

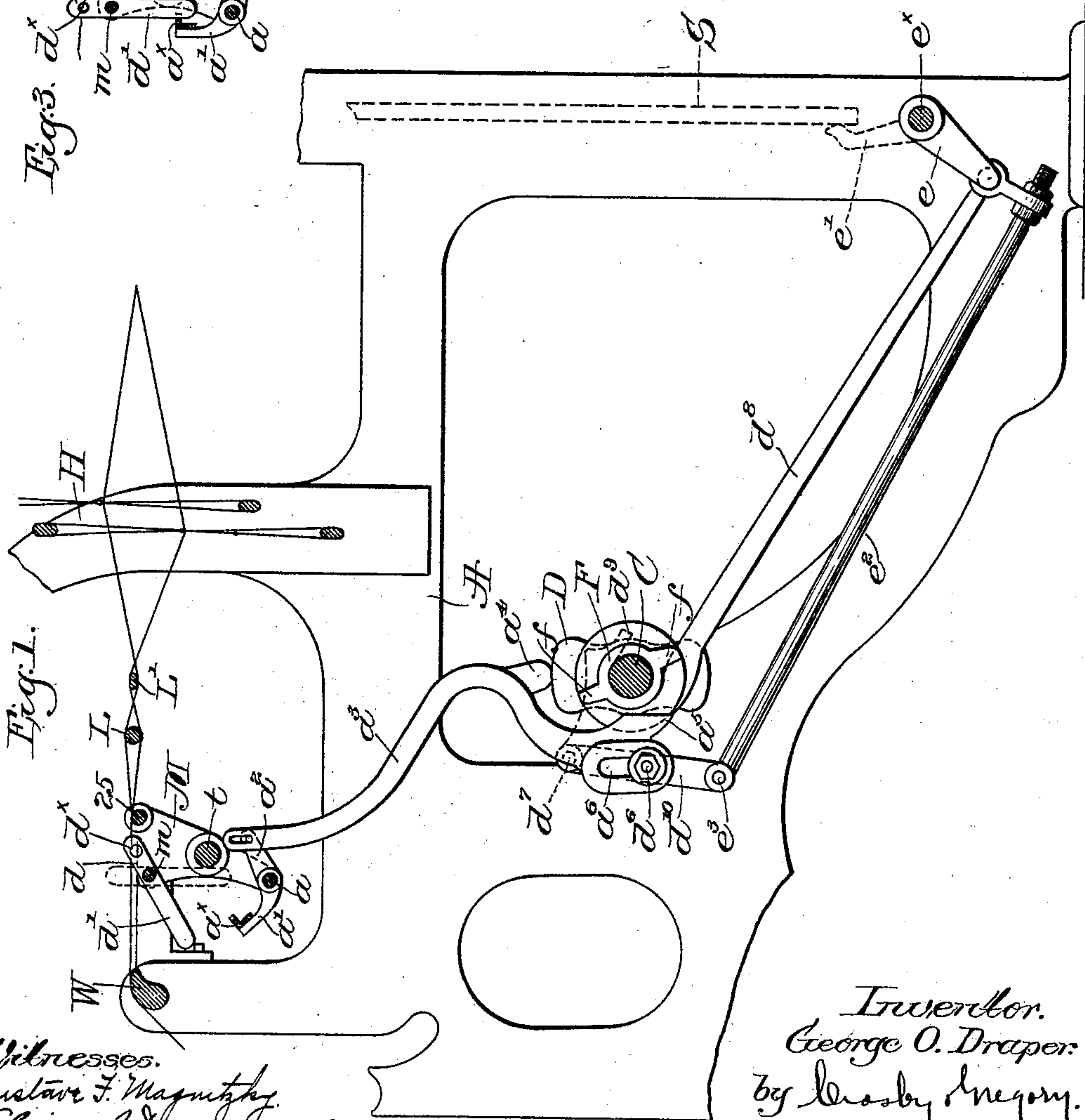
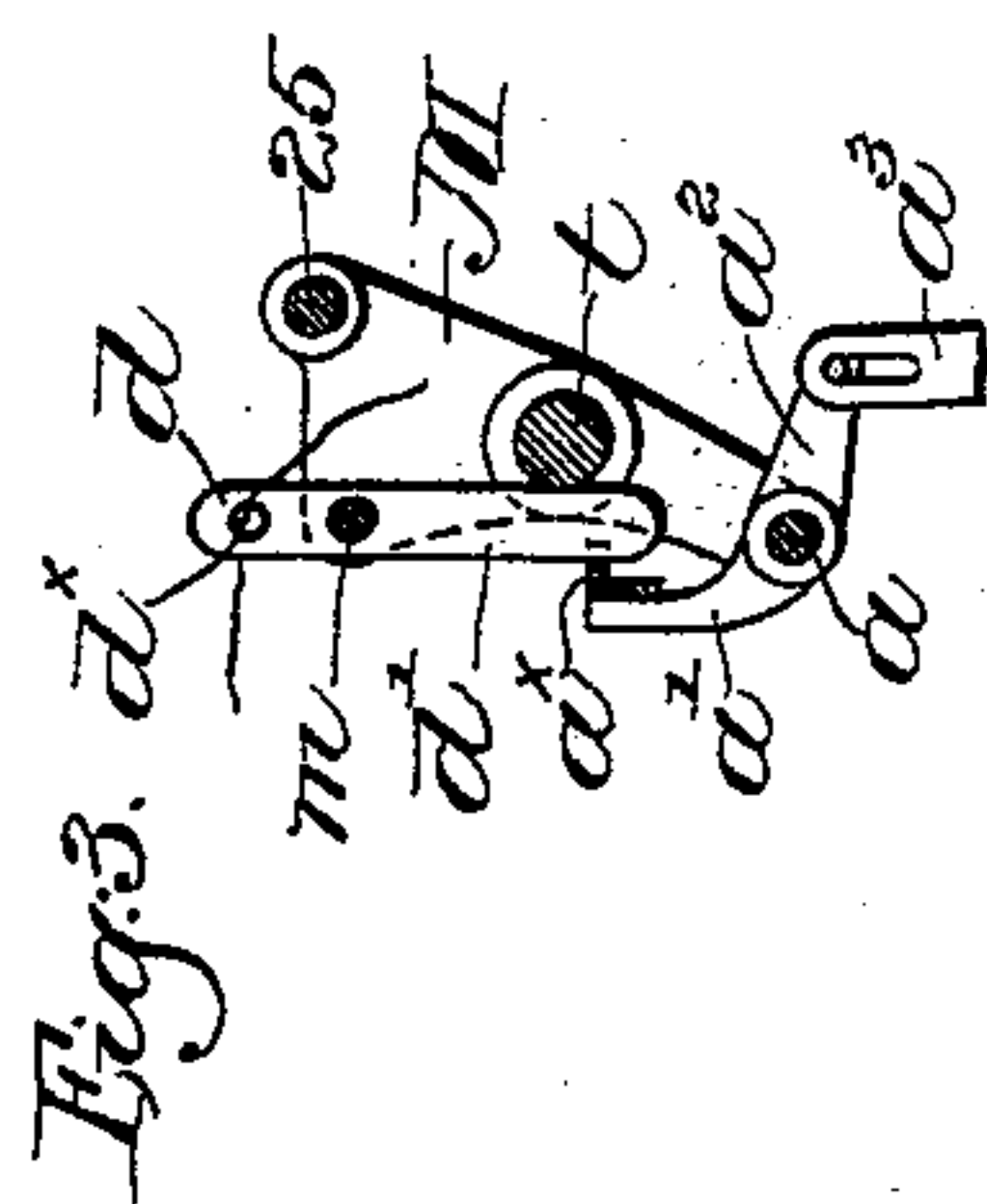
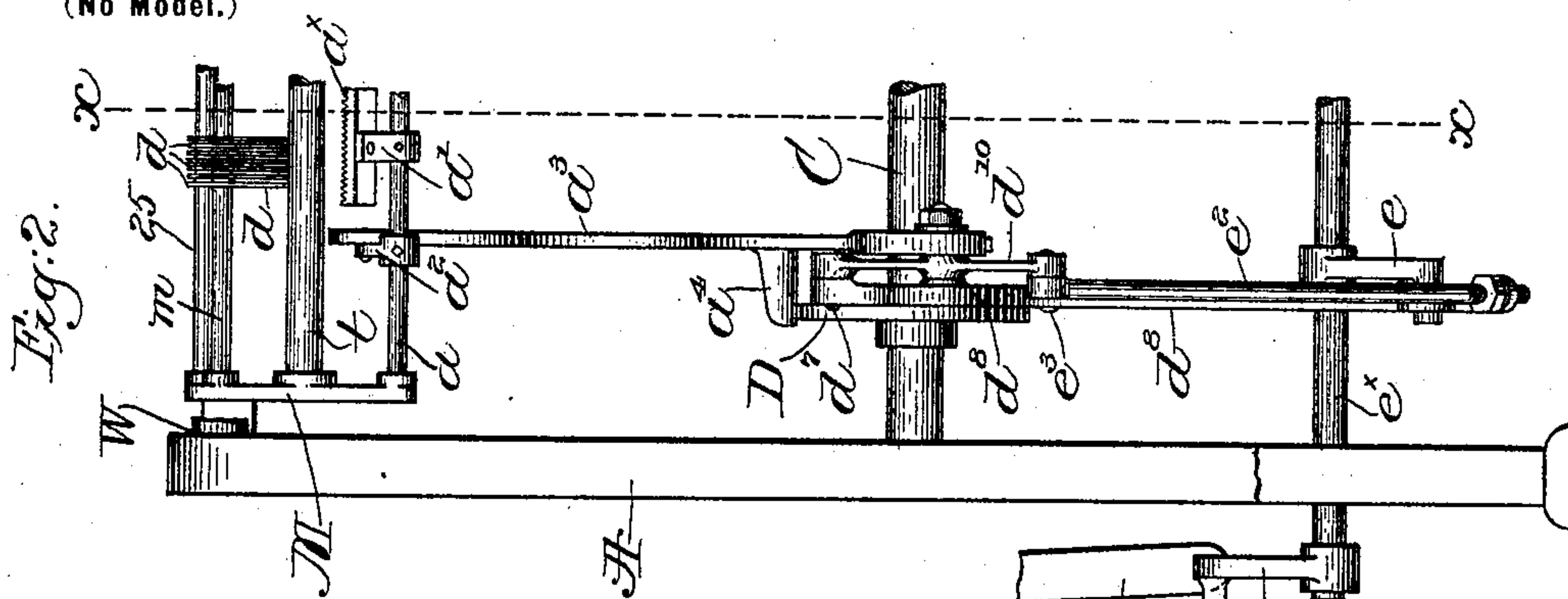
**No. 643,951.**

**Patented Feb. 20, 1900.**

**G. O. DRAPER.**  
**WARP STOP MOTION APPARATUS.**

(Application filed Aug. 7, 1899.)

(No Model.)



Witnesses.  
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# UNITED STATES PATENT OFFICE.

GEORGE O. DRAPER, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO THE  
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## WARP-STOP-MOTION APPARATUS.

SPECIFICATION forming part of Letters Patent No. 643,951, dated February 20, 1900.

Application filed August 7, 1899. Serial No. 726,368. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE O. DRAPER, of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Warp-Stop-Motion Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to warp-stop-motion apparatus wherein the movement of a detector into abnormal position when released by its warp-thread will through engagement with a feeler effect the operation of suitable stopping means, whereby the apparatus will be stopped automatically upon breakage or undue slackness of a warp-thread.

By the novel construction to be hereinafter described, and particularly pointed out in the claims, a detector when released moves to bring its warp-engaging portion into position to visually indicate to the weaver a faulty warp-thread and its location, such portion of the detector being at such time readily accessible for rethreading.

I have herein illustrated my invention as applied to a loom, such being probably its most general application; but my invention is not restricted to such use.

Figure 1 is a longitudinal sectional view of a portion of a loom with one embodiment of my invention applied thereto, taken on the line  $x x$ , Fig. 2. Fig. 2 is a partial rear elevation of the apparatus shown in Fig. 1, and Fig. 3 is a detail of part of the mechanism shown in Fig. 1, with a detector in abnormal position assumed when released by its warp-thread.

Of the loom mechanism shown the frame A, harnesses H, shipper-handle S, whip roll or bar W, and the lease-rods L L' may be and are of well-known or usual construction, the loom sides having mounted thereupon suitable brackets M to support a fixed rod or bar  $m$ , extended across the loom between the lease-rods and whip-roll, and mounted upon said rod I have herein shown a series of stop-motion controlling or actuating detectors  $d$ , loosely mounted to rock or move angularly upon the said rod or support.

I prefer to make the detectors of thin sheet

metal and considerably longer than wide, each detector having near one end, as herein represented, an aperture  $d^x$ , forming a warp-eye. The support or rod  $m$  is extended through an aperture in each detector located eccentric to its center of gravity and nearer the eye  $d^x$ , so that the longer portion  $d'$  will be below the support. When a detector is free to move angularly, it will be swung by gravity into upright position. (See dotted lines, Fig. 1, and full lines, Fig. 3.) Normal warp-threads—that is, threads intact and under proper tension—will control and maintain their detectors in an inclined position, (see full lines, Fig. 1,) with their eye ends inclined in the direction of travel of the threads, the detectors being substantially concealed by the threads, the latter passing over a warp-rest (shown as a bar 25) mounted in the brackets M somewhat above the support  $m$  and between the latter and the harnesses, as clearly shown in Fig. 1. When, however, a detector is released by slackness or failure of its warp-threads, it turns or moves angularly by or through the action of gravity into substantially upright position, (see Fig. 3,) with its lower heavy portion  $d'$  in the path of the feeler and between the latter and a back-stop (shown as a bar  $t$ ) mounted on the brackets. The entire framework of the supporting structure consists of side supports and rods, preferably of round cross-section to obviate the usual tendency to the collection of lint and dirt. The upright rear edge of the detector then engages and arrests the feeler  $a^x$  at its next inward swing at a point substantially opposite the back-stop, the latter preventing any movement of the detector when so engaged by the feeler, the latter being shown as an angle-iron attached to arms  $a'$ , fast on a rock-shaft  $a$ .

When a detector is released, its warp-engaging end swings up into position above the plane of the warp-threads, as shown in dotted lines, Fig. 1, and in full lines, Fig. 3, to thereby indicate at once to the weaver a faulty thread and the location of the same. At the same time the warp-eye is brought up into easily-accessible position, so that the weaver can readily insert the broken warp-thread and piece it up. The engaging edge



of the feeler is notched to prevent twisting or lateral movement of an engaged detector. The normal vibration of the feeler may be effected by any suitable mechanism and to  
 5 operate the stopping means for the apparatus upon arrest of the feeler by a detector, and I have herein shown one convenient form, substantially such as shown and described in United States Patent No. 622,182, dated March  
 10 29, 1899, and which will be described briefly.

An arm  $a^2$  on the rock-shaft  $a$  and extended oppositely to the feeler has a pivotally-connected bent arm  $a^3$ , provided with a bunter  $a^5$  and a toe  $a^4$ , coöperating with an edge  
 15 cam D, preferably on the cam-shaft C, said bunter  $a^5$  being thus moved into and out of the path of one or more tappets  $f$  of a cam F, fast on the shaft C. When the feeler is arrested, the bunter  $a^5$  is held up in the path  
 20 of the tappets, engagement therewith swinging the arm  $a^3$  to the rear. Said arm is slotted at  $a^6$  to receive a stud  $d^6$  on a short lever  $d^{10}$ , pivoted at its upper end at  $d^7$  to a link  $d^8$ , hooked around the cam-shaft at  $d^9$  and jointed  
 25 at its other end to an arm  $e$  of a rock-shaft  $e^x$ , provided with a knock-off arm  $e'$  for the shipper-lever. The lower end of the lever  $d^{10}$  and the arm  $e$  are connected by a rod  $e^2$ , the joint  $e^3$  acting as the lever-fulcrum when  
 30 the bunter  $a^5$  is acted upon by the tappet-cam F, the swing of the upper end of said lever moving the link  $d^8$  longitudinally to operate the knock-off arm and release the shipper-handle S. The feeler is swung toward the  
 35 detectors by the weight of the arm  $a^3$  and its connected parts, the reverse or outward swing of the feeler being effected by the cam D.

I have shown herein an operative mechanism embodying one form of my invention  
 40 without attempting to show the various forms

or arrangements in which my invention may be embodied.

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

1. In an apparatus of the class described, a series of angularly-movable detectors having parallel side edges, and fulcrumed eccentric to their centers of gravity and below the warps, each detector having a warp-eye in its  
 45 lighter portion, normal warp-threads maintaining the eye ends of the detectors depressed, a released detector moving by gravity into upright position with its eye end elevated above the warp-threads, a feeler to engage  
 50 the depending portion of a released detector, stopping means operative by or through engagement of the feeler with a released detector, and a back-stop for a detector engaged  
 55 by the feeler, the feeler and back-stop engaging opposite side edges of the detector, and being located below the fulcra of the detectors.

2. In a warp stop-motion, stopping means, and a frame to support a series of detectors and a feeler, and also to provide a warp-rest  
 60 and back-stop, said frame consisting of stationary side supports and a series of cylindrical parallel rods fixedly attached to said supports, substantially as shown, said rods  
 65 forming the only horizontal connections between the side supports and thus making a  
 70 light, clean structure for the purpose set forth.

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

GEORGE O. DRAPER.

Witnesses:

SIMON W. HATHEWAY,  
 JOHN C. EDWARDS.