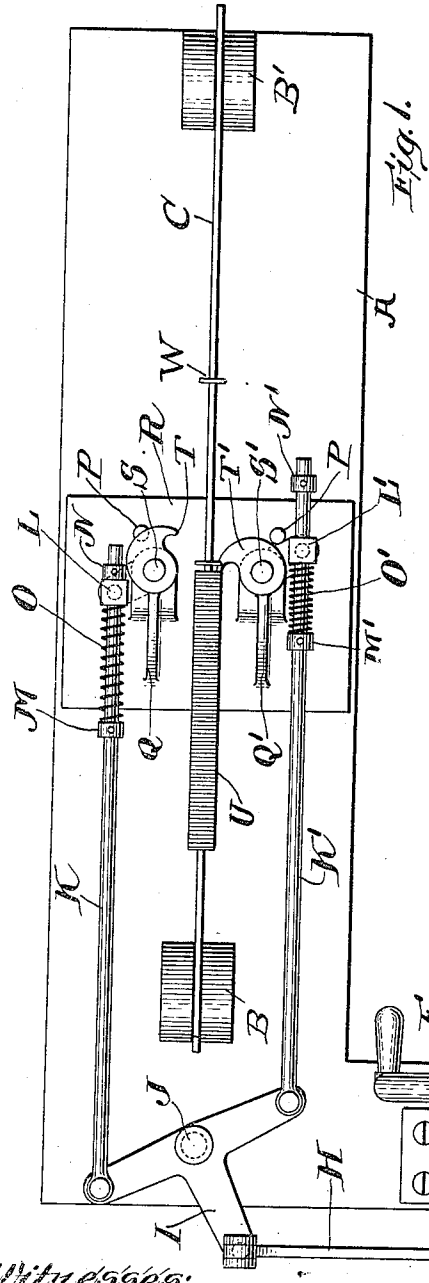
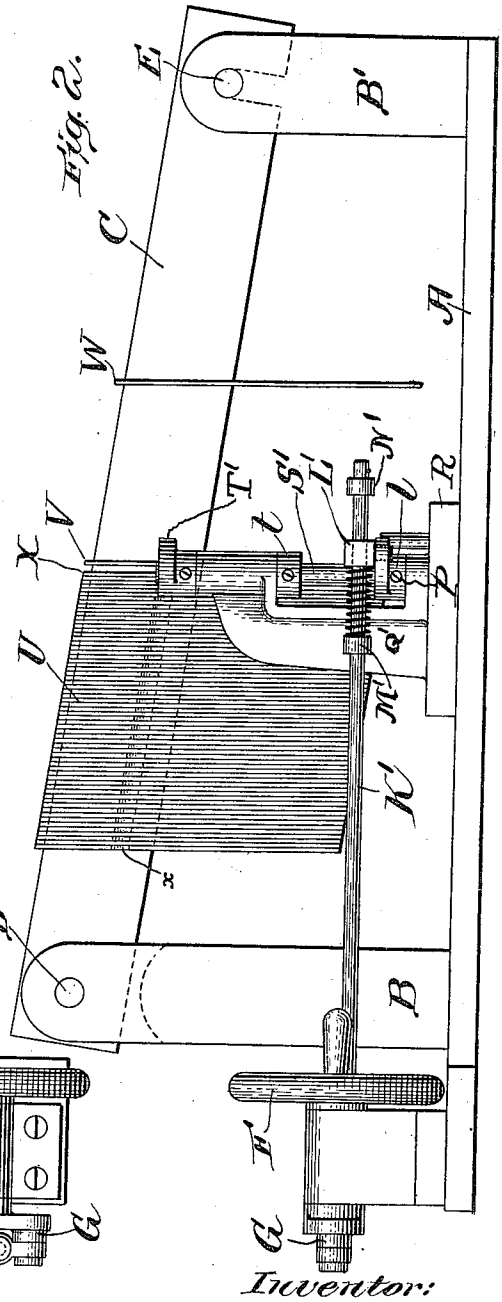


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

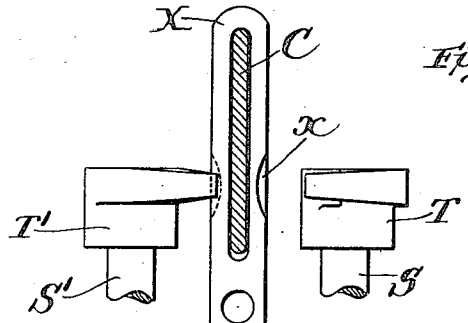
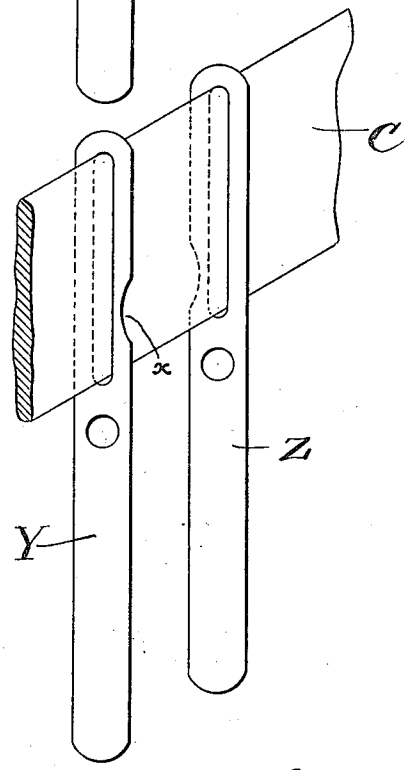


Fig. 4.



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MECHANISM FOR CONTROLLING OR RELEASING AND FEEDING INDEPENDENT, DETACHED HEDDLES.

1,190,760. Specification of Letters Patent. Patented July 11, 1916.

Application filed December 12, 1904. Serial No. 236,431.

To all whom it may concern:

Be it known that I, EDGAR F. HATHAWAY, a citizen of the United States, residing at Boston, in the county of Suffolk, Commonwealth of Massachusetts, have invented a new and useful Improvement in Mechanism for Controlling or Releasing and Feeding Independent, Detached Heddles, such as are employed in weaving in the textile art, of which the following is a specification.

My invention relates, as aforesaid, to improvements for controlling or releasing and feeding independent, detached heddles, and my invention is especially designed for incorporation in such mechanical combinations as are necessary in an organized warp-drawing or analogous machine. By independent, detached heddles, I mean heddles or holders such as are employed for controlling warp threads in weaving and, specifically, heddles that are entirely independent of each other so far as their structure is concerned, as distinguished from the heddles composing the ordinary woven or knit harness such as is most generally employed in the textile art. In such woven or knit harness the heddles are formed as part of a continuous structure, one heddle being incapable of removal therefrom without the severance of some organized formation. Independent or detached heddles, such as are referred to, are commonly made of metal and composed either of wire twisted into the necessary form or, as herein shown, of thin plates, such plates being perforated for the purpose of affording a heddle-eye and also having such other perforations as may be necessary for their support when used as a harness or similarly in the process of weaving.

A method of singly and successively selecting, controlling, releasing or feeding the ordinary heddles of an ordinary woven or knit harness has been disclosed in previous patents such as, for instance, that to Field, No. 600,670, March 15, 1898. The method of operation of selecting and feeding means in such cases is dependent upon the organized and continuous structure of the harness. In the development of machines for handling independent, detached heddles, it has become necessary to devise different means for controlling and feeding these heddles which may be capable of certain and simple operation, and it is to this precise object that the invention herein disclosed relates.

Broadly, this invention is based upon the organization of a series of such independent, detached heddles in such manner that the heddles are regularly alternated, showing in such alternate relation some peculiarity of form, structure or position.

The invention further comprises the use of a series of such alternately arranged heddles combined with means for holding such a series of heddles and means reciprocating with such alternately arranged series of heddles to release such heddles singly and successively or in any other desired manner.

In illustration of this invention, in the accompanying drawings Figure I shows a plan view of an organized mechanism showing a series of heddles, a holder therefor, feeding means adapted to reciprocate alternately with the heddles, and driving means adapted to actuate such feeding means. Fig. II shows the same mechanism in elevation. Fig. III shows a front view or elevation of the heddles as engaging with the feeding or releasing means, and Fig. IV shows a pair of heddles arranged in alternate relation upon a supporting bar.

In the various drawings, like letters indicate like parts.

In Figs. I and II, which show the mechanism in plan and elevation, A indicates the main platform on which the mechanism is erected. B and B′ indicate standards to support the bar which, in turn, supports the heddles. C indicates the supporting bar for the heddles, which is pivoted at D and adapted by the slot at the opposite end thereof to lock over the pin E through the slot in the top of the standard B′. F indicates a hand-wheel by which motion may be imparted to the releasing means by means of the eccentric G, connecting rod H and rocker I, supported on pivot J, actuating the two thrust rods K, K′. These thrust rods run through loose bearings L, L′, positively related to the releasing fingers T, T′, and the movement imparted to said releasing fingers T, T′, by the motion of the thrust rods is regulated by the compression springs O, O′ and the collars M,

M′ holding said springs between said collars and the thrust blocks L, L′, which thrust blocks are positively related, as stated, to said releasing fingers T, T′, as hereinafter shown. Another pair of collars, N, N′, on said thrust rods check the backward movement of said thrust rods. Said releasing fingers T, T′, are directly supported by the standards, Q, Q′, which standards constitute part of the auxiliary base R. Through vertical bearings in said standards Q, Q′ run rods S, S′. At the upper end of said rods, the releasing fingers T, T′ are secured in proper operative relation by set screws as indicated. At the bottom of said rods, as shown in Fig. II, are secured turning brackets as *l*, fastened to said rods S, S′ by set screws, and to said turning brackets said thrust blocks L, L′ are pivotally fastened, said thrust blocks providing a thrust bearing for the thrust rods K, K′, as shown in Fig. II. Said vertical rods S, S′ are further secured in position by collars as *t*. The forward movement of the turning brackets *l* is limited by stop-pins P secured in the base R; this also limits the movement of the fingers T, T′, at the upper end of the rods S, S′. U indicates the series of heddles, X indicating the heddle next to be released, and V and W heddles that have respectively been released by the releasing mechanism.

In Fig. IV, Y and Z indicate heddles of substantially similar form and structure but so related upon the bar C as to provide an alternate variation of form, structure or position, Y being considered as the foremost heddle, presenting an indentation upon its right side, and Z, the next heddle, presenting an indentation upon its left side, which alternate relation it is apparent could be extended to any length of series. It will be observed that when the heddles are assembled in compact relation the indentation or cutaway portion of each heddle leaves uncovered a holding portion upon the next adjacent heddle which, as will be more fully seen, is adapted to be engaged by suitable holding means. In the mechanism as organized, it will be apparent that the series of heddles, being supported upon the inclined bar C, will be advanced by effect of gravity into contact with the releasing or feeding mechanism, of which the parts engaging with the said heddles are the releasing fingers T, T′. Any other means might be provided for keeping said series of heddles compactly arranged and in operative relation to the releasing or feeding mechanism, such as a spring, or pulley, or weight-driven presser or positive means.

In the operation of the invention, as the series of heddles is held in compact organization and advanced along the supporting bar C by the effect of gravity, upon the operation of the feeding means by the reciprocation of the thrust rods K, K′, the releasing fingers T, T′ will alternately engage and disengage with the advancing heddles. Fig. III shows the releasing fingers T, T′ and the first unreleased heddle of the series, X, in the positions indicated in Figs. I and II. In this position the releasing finger T′ presses against the face of the heddle X in such manner as to retain said heddle as a part of the unreleased series. As the feed rod K′ is drawn back and the feed rod K is thrown forward, it is apparent that the releasing finger T will be thrown into engagement with the second heddle *x*, the end of the releasing finger T passing by heddle X by means of the indentation in the side thereof. The effect of the compression springs O, O′ is to permit a certain degree of lost action of said thrust rods K, K′, as related to the movement of said releasing fingers T, T′. It will be apparent, therefore, that said releasing finger T will be so thrown into positive engagement with said heddle *x* before releasing finger T′ is withdrawn from the face of the heddle X, said releasing finger T′ being so held in positive engagement until the thrust rod K′ has reached such position that the releasing collar N′ comes into engagement with the thrust block L′; when said releasing finger T′ will be retracted, and the heddle *x* will thus be released from the series and by gravity fed along the supporting rod C. Upon the continued operation of the mechanism, therefore, the heddles will be singly and successively released from the compact series and thus fed singly and successively along the supporting bar C for any desired purpose.

It is apparent on inspection of Fig. IV that the indentation in the side of heddle Z might be on the same side as the indentation in heddle Y but varied in vertical position, that is, higher or lower with reference to the normal position of the drop-bars as they hang upon the supporting rod. In such an arrangement it is apparent that both of the releasing fingers would work upon one side of the holding bar but in different vertical planes. The advantage of using the exact type of heddle shown is that only one form of heddle need be prepared, the alternate relation being established by turning heddles of this common form alternately to right and to left, and in that position supporting them upon the holding bar. This amounts substantially to a variation of position of one form of heddle, whereas if the indentations were on the same side with reference to the relation of the heddles to the retaining bar, but the indentations alternately and regularly varied in vertical rela-

tion, two forms of heddle would be necessary, and the alternate relation in such case would be established by a positive variation of form irrespective of position. It is evident, therefore, from the foregoing disclosure that the essence of the invention is the regular, alternate disposition of independent, detached heddles in such manner as to form an alternately arranged series, and, further, the provision of selecting, disengaging or releasing means to reciprocate accurately with relation to the members of such alternately arranged series.

It will be obvious that my invention not only contemplates the control or release and feeding of detached heddles employed for the specific purpose of controlling the several sheds of warp threads in the loom, but also those devices sometimes termed drop heddles, or drop wires, employed in connection with warp stop motions for the loom, as well as other detached, thread-receiving, loom elements and similar and analogous devices employed in the textile art.

It will be apparent that the necessary, regular, alternate relation between the successive members of the series of heddles may be established in many ways by varying the form, construction or position of the heddles, and that the releasing means to reciprocate with relation to such alternately arranged series of heddles may be of different forms adapted to reciprocate in each instance with form or position of heddle adopted.

Without specifying, therefore, all the various forms in which the invention may be illustrated or all the modes of its use, what I desire to claim is:

1. The combination with a series of independent heddles characterized by regular, alternate, exterior, linear variation of the members of the series, means for holding said series and releasing or disengaging means coöperating with the alternate, exterior linear variation of the members of the series adapted regularly and alternately to reciprocate with relation to the alternate members of said series, and to release or disengage said members from the series.

2. The combination with a series of independent heddles characterized by regular, alternate, exterior, linear variation of the members of said series, means for causing the feeding of said series to releasing or disengaging means, and releasing or disengaging means coöperating with the alternate, exterior, linear variation of the members of the series adapted regularly and alternately to reciprocate with relation to the alternate members of said series, and to release or disengage said members successively from the series.

3. The combination with a series of independent heddles characterized by regular, alternate, exterior, linear variation of the members of said series, means for holding said series, and a pair of vibratory or oscillating releasing fingers coöperating with the alternate, exterior linear variation of the members of the series adapted to reciprocate alternately with relation to the members of said series, together with means for actuating said releasing fingers and causing the successive release and disengagement of the members of the series.

4. The combination with a series of independent heddles characterized by regular, alternate, exterior, linear variation of the members of said series, means for causing the feeding of said series to releasing or disengaging means, and a pair of vibratory, oscillating, releasing fingers coöperating with the alternate, exterior linear variation of the members of the series adapted to reciprocate alternately with relation to the members of said series, together with means for actuating said releasing fingers and causing the successive release or disengagement of the members of said series.

5. The combination with a series of independent heddles characterized by regular, alternate, exterior, linear variation of the members of said series, means for holding said heddles in compact series arrangement, and means coöperating with the linear variation of the members of said series for releasing the heddles singly and successively therefrom.

6. The combination with a series of independent, detached heddles each consisting of a thin, flat strip of resilient sheet material having flat faces and substantially straight parallel edges, one edge being recessed to provide a releasing formation, of means for holding said heddles to present said releasing formations in an alternately varying position whereby the releasing formation of one heddle uncovers a holding formation in the next succeeding heddle and releasing means coöperating with said releasing formations to release the heddles singly and successively from the series.

7. The combination with a series of heddles consisting each of a thin, flat strip of resilient sheet material and having longitudinal, parallel edges, one edge being recessed to provide a releasing formation, of means for holding said heddles in series to present each a holding portion uncovered by the releasing formation of the preceding heddle and releasing means coöperating with said releasing formations and holding portions to release said heddles singly and successively from the series.

8. The combination with a series of metallic heddles consisting each of a thin, flat strip of resilient sheet material and having each a straight edge interrupted by a recess providing thereby a releasing formation at the edge of the heddle, means for holding

said heddles in series arrangement to present a holding portion on each heddle uncovered by the releasing formation of the preceding heddle, and releasing means cooperating with the releasing formations of the heddles to release the heddles singly and successively from the series.

9. The combination with a series of heddles consisting each of a thin, flat strip of resilient sheet material having flat faces and having a recess at one edge to provide a releasing formation, means for holding said heddles in series with the releasing formations arranged in alternating position to present each a holding portion uncovered by the releasing formation of the next succeeding heddle, and means first engaging and then disengaging the holding portion of successive heddles to release said heddles singly and successively from the series.

10. The combination with a series of detached, metallic heddles consisting each of a strip of thin, flat resilient material having flat faces, of means for holding said heddles in a bank or series, said heddles when arranged in series presenting an alternate variation in exterior, linear form and serving to present each a holding portion uncovered by the preceding heddle, and means operating at the side of the bank of heddles to coöperate with the exterior, linear variation in form of successive heddles to release the same singly and successively from the series.

11. The combination with a series of flat, metallic heddles having each a recessed edge to provide a releasing formation, holding means working from a position exterior to the bank or series of heddles, means for withdrawing the holding means from one heddle while applying it to the holding portion of the next adjacent heddle uncovered by the recessed portion of the preceding heddle, thereby to release the preceding heddle and thereby through a continuation of such operation to release the heddles singly and successively from the series.

12. In a machine for acting upon independent heddles or the like, the combination with heddle releasing means, of means for holding a series of such heddles to present to the said releasing means a regular, alternate, exterior linear variation and means to actuate said releasing means to coöperate with said alternate variation and release the heddles singly and successively from the series.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."