

No. 756,442.

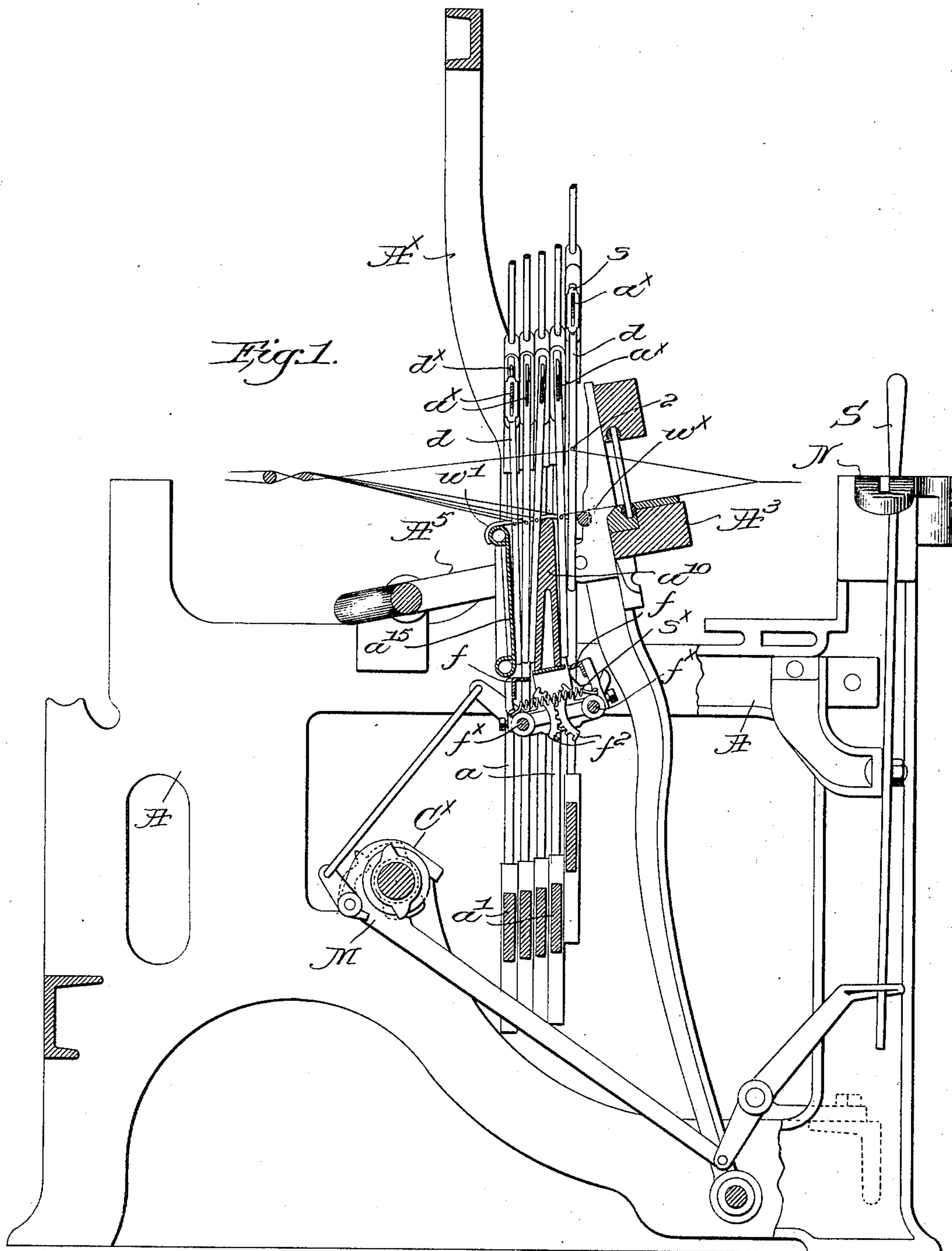
PATENTED APR. 5, 1904.

C. H. WARREN.
WARP STOP MOTION FOR LOOMS.

APPLIOATION FILED SEPT. 5, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



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No. 756,442.

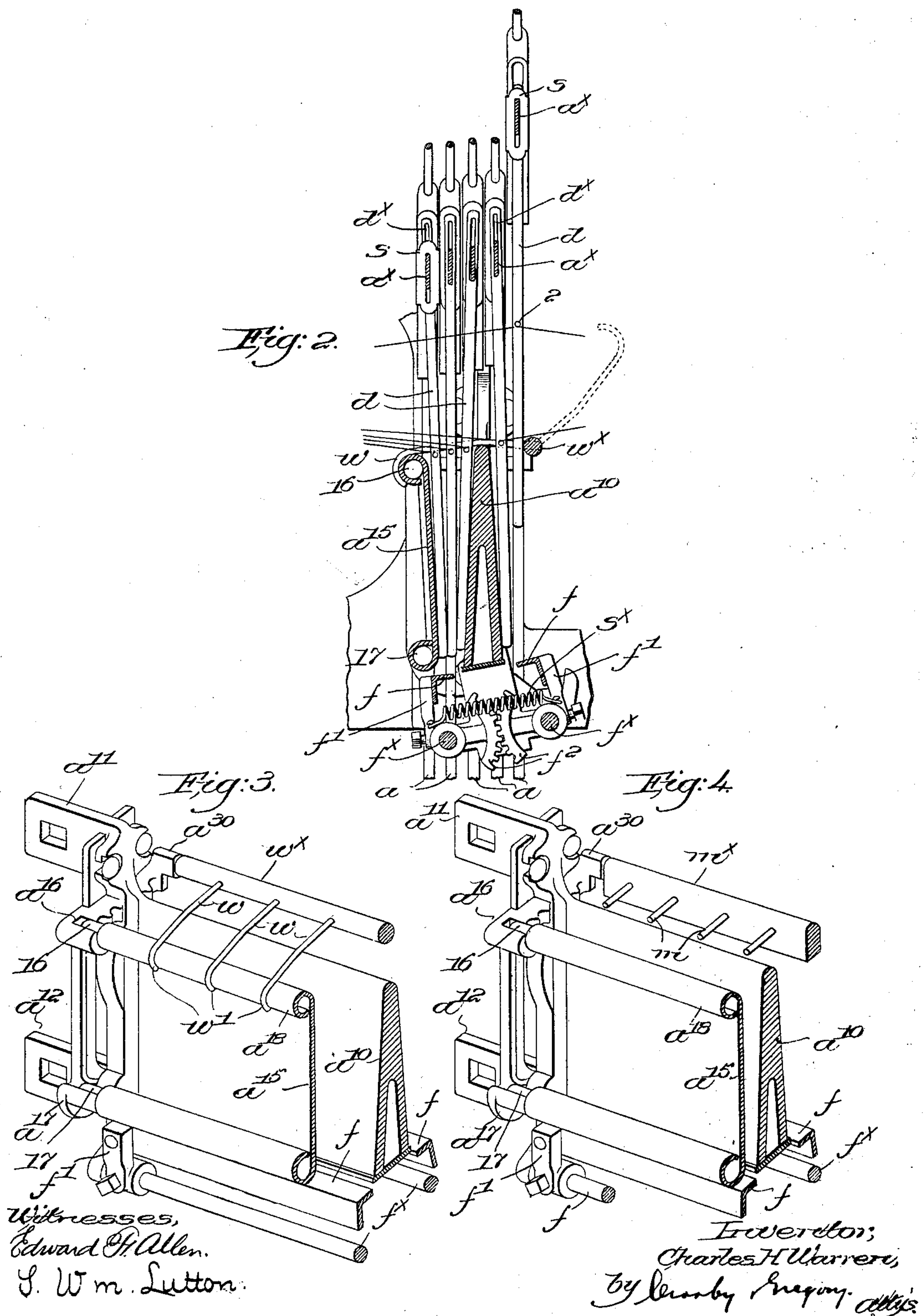
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UNITED STATES PATENT OFFICE.

CHARLES H. WARREN, OF ATLANTA, GEORGIA, ASSIGNOR TO DRAPER COMPANY, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

WARP STOP-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 756,442, dated April 5, 1904.

Application filed September 5, 1903. Serial No. 172,121. (No model.)

To all whom it may concern:

Be it known that I, CHARLES H. WARREN, a citizen of the United States, and a resident of Atlanta, county of Fulton, State of Georgia, have invented an Improvement in Warp Stop-Motions for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

10 The extended and increasing use of looms provided with warp stop-motions of the type wherein controlling detectors serve also as heddles has given rise to new problems, some of which have been already solved in a successful manner; but not infrequently the solution of one problem serves to present a new one. For instance, it was observed that the rapid and constant vertical reciprocation of the harness-frames and the movement of the warp-threads in forming the shed caused a very marked and objectionable lateral swaying of the detectors. It was objectionable because the appearance of the cloth was affected thereby, and even in greater degree objectionable because the lower ends of the detectors were moved out of the path of the vibrating feeler, so that upon failure of a warp-thread it was not promptly detected and faulty cloth was produced. To overcome these objections, the detectors of a series were divided into relatively small groups or sections by the use of a plurality of separators projecting between the detectors adjacent the support from which they were suspended, as in United States Patent No. 717,132. This prevented a great deal of the trouble, and the swaying was reduced to a very considerable extent. A further advance in the art was made by the invention forming the subject-matter of United States Patent No. 732,885, wherein sheet-metal separators are mounted directly upon the transverse support from which the detectors are suspended. In some instances these separators alternate with the detectors, and their use has given very satisfactory results; but it has been found in practice that while in both forms of separat-

ing means referred to the upper ends of the detectors are satisfactorily positioned their lower ends in some classes of work will still have an undesirable lateral movement, so that the operation is not perfect and unfailing.

Manifestly apparatus which will attain the desired object nearly always is good; but if such object can be attained always the apparatus is better and an improvement and advance over what has been previously devised.

In the course of my experiments I have found that if the lower ends of the detector-heddles are separated or divided into relatively small groups or sections the operation of the stop-motion can be depended upon to perform its work promptly and accurately. This is particularly true in multiple-harness motions, wherein three, five, or more harnesses are employed, each equipped with its own series of steel heddles. The latter are light and thin, and in heavy work there is a tendency to bend slightly on the downstroke of the frame, as it will be remembered that the heddles are pushed down from their upper ends, the warp-eyes being located below the transverse support or bar from which the heddles are suspended. I have found that in many instances it is preferable to use my invention in connection with separating means acting at or near the upper ends of the heddles, and in the present embodiment of my invention I have shown separators of the character referred to in Patent No. 732,885, as said.

The novel features of my invention will be fully described in the subjoined specification, and particularly pointed out in the following claims.

Figure 1 is a transverse partly-sectional view of a portion of a loom with one embodiment of my invention applied thereto. Fig. 2 is an enlarged sectional detail taken through the harnesses and showing more clearly the construction, a five-set harness being illustrated. Fig. 3 is an enlarged perspective detail showing the manner in which the lower

separation or grouping of the heddles is effected, and Fig. 4 is a similar view of a modified form of separating means.

The loom-frame A, arch A^x , the lay A^3 , cam-shaft C^x , the shipper S, and its notched holding-plate N, Fig. 1, may be and are all of usual or well-known construction. I have herein shown a five harness set of the so-called "steel-harness" type, each harness-frame hav-
 10 ing upright side bars a , a bottom cross-bar a' , and a top cross-bar a^x , the latter also serving as a support for and from which the detector-heddles are suspended.

The mechanism for reciprocating the harness-frames forms no part of my invention, and inasmuch as any one of several forms of actuating mechanism may be employed I have not illustrated any herein.

An upright plate a^{10} is extended transversely across the loom, having slightly inclined opposite sides, and lateral ears a^{11} a^{12} , Figs. 3 and 4, project from the ends of the plate at its upper and lower edges to be bolted to suitable brackets mounted on the loom
 20 sides. Between each pair of ears the pitmen A^5 pass, the space so provided giving ample space for the necessary pitman movement.

Referring to Figs. 1 and 2, it will be seen that the plate a^{10} divides the lower ends of the
 30 several series of detectors d , the detectors of the first and second harness-frames being located in front of the plate, and the detectors of the other three frames are behind it. For the latter a rear wall a^{15} is provided, preferably made of sheet metal and having at its ends lugs or pins 16 and 17, Figs. 3 and 4, which drop into seats a^{16} a^{17} , secured to or forming a part of the plate a^{10} . This rear
 35 wall in conjunction with the said plate forms a species of box to loosely receive the lower ends of the three rearmost sets of detectors, bringing them into range of the cooperating feeler. Briefly the warp-stop-motion-controlling detectors d , also serving as heddles,
 45 are made as long, thin, and flat metal strips, longitudinally slotted at d^x near their upper ends to receive the supports a^x , the depth of the latter being less than the length of the slots to permit relative longitudinal movement of a detector when released by failure,
 50 such as breakage or running out of its warp-thread. The threads pass through warp-eyes 2 below the slots d^x , the operation of such detector-heddles being well known to those skilled in the art. Two oppositely-moving
 55 feelers f , secured to arms f' , fast on rock-shafts f^x , Figs. 1 and 2, are normally vibrated toward and from each other below the lower ends of the detectors, segmental intermeshing
 60 gears f^2 on the rock-shafts causing them to rock in unison. A spring s^x effects the inward or feeling stroke, and their outward stroke is effected positively by or through suitable mechanism (indicated at M, Fig. 1) and

operated by or through rotation of the cam-shaft C^x . Such mechanism forms no part of
 65 my invention.

Should a detector be released, it will drop on the descent of its frame, so that its lower end should be in the path of a feeler to en-
 70 gage and arrest the movement of the latter on its feeling stroke to effect the release of the shipper in well-known manner. If, however, the detector is laterally displaced, so that its lower end when released will be out of range
 75 of the feeler, the latter will not be arrested and the warp-failure will not be detected.

As has been stated, the rapid reciprocations of the harness-frames and the action of the warp-threads in forming the sheds tend to
 80 cause very marked and objectionable swaying, which has in a very marked degree been overcome by the use of separators at or near the upper ends of the detectors, as in the patents
 85 hereinbefore referred to.

I have herein shown separators s , Figs. 1 and 2, of the type shown and described in Patent No. 732,885. When working on some
 90 kinds of yarn, however, and also because of the character of the shedding, such separators will not always prevent lateral displacement of the lower ends of the detectors to such an extent that detecting action is too slow or in
 95 some instances it may not occur at all upon failure of a warp-thread. In order to overcome this, I have provided separating means for the lower ends of the detectors and herein shown as acting upon them between the feeler-
 100 path and the warp-eyes. On the front side of the plate a^{10} , at or near its top, I provide forwardly-extended brackets a^{30} , one at each side of the set of harness-frames, and a rod or bar
 105 w^x is mounted on said brackets, preferably by inserting its ends in sockets in the brackets, so that the rod can be turned. This bar is so
 110 located, preferably, that it forms a warp-rest for the warp-threads in the lower plane of the shed, Figs. 1 and 2, and in front of the front series of detectors. Separators (shown in Figs. 1, 2, and 3 as pins w of stout wire) are rigidly
 115 secured to the warp-rest and extend at right angles thereto rearwardly across the top of the plate a^{10} , projecting between the lower ends of the detectors of the several series and dividing them into relatively small groups or
 120 sections. Lateral swaying or displacement of the detectors is thus absolutely prevented, and the lower end of a released detector will always move into the path of and be engaged by a feeler.

In order to retain the separators in operative position, I may downcurve their free ends, as at w' , and snap them over the rolled upper
 125 edge a^{18} of the back wall a^{15} , the resiliency of the wire holding the separators in place. Should it be desired to throw the separators out of operation, their free ends are disengaged from the top of the wall a^{15} and they are swung

up and forward. (See dotted lines, Fig. 2.)

In Fig. 4 a slight modification is shown, the bar m^x , which is mounted in the brackets a^{30} described, forming the warp-rest; but the
 5 separators are short pins m , mounted thereon and long enough to project between only a portion of the several series of detectors. This arrangement may be used when it is unnecessary to separate all of the banks of de-
 10 tectors, as when the character of the work is such that separation of a portion of the detectors will prevent improper lateral movement of the detectors of the remaining harnesses.

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

1. In a loom, a series of warp-stop-motion-controlling detectors, a vertically-reciprocating support from which they are suspended
 20 and relatively to which they have a limited longitudinal movement, each detector having a warp-eye located below the support, a vibrating feeler to engage the lower end of a released detector, and a plurality of separators
 25 intermediate the warp-eyes and the feeler and projecting between the detectors to divide the same at their lower ends into small groups or sections and prevent their lateral displacement out of range of the feeler.
 30

2. In a loom, a series of warp-stop-motion-controlling detectors, a vertically-reciprocating support from which they are suspended and relatively to which they have a limited
 35 longitudinal movement, a vibrating feeler to engage the lower end of a released detector, a pivotally-mounted warp-rest, and a plurality of separators secured thereto and projecting

between the detectors near their lower ends to divide them into groups or sections, and
 40 means to normally maintain the warp-rest and separators in operative position.

3. In a loom, a series of warp-stop-motion-controlling detectors, a vertically-reciprocating support from which they are suspended
 45 and relatively to which they have a limited longitudinal movement, a vibrating feeler to engage the lower end of a released detector, a pivotally-mounted, transverse rod located below the warp, a plurality of separating-pins
 50 mounted on and adapted to extend between the detectors near their lower ends to separate them into groups or sections, the free ends of the pins being downcurved, and a downhold to be engaged by such downcurved ends to nor-
 55 mally retain the pins in separating position.

4. In a loom, a series of longitudinally-slotted warp-stop-motion-controlling detectors, serving also as heddles, a support extended through
 60 the slots and by which the detectors are suspended, separators mounted on said support and interspersed between the detectors to separate the same at their upper ends and prevent
 65 improper lateral movement thereat, a vibrating feeler to engage a released detector, and a plurality of stationary separators projecting between the detectors near their lower ends and dividing the same into small groups or sections to prevent their lateral displacement.

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

CHARLES H. WARREN.

Witnesses:

F. E. FORSTER,
 CECIL MEYER.