

No. 653,178.

Patented July 3, 1900.

H. I. HARRIMAN.

LOOM.

(Application filed Mar. 28, 1900.)

(No Model.)

4 Sheets—Sheet 1.

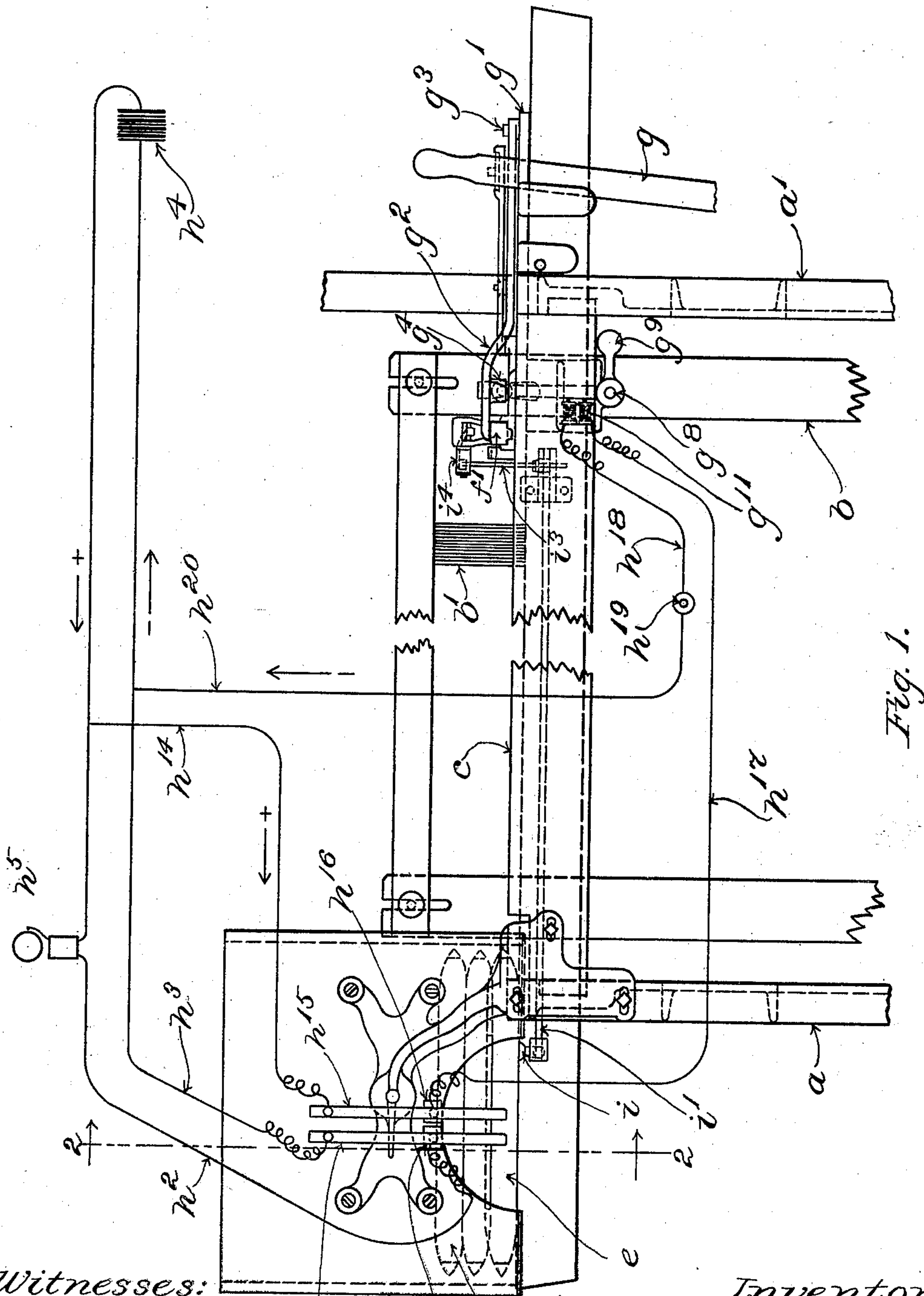


Fig. 1.

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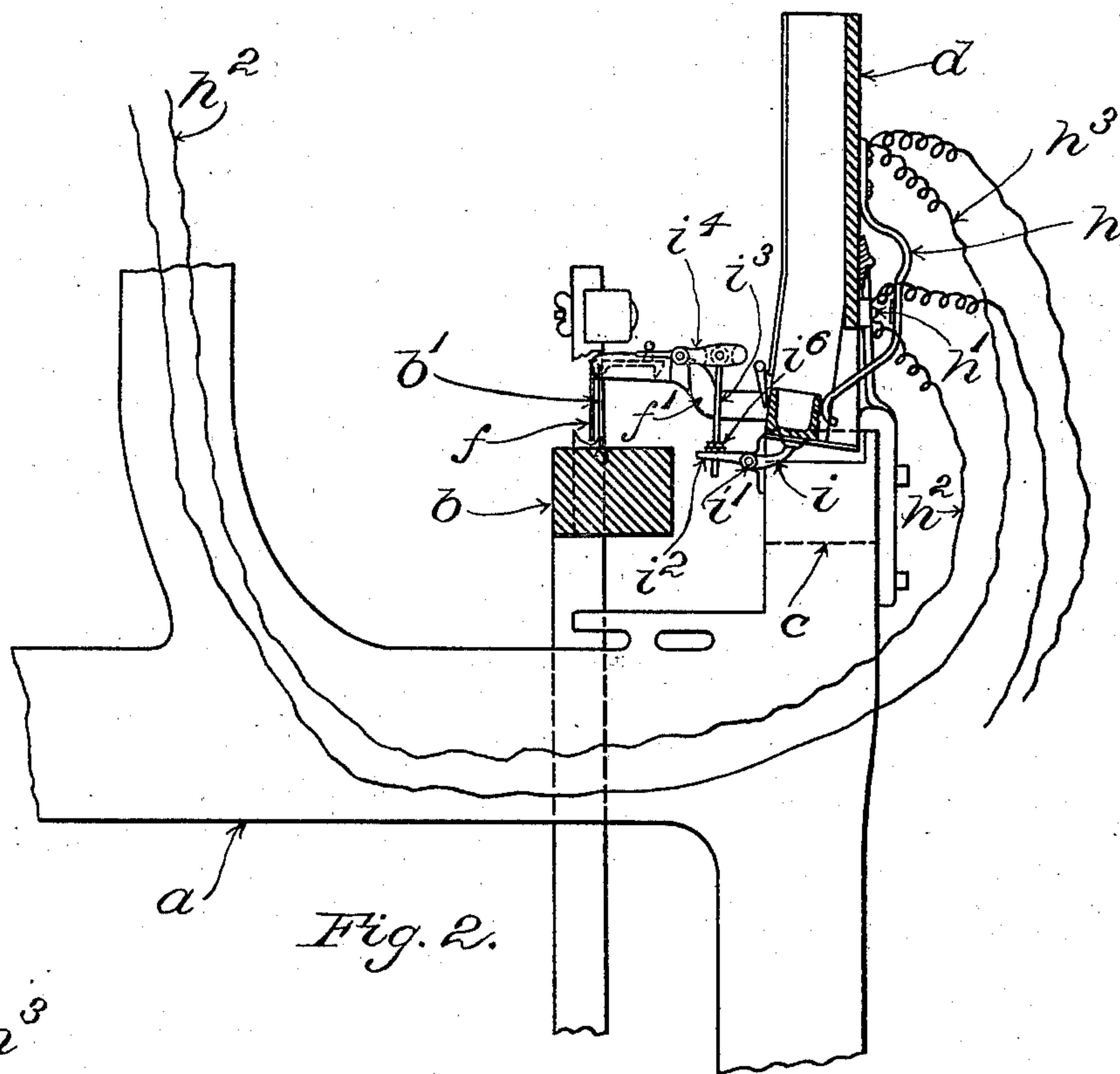


Fig. 2.

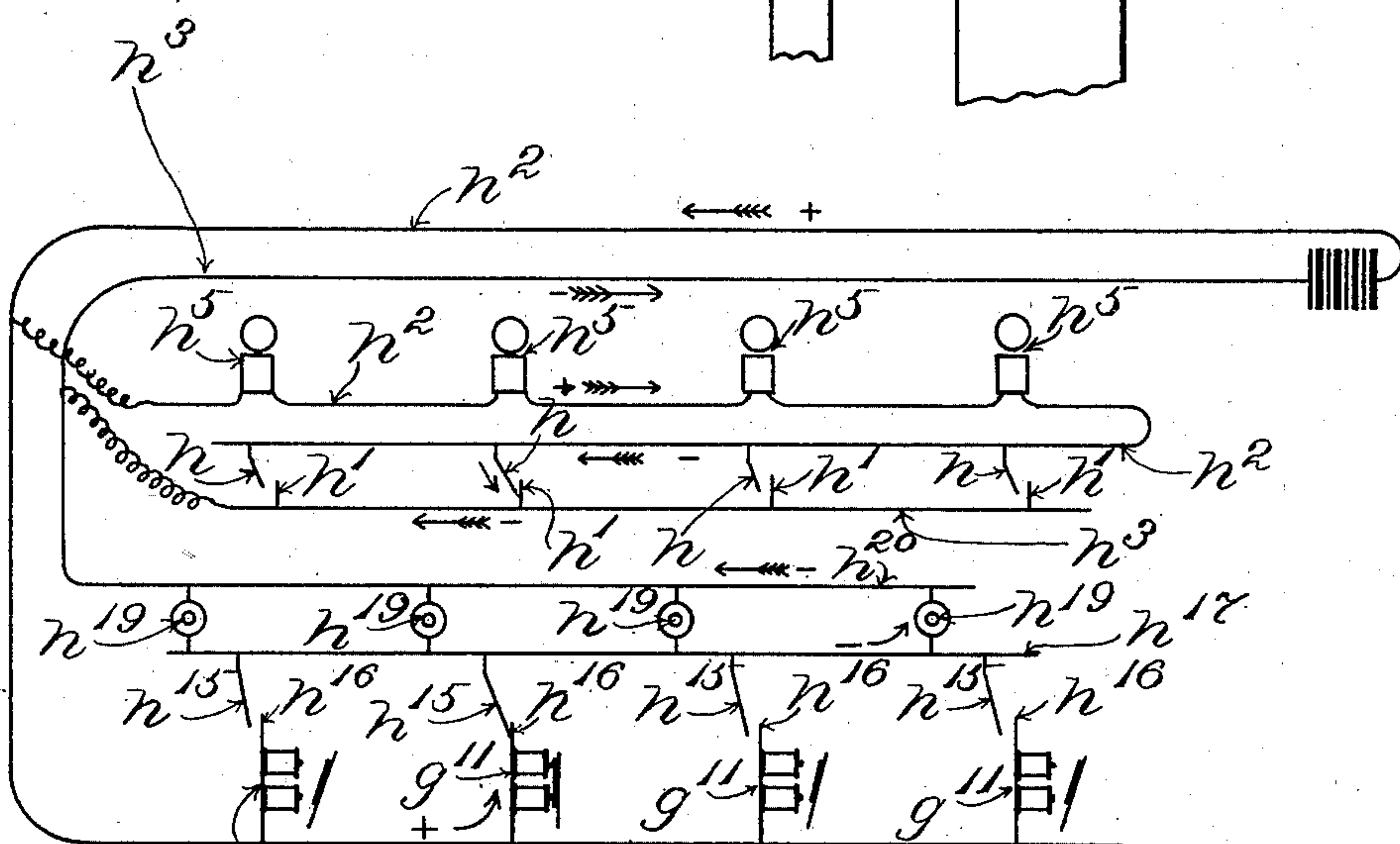


Fig. 5.

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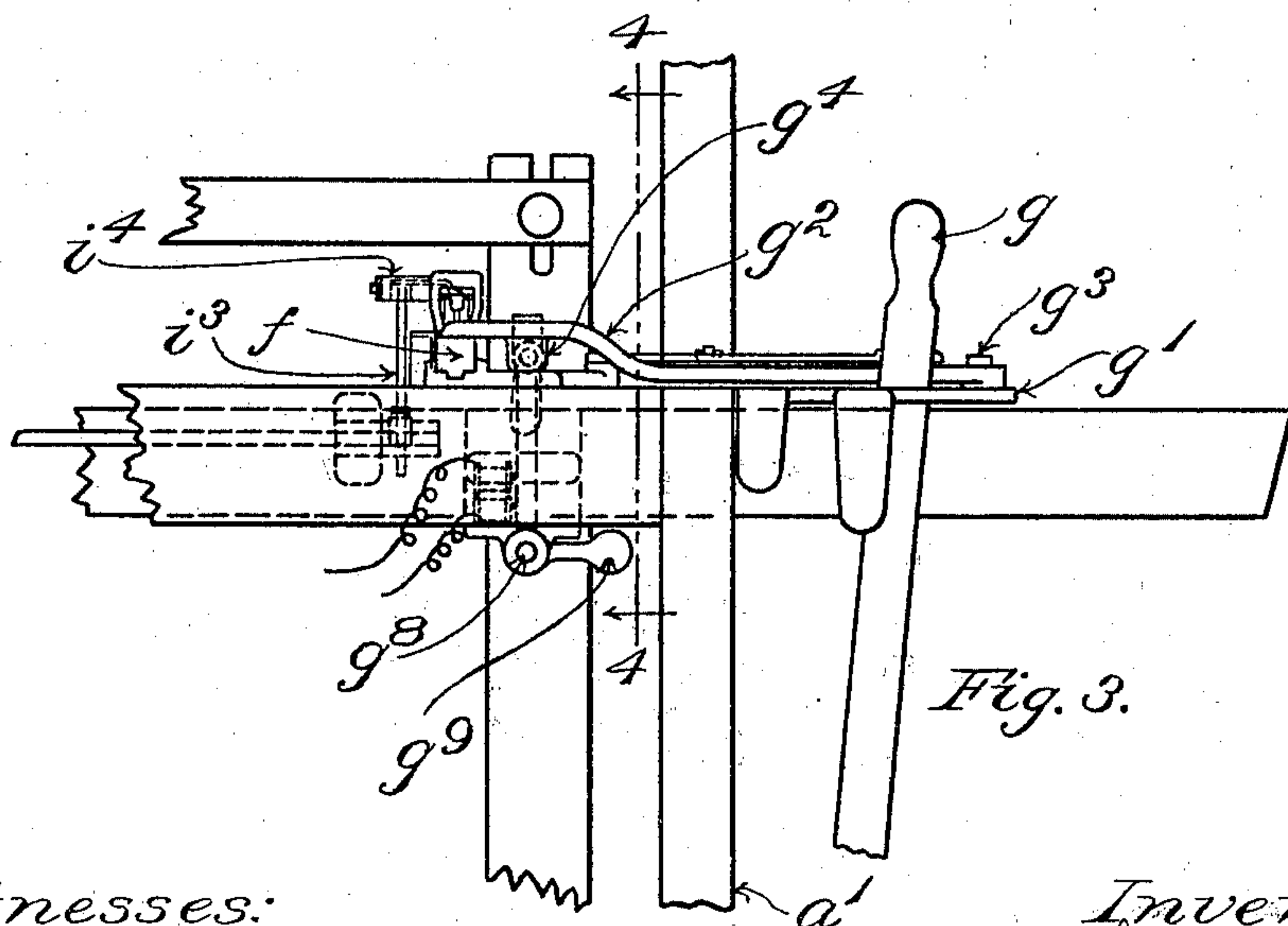
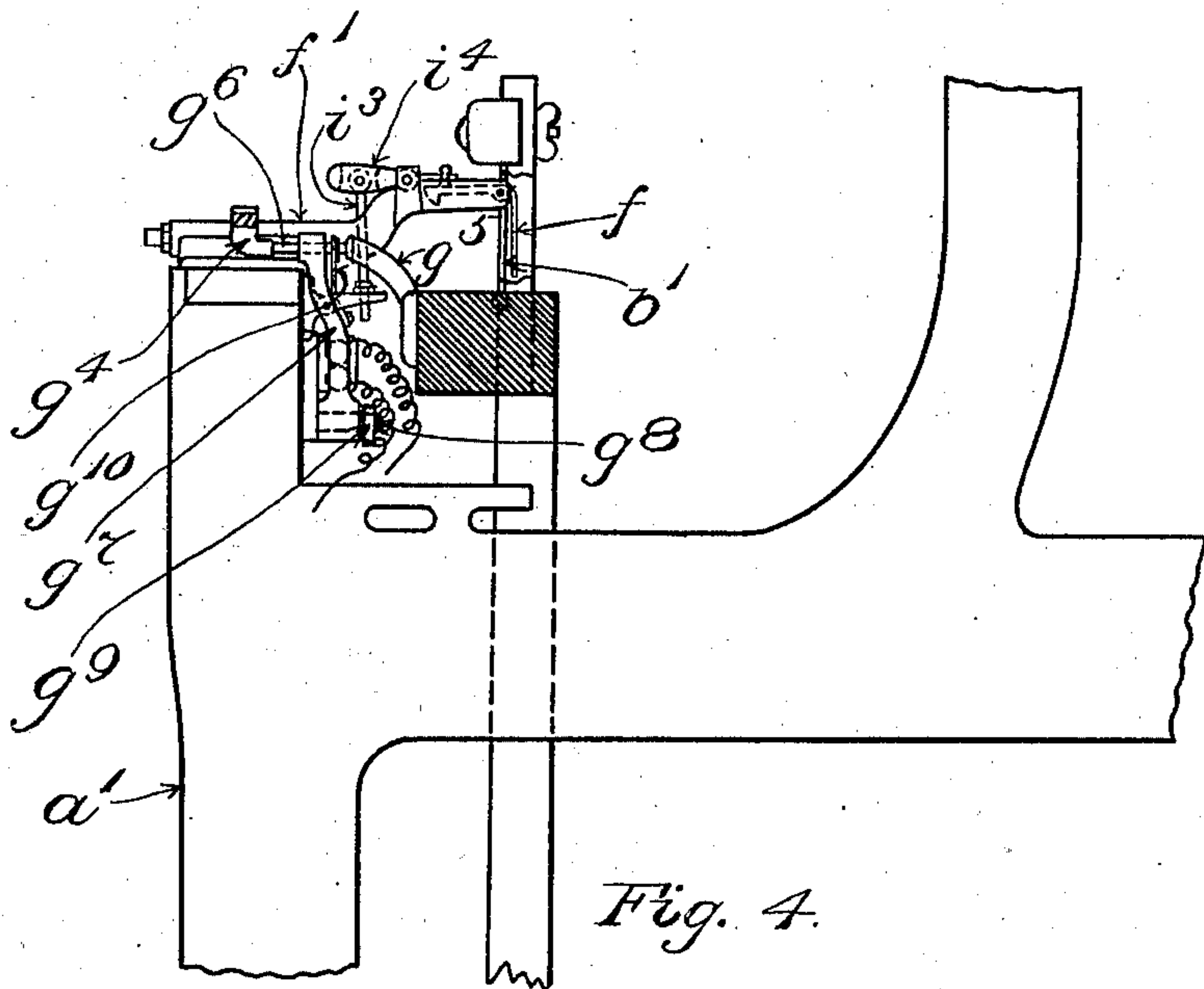
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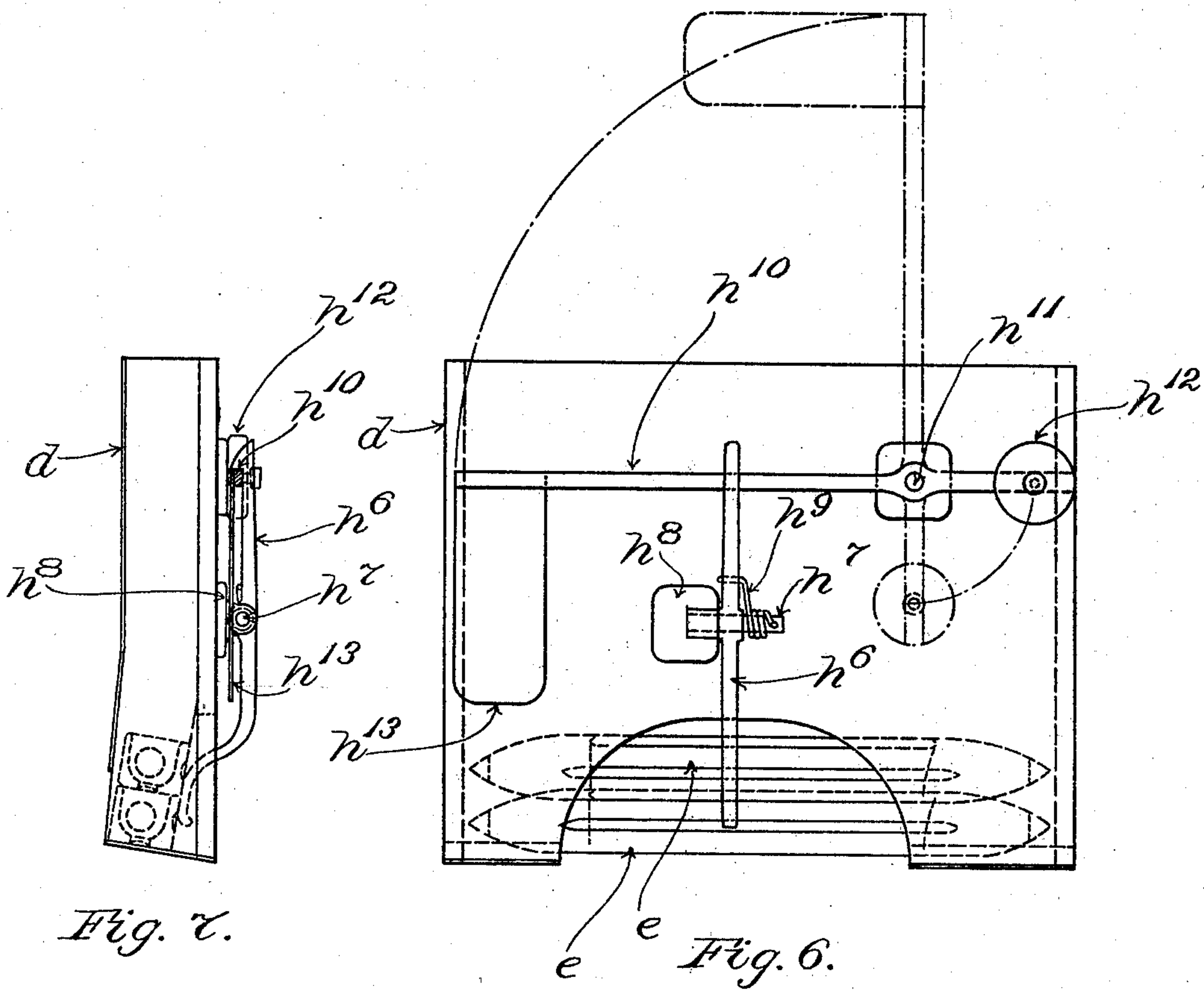
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4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

HENRY I. HARRIMAN, OF NEW YORK, N. Y.

LOOM.

SPECIFICATION forming part of Letters Patent No. 653,178, dated July 3, 1900.

Application filed March 28, 1900. Serial No. 10,439. (No model.)

To all whom it may concern:

Be it known that I, HENRY I. HARRIMAN, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented a certain new and useful Improvement in Looms, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention has relation to looms of that class in which replenishment of the working weft-supply is effected automatically by the mechanism of the loom when necessity arises therefor—as, for example, on exhaustion of the supply of weft or filling that is carried by the working shuttle on the lay or on exhaustion thereof to a predetermined extent or on loss of continuity of such weft or filling, the action of the replenishing instrumentalities being brought about or instituted through the agency of suitable forms of weft-indicator mechanism.

Looms of the foregoing class are presented in United States Letters Patent granted to me June 13, 1899, No. 626,834; October 31, 1899, No. 636,228; November 14, 1899, No. 637,113, and December 26, 1899, No. 639,975. A loom of the said class is furnished with a reserve supply of weft, which supply is drawn upon in accordance with the needs of the loom by the automatic replenishing instrumentalities. The said supply is contained in a holder of appropriate character, which last is arranged and mounted conveniently in the loom. In the looms of my patents mentioned above this holder consists of a hopper or magazine, which is located at one end of the breast-beam. The holder usually is capable of containing a reserve supply of weft sufficient to permit the replenishing instrumentalities to act several times in succession without exhausting such supply. For instance, when the loom is fitted to effect replenishment by substituting a properly filled and threaded reserve shuttle in lieu of the spent or failed working shuttle on the lay the holder is adapted to contain a plurality of reserve shuttles, all prepared in readiness to be brought successively into service in continuing the weaving. In practice the attendant weaver places in the holder what he regards as an adequate quantity of reserve weft to meet the usual exigencies and from time to

time makes such additions as seem called for in order to maintain the supply and enable the loom to continue weaving uninterruptedly. The necessity for keeping properly charged the holders for reserve weft in connection with all the looms of the entire number under the care of the weaver, which number is sometimes quite large, imposes quite a tax upon the weaver, since it involves looking closely after the condition of the contents of all the holders, which ordinarily can be done only by continued traveling about from loom to loom for purposes of inspection. Occasionally the reserve supply of weft in a given loom is drawn upon quite rapidly—as, for instance, when several failures of weft follow one another in close succession in such loom or the weaver may be detained by some duty at a particular point or points in the series of looms under his charge. It thus may happen that the reserve supply contained in a given holder becomes exhausted. If now breakage or failure of the working weft-supply occurs in the particular loom to which such holder pertains before the weaver renews the reserve supply, the lack of reserve weft will prevent replenishment from being effected automatically, although the replenishing instrumentalities will be called into action.

One object of the invention is to aid the weaver and reduce the possibilities of oversight by apprising him whenever the reserve supply of weft is in need of renewal in any particular one or more of the series of looms under his charge.

Another object thereof is to enable the weaver when unable to give immediate attention to the particular loom in which the reserve supply has become exhausted to bring about at will the arrest of the working thereof even when stationed for the time being at some distant point among the said series.

Another object is to suppress the action of the replenishing instrumentalities when the reserve supply of weft is exhausted or otherwise not in condition to enable replenishment to be effected.

In the accompanying drawings, Figure 1 shows in front elevation portion of a loom having applied thereto an embodiment of the invention, certain features which are em-

bodied in an electrical circuit being represented diagrammatically. Fig. 2 is a view, partly in vertical section, on line 2 2, Fig. 1, looking in the direction indicated by the arrows adjacent the ends of such line. Fig. 3 is a view in front elevation, showing mainly the weft-indicator mechanism and certain essentials of the unshipping appliances. Fig. 4 is a view, partly in vertical section, on line 4 4, Fig. 3, looking in the direction indicated by the arrows adjacent the ends of such line. Fig. 5 is a diagram illustrating the application of the essentials of the invention to a series of looms. Fig. 6 is an elevation of a hopper or magazine for reserve weft, showing a modification applied thereto. Fig. 7 shows in end elevation the parts which are represented in Fig. 6.

Having reference to the drawings, *a a'* designate the end frames of a loom.

b is the lay, and *b'* the reed carried thereby. *c* is the breast-beam.

d is a hopper or magazine corresponding substantially with those of my Letters Patent hereinbefore mentioned and constituting in the illustrated embodiments of my invention the holder for the reserve supply of weft. Reserve shuttles are shown in the said hopper or magazine at *e e*. In practice these reserve shuttles will be filled with weft and in readiness to be brought successively into service in carrying on the process of weaving. The instrumentalities by means of which the weft-replenishing operations are performed in practice are or may be substantially such as in the said Letters Patent, although it should be understood that the precise character of the holder and replenishing instrumentalities is not material.

My present invention bears a certain relationship to the weft-indicator mechanism and power-unshipping appliances of a loom, although the precise character, construction, and arrangement of these are not material. Sufficient of the elements of the said mechanism and appliances is shown in the drawings to render clear the manner in which these cooperate with the other features of which I shall treat herein.

An ordinary weft-fork is shown at *f* and its carrying-slide at *f'*, the latter being mounted on top of breast-beam *c* in the manner customary in weft-indicator mechanism of the common type. The gooseneck cooperating with weft-fork *f* is not shown, but will be arranged and caused to operate as usual. It will be understood that in the running of the loom each time the lay beats up after a flight of the working shuttle toward the driving end of the loom the weft, if extending through the shed and intact, will be borne against the tines of the weft-fork, so as to cause the weft-fork to tilt on its pivot and raise its hooked tail end above the path of movement of the gooseneck, which last is caused to advance at this instant in the working of the parts. Thereby the gooseneck will be prevented

from engaging with the weft-fork. It will be understood also that should the weft be absent from in front of the tines of the weft-fork at the time of the beat up of the lay and the advance of the gooseneck the weft-fork will be permitted to remain with its hooked tail end within the path of movement of the gooseneck. This will enable the gooseneck to engage with the said hooked tail end, with the result that the weft-fork slide *f'* will be driven forward across the breast-beam. This advance of the weft-fork slide will be utilized in practice in a suitable manner to bring the weft-replenishing instrumentalities into action—for instance, as in my Letters Patent aforesaid.

An ordinary shipper-handle is shown at *g*.

At *g'* is indicated the plate at one end of the breast-beam, having a slot in which the upper portion of the shipper-handle works, the usual notch being formed adjacent one end of the said slot to receive the shipper-handle and retain it in place after the power has been shipped on during the running of the loom.

g² is a knocking-off lever of usual character, pivotally mounted at *g³* on top of the plate *g'* and extending inwardly beyond the shipper-handle. Movement communicated to the said knocking-off lever will cause the latter to act in the customary manner to press the shipper-handle out of its holding-notch, so as to allow it to effect the unshipping of the loom.

In carrying my present invention into effect I combine with the holder for the reserve supply of weft devices to ascertain the condition of the said supply. Thus a movable feeler is applied to the hopper or magazine *d*. This feeler in Figs. 1 and 2 is constituted of a spring arm or strip *h*, which is secured to the front of the said hopper or magazine, one portion thereof being arranged to project inwardly into the hopper or magazine into position to coact with the contents of the latter. A reserve shuttle within the hopper or magazine in position to act against the feeler will press the latter outward into its inoperative position. In Figs. 1 and 2 the devices are electrical, the feeler being utilized as a means of controlling an electric circuit. The feeler forms or carries one terminal of the said circuit, the other terminal being located conveniently, as at *h'*, on the hopper or magazine. The wires leading to the said terminals are represented at *h² h³*, respectively, and the source of electrical energy is represented at *h⁴*, Fig. 1. So long as the hopper or magazine contains a reserve supply sufficient to meet the immediate needs of the loom, such supply being in proper position to enable replenishment to be effected, the circuit will be held open or broken between the two terminals *h h'*. Should, however, the reserve supply become depleted to the predetermined extent or a shuttle fail to descend properly within the hopper or magazine, the feeler will be per-

mitted to move, so as to occasion a closing of the circuit. For the purpose of apprising the weaver of the fact that the holder for the reserve supply of weft requires attention I include in the circuit a signaling device of suitable and approved character either audible or visual. Thus at h^5 , Fig. 1, I have represented an electric bell.

Figs. 6 and 7 show a mechanically-operated visual signal which may be combined with the hopper d . The feeler is shown at h^6 , it being in the form of a lever, which is pivoted upon a pin h^7 , provided on a bracket or stand h^8 , fastened to the front of the hopper or magazine d . A spring h^9 acts upon the feeler h^6 with a tendency to force its lower end inward against the contents of the hopper or magazine. A second lever h^{10} is pivoted upon the front of the hopper or magazine at h^{11} . It is weighted at one end, as at h^{12} , and the other end thereof carries a target h^{13} in the shape of a small flag. The upper arm of feeler h^6 is furnished with a hook or latch, as shown in Fig. 7, to engage with the signal-lever h^{10} . Thereby the signal-lever is held normally in the full-line position represented in Figs. 6 and 7. When the feeling end of feeler h^6 is permitted to move inward into the hopper or magazine by the absence of a shuttle adjacent such end, the hook becomes disengaged from signal-lever h^{10} , whereupon the weight h^{12} causes the latter to assume the dotted-line position of Fig. 6, displaying the flag or other target h^{13} .

Usually, though not necessarily in all cases, the feeler is arranged in position to coact with the reserve shuttle in the hopper or magazine, which is in position to be transferred by the replenishing instrumentalities to the lay. When thus arranged, the signal apprises the weaver when the hopper or magazine has been emptied. It will be operated also in case a shuttle should become caught in the hopper or magazine and fail to descend into position to be transferred.

In the event of not being able to give sufficiently-prompt attention to the reserve supply of weft after having been signaled as aforesaid it is preferred that the weaver should arrest the working of the loom. If he is near to the loom, this of course may be effected by unshipping the shipper-handle. For greater convenience, however, I provide automatic unshipping appliances capable of being brought into action at the will of the weaver, all as follows:

g^4 is a projection or bracket with which the knocking-off lever g^2 is provided, and g^5 is a bunter moving toward and from the front of the loom, the said bunter being affixed to the lay-beam.

g^6 is a bolt mounted movably on an arm g^7 , the latter being pivoted beneath the breast-beam at g^8 and furnished with a weighted portion g^9 , Figs. 1 and 3, the action of which tends to keep the said arm in a position to hold the bolt at one side of the path of move-

ment of the bunter g^5 . A spring g^{10} , carried by arm g^7 , acts on bolt g^6 with a tendency to press the same rearward on the arm.

g^{11} is an electromagnet conveniently supported from the breast-beam. The armature for this electromagnet is formed or carried by the arm g^7 . The said electromagnet is embraced in a branch circuit connected with the electric circuit already described. This branch circuit contains breaks, which normally are open. One of these breaks is arranged to be closed automatically by devices coacting with the contacts of the holder for reserve weft, while the other is arranged to be closed by the weaver. The automatic devices act to close the first break on the occurrence of the predetermined emergency in connection with the reserve supply of weft and prepare the way for stoppage of the loom by the closing of the other break by the weaver. The relations are such that until the first break has thus been closed automatically the closing of the other break by the weaver will be ineffective to bring about a stoppage of the loom. In the illustrated embodiment of the invention the branch circuit comprises a wire h^{14} , leading from wire h^2 of the main circuit, a feeler h^{15} , corresponding substantially in construction, &c., with feeler h and applied to hopper or magazine d alongside said feeler h , a terminal h^{16} , with which feeler h^{15} coöperates, a wire h^{17} , leading from terminal h^{16} to electromagnet g^{11} , and a wire h^{18} , leading from the said electromagnet to a suitable push-button, switch, or the like h^{19} , from which last a wire h^{20} extends to the wire h^3 of the main circuit.

So long as the feelers h h^{15} are held pressed out by a reserve shuttle within the hopper or magazine, breaks are maintained at such feelers in both the main and the branch circuits. If under this condition of things push-button h^{19} is pressed upon by the weaver, the electromagnet at g^{11} will not become excited. When, however, the absence of a shuttle from the hopper or magazine permits the feelers to move inwardly, the said breaks are closed. One result of this is that the signal is operated. The other is that if the weaver after observing the signal now presses upon the push-button the electromagnet g^{11} will become excited and, acting to swing arm g^7 , will move bolt g^6 in line with bunter g^5 . In the ensuing advance of the said bunter it will encounter the bolt and drive it forward against projection g^4 of knocking-off lever g^2 , thereby occasioning the disengagement of the shipper-handle g and the unshipping of the loom.

The foregoing devices provide for detecting automatically the occurrence of a predetermined emergency in connection with the reserve supply of weft in a weft-replenishing loom and apprising the weaver of such occurrence by operating a signal, without, however, actually causing the immediate stoppage of the loom. In addition they provide

for enabling the loom to be stopped automatically by the aid of appliances which normally are inoperable for occasioning stoppage, but which when the detector devices
 5 ascertain the occurrence of such emergency thereby are rendered operable at the will of the weaver to bring about the stoppage of the loom. Thus the weaver is apprised promptly
 10 of the emergency aforesaid by the signal device. This will enable him to take the steps which are necessary to be taken for supplying the needs of the loom. Also he is enabled at his discretion, and especially if he
 15 is occupied elsewhere, to bring about the arrest of the working of the loom before exhaustion or failure of the working weft-supply occurs.

For the purpose of enabling the weaver to bring about at will the arrest of the particular loom in which need exists for attention to
 20 the condition of the reserve weft supply, even when stationed at some distant point among the group of looms under his charge, I connect the said group of looms into a series, as
 25 I now will proceed to explain. The wires h^2 h^3 of the main circuit are extended throughout the entire series of looms. To the wire h^2 are applied bells h^5 or other signals sufficient in number to answer for the series of
 30 looms, either one for each loom or otherwise, as deemed advisable. Reference may be had to Fig. 5. With the said wire h^2 are connected also the feelers h of the various looms. The wire h^3 has connected therewith all the
 35 terminals h' . The wires h^{14} h^{20} of the branch circuit are extended throughout the series of looms. One of the said wires (shown as h^{20} in Fig. 5, to secure simplicity in the diagram) has all the push-buttons h^{19} in connection
 40 therewith, while the other of the said wires (h^{14} in Fig. 5) has all the electromagnets h^{11} connected therewith. The wire h^{17} is also extended throughout the series of looms, it connecting in Fig. 5 with all the feelers h^{15} and
 45 push-buttons h^{19} . The slight difference in arrangement which is observable in Fig. 5 is adopted for greater clearness and simplicity of diagrammatic representation.

From Fig. 5 it will be apparent that the
 50 closing of a feeler h against its terminal h' in any loom will cause the signals to be operated throughout the series of looms; also, that if the weaver presses upon a push-button h^{19} at any point in the series of looms this
 55 act will bring about the stoppage of the loom in which feeler h^{15} is closed against terminal h^{16} and of no other loom.

For the purpose of preventing the replenishing instrumentalities from being called
 60 automatically into play after the last reserve shuttle has been transferred to the lay from the hopper or magazine d , I provide the following devices: In Figs. 1 and 2, i designates an arm projecting beneath the said hopper or
 65 magazine. A shuttle at the bottom of the latter in readiness to be transferred to the

lay by the action of the replenishing instrumentalities bears upon the said arm and by its weight depresses the latter, thereby rocking the shaft i' , on one end of which the arm
 70 is made fast. The said shaft is mounted in bearings at the rear side of the breast-beam c and at the opposite end thereof carries a second arm i^2 . Through a hole in the latter passes the lower end of a rod i^3 , which is hung
 75 to the weighted forward arm of a lever i^4 . The latter is pivoted upon the weft-fork slide f' and its rear arm passes under a projection from the tail of weft-fork f . A collar i^5 on the rod i^3 rests on top of the arm i^2 . When a
 80 shuttle at the bottom of the hopper or magazine d bears against arm i and depresses it, rocking the shaft i' as stated, the arm i^2 , bearing upwardly the rod i^3 and weighted arm of lever i^4 , thereby leaving the tail of weft-fork f
 85 free to descend, as in the drawings, into the path of the gooseneck and to be engaged by the latter when such tail is not raised by the action of weft against the tines of the weft-fork at the beat up of the lay. When, how-
 90 ever, no shuttle bears on arm i , the weighted arm of lever i^4 is free to descend, whereupon the rear arm of said lever lifts the tail end of the weft-fork out of the path of the gooseneck. This prevents the working of the weft-
 95 indicator mechanism, and consequently, inasmuch as such mechanism is depended upon to call the weft-replenishing instrumentalities into action, suppresses the action of the
 100 said instrumentalities.

What I claim is—

1. In a weft-replenishing loom, in combination, means for supplying reserve weft including a holder independent of the lay for a plurality of charges of reserve weft, and detector devices to ascertain the occurrence of
 105 the predetermined emergency in connection with the reserve supply.

2. In a weft-replenishing loom, in combination, means for supplying reserve weft including a holder independent of the lay for a plurality of charges of reserve weft, detector devices to ascertain the occurrence of the predetermined emergency in connection with the reserve supply, and unshipping appliances for the loom.
 110

3. In a weft-replenishing loom, in combination, a holder for a reserve supply of weft comprising a plurality of charges of reserve weft, and devices to signal the occurrence of
 120 the predetermined condition or emergency in connection with the said supply.

4. In a weft-replenishing loom, in combination, a holder for a reserve supply of weft comprising a plurality of charges of reserve
 125 weft, and devices whereby the fact is signaled when depletion of such supply reaches the predetermined stage.

5. In a weft-replenishing loom, in combination, a holder for a number of reserve shuttles, a feeler acting in connection with the said shuttles, and a signal under operative
 130

control of the said feeler, whereby the attendant weaver is notified when the reserve becomes depleted to the predetermined extent.

6. In a weft-replenishing loom, in combination, a holder for a reserve supply of weft comprising a plurality of charges of reserve weft, devices to signal the occurrence of the predetermined condition or emergency in connection with the said supply, and unshipping appliances to enable the weaver to arrest the working of the loom.

7. In a weft-replenishing loom, in combination, a holder for a reserve supply of weft, devices to ascertain the condition of said supply, unshipping appliances normally remaining in inoperable relations and established in operable relations by the said devices without stoppage of the loom when the predetermined condition of the said reserve supply occurs, and a device operable at the will of the weaver to cause the stoppage of the loom to be effectuated through the said appliances after the said operable relations have been established.

8. In a weft-replenishing loom, in combination, a holder for a reserve supply of weft, devices to ascertain the condition of the said supply, a signal under control of the said devices to apprise the weaver of the occurrence of the predetermined condition or emergency in connection with the reserve supply, unshipping appliances normally remaining in inoperable relations and established in operable relations by the said devices without stoppage of the loom when the predetermined condition or emergency occurs, and a device operable at the will of the weaver to cause the stoppage of the loom to be effectuated through the said appliances after the said operable relations have been established.

9. In combination, a series of looms, each loom provided with a holder for a reserve supply of weft, with detector devices to ascertain the occurrence of the predetermined emergency in connection with the reserve supply, and with unshipping appliances normally remaining in inoperable relations and controlled by the said detector devices to establish operable relations on said occurrence, without effecting stoppage of the loom, and master connections for the unshipping appliances of the series of looms, operating through the said appliances to effect stoppage of the particular loom in which the said occurrence has been detected.

10. In combination, a series of looms, each loom provided with a holder for a reserve supply of weft, with detector devices to ascertain the occurrence of the predetermined emergency in connection with the reserve supply, and with unshipping appliances normally remaining in inoperable relations and controlled by the said detector devices to establish operable relations on said occurrence, without effecting stoppage of the loom, signaling means under control of the respective detector devices to apprise the weaver of the action of the latter, and master connections for the unshipping appliances of the series of looms operating through the said appliances to effect stoppage of the particular loom in which occurrence of the predetermined emergency has been detected.

11. In a weft-replenishing loom, in combination, a holder for a reserve supply of weft for purposes of replenishment, devices to institute the replenishing action, and means to suppress the replenishing action in case the said reserve supply is exhausted or not in condition to permit replenishment to be effected.

12. In a weft-replenishing loom, in combination, a holder for a reserve supply of weft for purposes of replenishment, weft-indicator devices adapted to control the replenishing instrumentalities, and means to render the said devices inoperative to act in case the said reserve supply is exhausted or not in condition to permit replenishment to be effected.

13. In a weft-replenishing loom, in combination, a holder for a reserve supply of weft for purposes of replenishment, weft-indicator devices adapted to control the replenishing instrumentalities, a feeler, coöperating with weft in said holder in readiness for transfer, and means through which the said feeler controls the working of the said weft-indicator devices.

14. In a weft-replenishing loom, in combination, a holder for a reserve supply of weft, weft-indicator devices including a weft-fork, a feeler at the delivery-point of the said holder, and means connected with said feeler to control the working of said weft-fork.

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

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Witnesses:

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