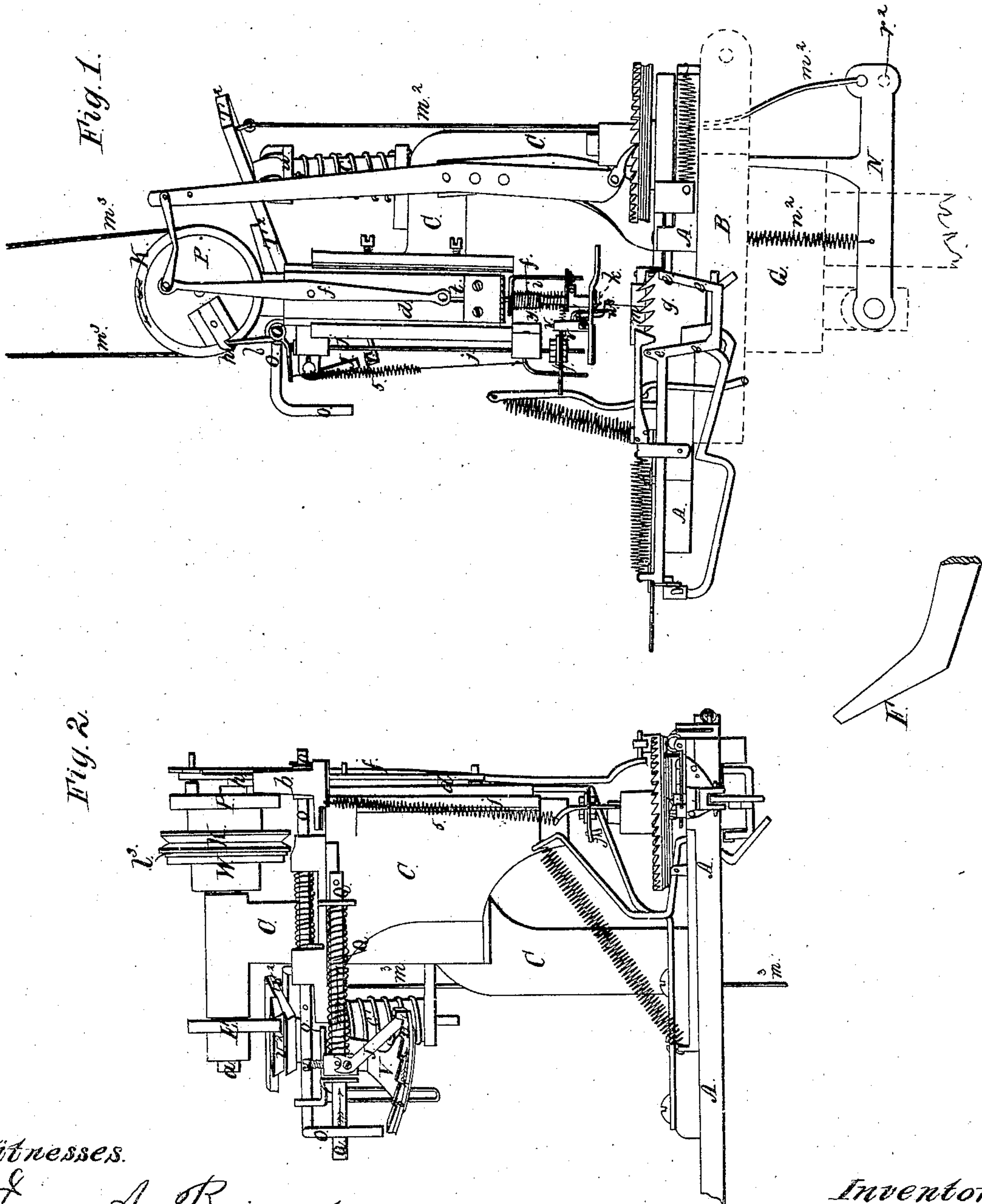


No. 44,808.

PATENTED OCT. 25, 1864.

I. LINDSLEY.  
POWER LOOM FOR WEAVING HAIRCLOTH.

3 SHEETS—SHEET 1.



Witnesses.

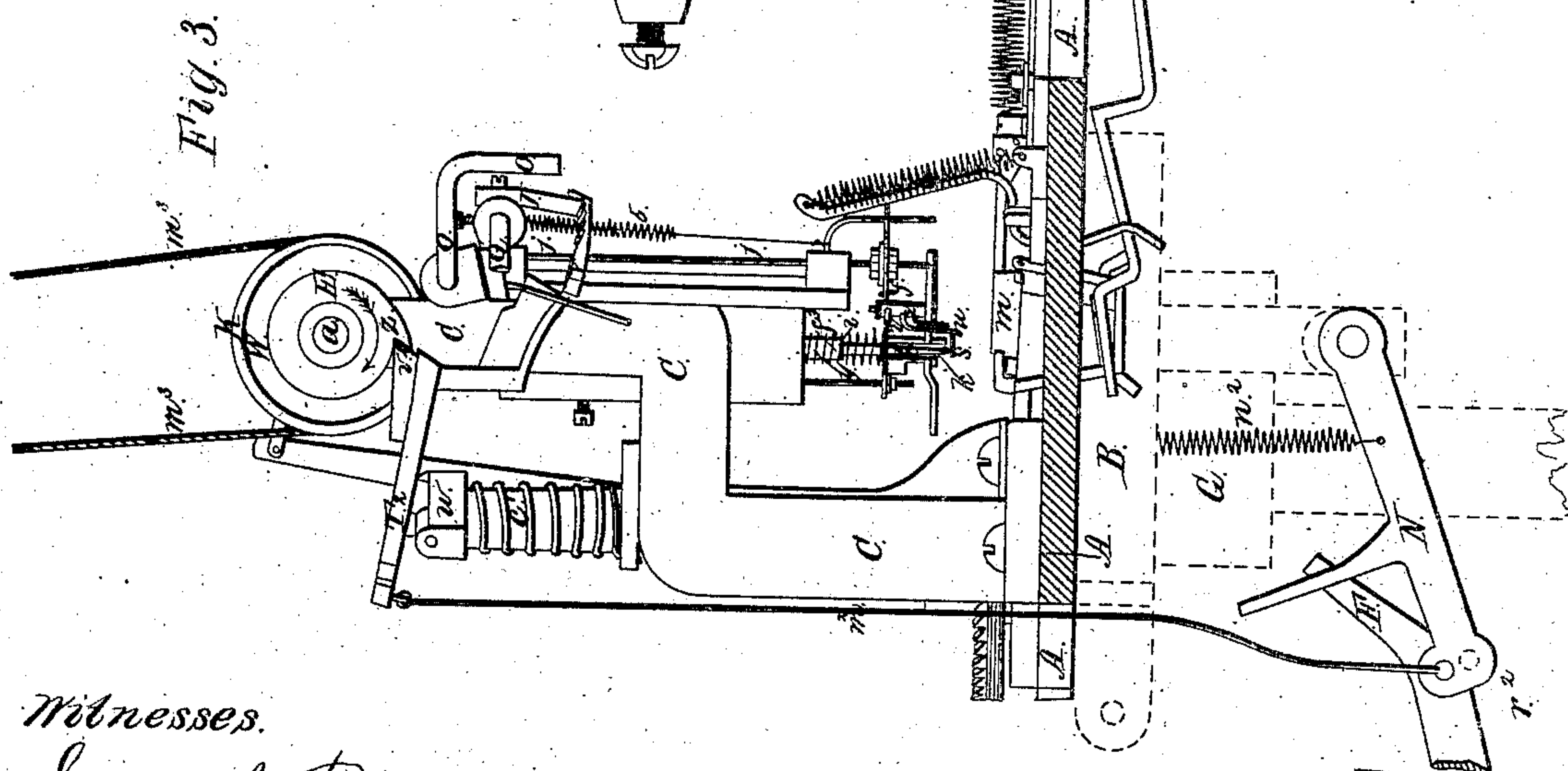
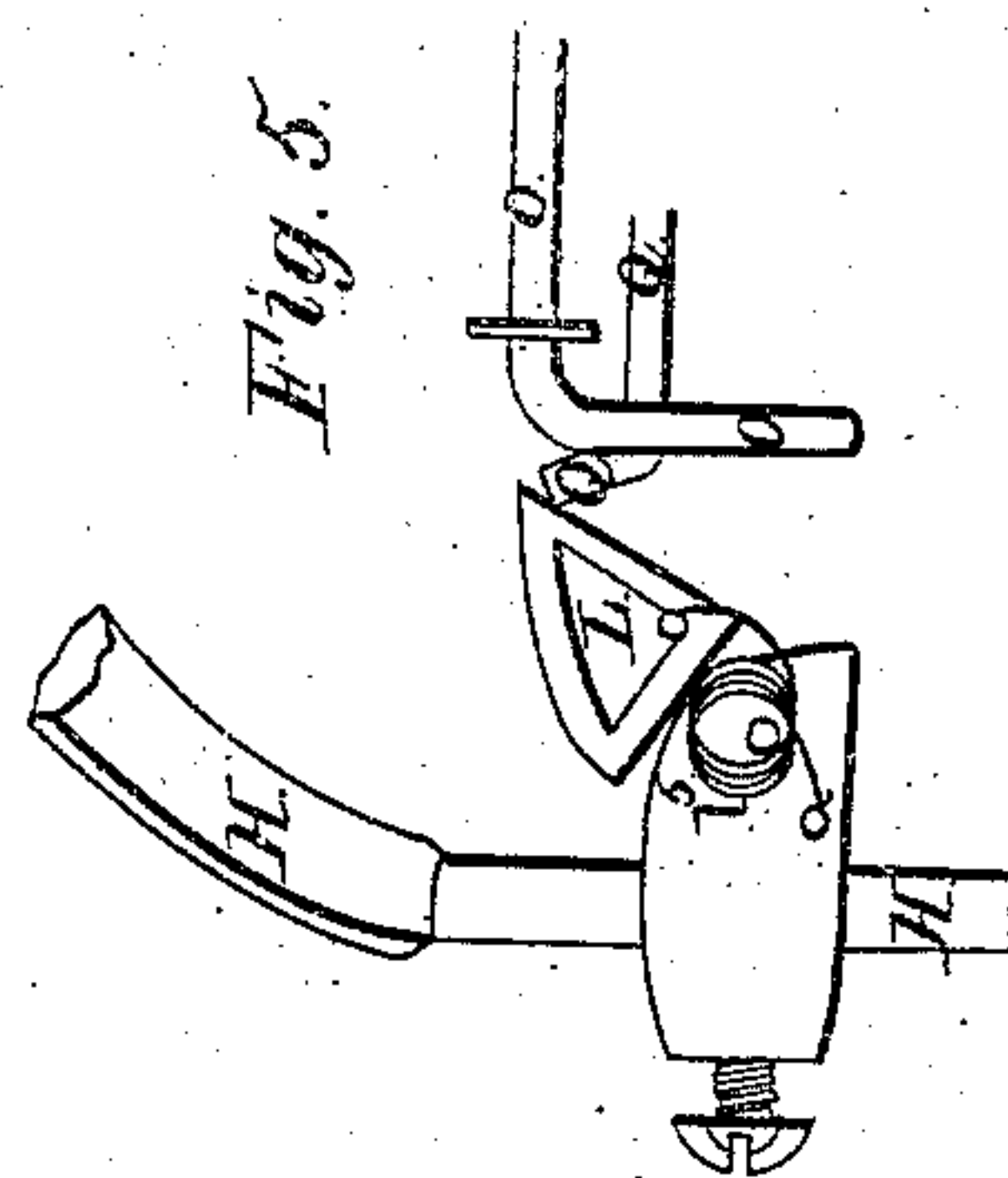
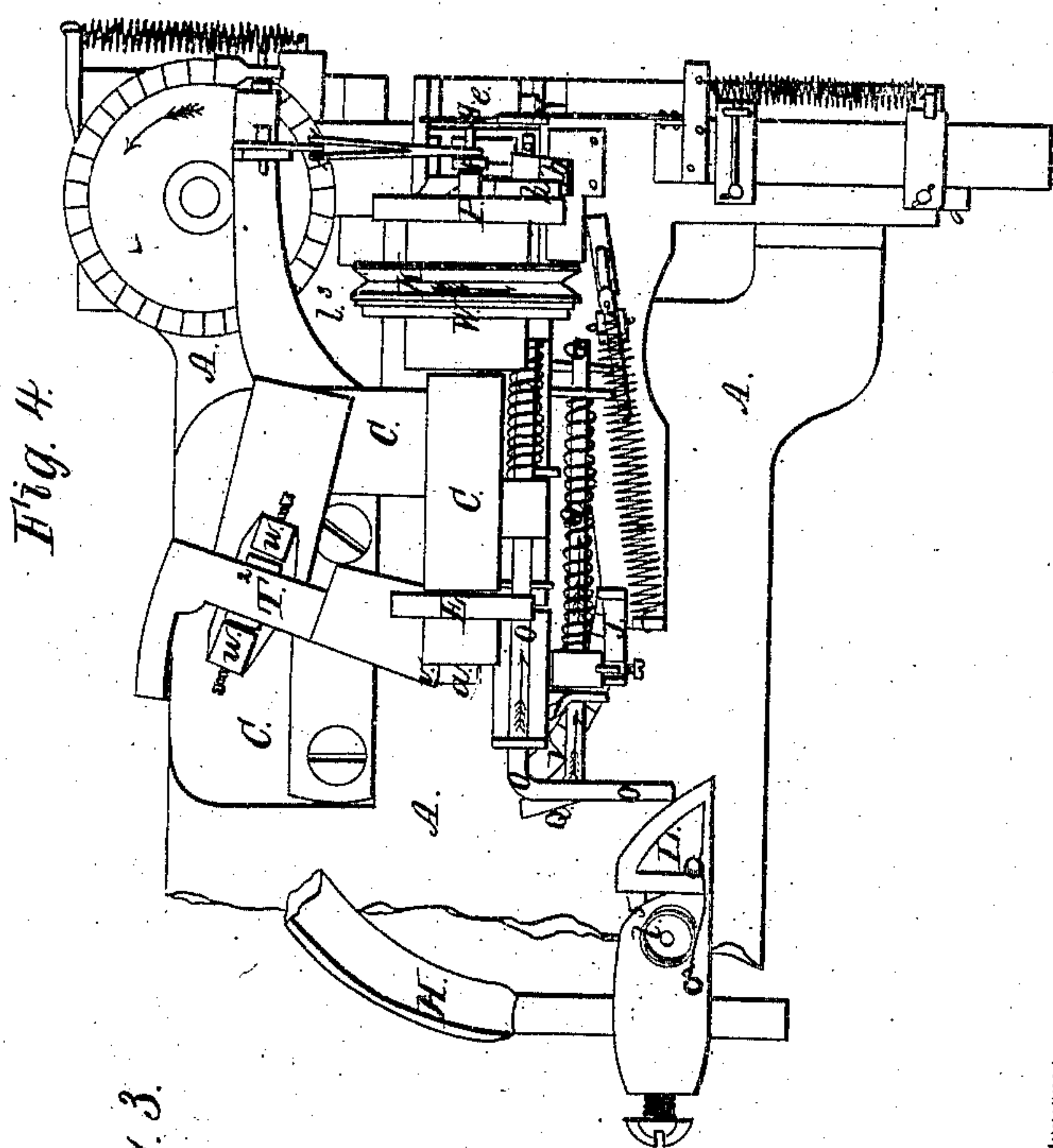
Isaac A. Brinnell  
George G. Phillips

Inventor.

Isaac Lindsley

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POWER LOOM FOR WEAVING HAIRCLOTH.

3 SHEETS—SHEET 2.



Witnesses.

Isaac A. Brinnell.  
George G. Phillips

Inventor.

Isaac Lindsley

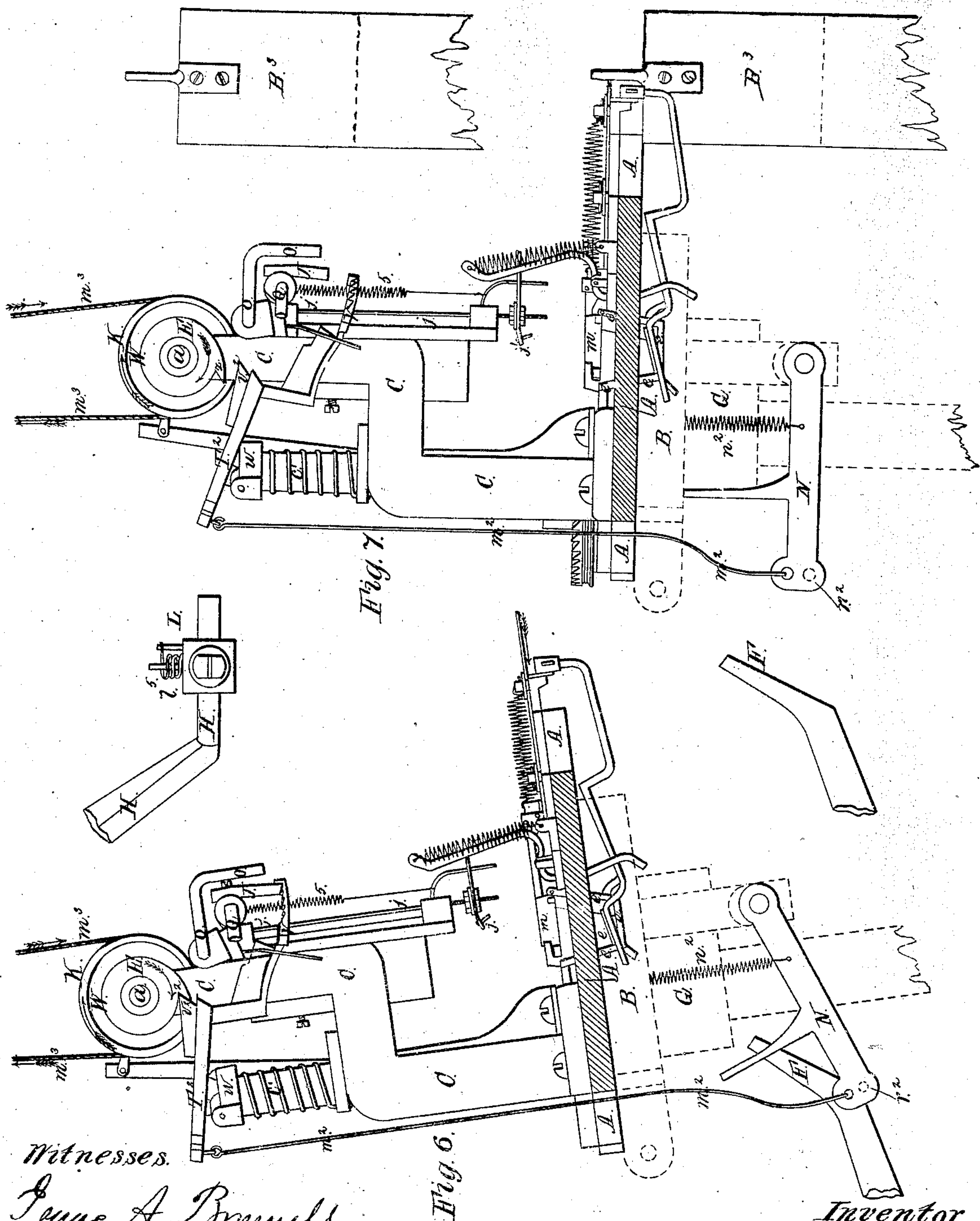


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I. LINDSLEY.  
POWER LOOM FOR WEAVING HAIRCLOTH

3 SHEETS-SHEET 3.



Witnesses.  
James A. Brunell.  
George C. Phillips.

Inventor.  
Isaac Lindsley



# UNITED STATES PATENT OFFICE.

ISAAC LINDSLEY, OF PAWTUCKET, RHODE ISLAND.

## IMPROVEMENT IN POWER-LOOMS FOR WEAVING HAIR-CLOTH.

Specification forming part of Letters Patent No. 44,808, dated October 25, 1864; antedated April 25, 1864.

*To all whom it may concern:*

Be it known that I, ISAAC LINDSLEY, of Pawtucket, in the county of Providence and State of Rhode Island, have invented a new and useful improvement in power looms for weaving hair-cloth and fabrics in which the weft is composed of separate lengths of material instead of being continuous; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a front elevation of the machine which embodies my improvement. Fig. 2 is a side elevation of the same. Fig. 3 is a rear elevation of the same, or of the reverse end from that shown in Fig. 1. Fig. 4 is a plan of the machine. Fig. 5 is a plan of a detached portion of Fig. 4, illustrative of the peculiar mode of operation hereinafter described. Fig. 6 is a rear elevation of the said machine arranged with the contiguous parts of the loom. Fig. 7 is a like view of said machine and parts of the loom in a different position relatively from that of Fig. 6, the two figures illustrating the peculiar mode of operation hereinafter described as produced by the beating movements of the lathe.

Similar letters of reference indicate corresponding parts in all the figures.

The apparatus represented in the said drawings is a modified construction of the apparatus for feeding or serving the weft to hair-cloth looms which is shown and described in Letters Patent of the United States number 1,630-32,634, bearing date June 25, 1861.

The first feature of my improvement relates to the construction of the repeating mechanism or means by which, in case that the selecting-instrument fails to select a hair or weft at its first effort, the operation will be repeated several times during a single beat of the lathe. In the patent before mentioned the detent or stop by which the operation of the selecting device was arrested when a weft was selected was controlled by the position of the "pad," (so called,) the movement of which depended upon the seizure of a weft by the selecting-instrument, the pad in that instance performing the double purpose of holding the weft in the notch of the "lance" or selecting-instrument and also of controlling the stop

before mentioned. By my present improvement these functions are separated; and this part of my invention consists in controlling the operation of the stop by means of a delicate finger or detector that has a movement across the position of the selected weft after each operation of the selecting instrument between the same and the mass of weft when the weft is not present, or is arrested by the weft when it is present. By the first-named condition the stop is placed so as to be inoperative, and permits the operation of the selecting instrument to be repeated, and by the last condition the stop is put into action and arrests the operation of selecting.

The second part of my invention relates to the mode of operation of the selecting mechanism after it has failed to select and deliver to the nipper a weft to be drawn into the shed, by which the operations of the selecting mechanism are arrested while the operations of the heddles and lathe are continued until the proper shed is again opened to receive the weft, when the selecting mechanism again automatically resumes its operations. This part of my invention consists in the employment, in connection with the selecting mechanism, of a second detent or stop, which arrests the selecting mechanism in a position to be out of the way of the nipper, and is brought into action with each backward movement of the lathe in case that the weft fails to be selected, and continues in action during any determined number of picks, and is then automatically released.

To enable others skilled in the art to make and use my said invention, I will proceed to describe the construction and operation of the same.

In the drawings, A is the bed-plate of the apparatus, which is designed to be firmly secured to the metal plate B, (shown in dotted lines,) extending from the left end of the race-beam G of the lathe. C is an upright stand on the bed-plate A, in the upper part of which is formed suitable bearings for the driving-shaft *a*. In the front of the stand C is fitted a slide, *d*, which is connected by the rod *f* to a stud or crank-pin in the face of the wheel, Figs. 1 and 2, on the driving-shaft *a*, the revolution of which is thus made to reciprocate the slide *d* vertically. The lance or selecting-



instrument *k* is secured in the lower part of the slide *d* by means of a binder, *t*, with set-screws or otherwise, and the downward movement of the slide plunges the selecting device into the mass of hair or weft, which is held in a suitable receptacle, *e e*, beneath it, in doing which one of the hairs or wefts is caught by the selecting-instrument and with the upward movement of the slide is deflected from the mass and held in the proper position, aside from it, as shown in Fig. 1, to be seized by the nipper between the selecting-instrument and the mass and drawn into the open shed. The pad *i*, in this improved construction, consists of a surface upon the lower part of a sliding sleeve, *y*, which incloses the shank of the selecting-instrument in a kind of sheath, from which it protrudes to catch a hair or weft from the mass by the movement above mentioned, and by the reaction of the spiral spring *j*<sup>3</sup>, or an equivalent yielding force, caused by the upward movement of the slide *d*, is drawn into the said sheath, carrying the hair or weft so selected against the pad *i* on the sleeve, which forms a bight in the weft and holds the same in the custody of the selecting-instrument until it is seized and disengaged therefrom by the nipper, to be drawn into the open shed.

The operation of the selecting device is arrested and it is held in its proper position aside from the mass of weft when a weft has been selected by means of a detent or stop, *h*, at the periphery of the wheel *P* and a pawl, *b*, on the end of the rod *o*, which engages with the stop *h* at the proper time, and thereby prevents the wheel from turning and reciprocating the slide *d* and operating the parts connected therewith. The pawl *b* is withheld from engaging with the stop *h* by the force of the spring *5*, which is suitably arranged for the purpose, and its engagement is effected by means of the rod *j*, which connects it with the mechanism that governs and controls the repeating movement of the selecting device above mentioned.

This mechanism consists of a delicate finger or detector, *s*, Figs. 1 and 3, swinging on a pivot, *x*, connected with the sleeve *y*, or otherwise arranged to move across the position of the selected weft, and having a finger, *v*, or an equivalent device to communicate motion to the connecting rod *j*, and thence to the pawl *b*, and a third finger, *u*, which slides upon a stationary inclined surface, *m*, conveniently arranged therewith by the reciprocating movement of the slide *d*, and, with the assistance of a spiral spring on the pivot *x*, serves to swing the detector *s* and its finger *v* to and fro between the selecting device and the mass of weft with each operation of the selecting-instrument, to select a weft therefrom for the purpose of detecting the presence of a weft in the custody of the said instrument and governing the action of the detent or stop accordingly.

This mechanism being constructed and arranged as described, the operation is as follows: When the selecting-instrument descends

to select a weft from the mass, the finger *u* comes in contact with the inclined surface *m*, and by sliding thereon swings the detector *s* beneath and to one side of the selecting-instrument, the same movement swinging the finger *v* directly beneath the projecting piece *j'* on the lower end of the connecting-rod *j*, and when the selecting-instrument ascends after being plunged into the mass of weft, and one of the hairs or wefts is selected and deflected therefrom, the spiral spring on the pivot *x* swings the detector *s* back to its former position, in doing which it is arrested by the presence of the selected weft, and, resting against said weft, it gives a position to its finger *v* directly beneath the projection *j'*, with which it comes in contact and lifts, and with it the rod *j*, the upper end of the latter serving to swing the pawl *b* into engagement with the stop *h* on the wheel *P* and arresting its revolution with the selected weft sufficiently deflected to be seized by the nipper between the selecting-instrument and the mass. Should the selecting-instrument, however, fail to select a weft from the mass, the absence of the deflected weft permits the detector to swing across the position it would otherwise occupy, and its finger *v* to swing from beneath the projection *j'* of the connecting-rod *j*, which, with the pawl *b*, remains unmoved during the ascending movement of the slide *d*, and no engagement of the pawl *b* with the stop *h* takes place, and the wheel *P* therefore continues to revolve and repeat the operation of the selecting-instrument one or more times until a weft is selected, when the operation is arrested, as before explained.

When the selected hair has been disengaged from the selecting-instrument by the nipper, to be drawn into the open shed, the stop by which the operation of the selecting device was arrested holds the wheel *P* from turning until with the forward beat of the lathe the end of the rod *o* comes in contact with the inclined surface of the dog *L* on the stationary arm *H*, extending from the frame of the loom, as shown in Fig. 4, which has the effect to slide the rod *o* lengthwise and the pawl *b* on the opposite end aside from the stop *h*, and thereby disengage the same and permit the wheel *P* to resume its revolutions, the rod *o* being returned to its first position by the spiral spring which encircles it, the band *m*<sup>3</sup>, by which the shaft *a* is driven, being allowed to slip in the groove of the wheel *P* during its detention by the detent or stop. When the rod *o* meets the dog *L* during the backward beat of the lathe, the dog swings aside and allows the end of the rod to pass, as shown in Fig. 5, after which it is swung back to its former position by the spiral spring *l*<sup>5</sup>.

When the selecting instrument fails to select a weft during the backward beat of the lathe, a continuance of its operation would render the selecting device liable to collision with the nipper, and to be injured in consequence. To prevent this casualty I have pre-



viously invented and successfully applied the second detent or stop shown in Figs. 2, 3, 6, and 7, consisting of the lever or pawl  $T^2$ , which is thrown up to engage with the notched disk E on the shaft  $a$ , nearly at the completion of the backward beat of the lathe by means of the lever N, the free end of which is connected by the rod  $m^2$  to the pawl  $T^2$ , and is depressed by sliding against the stationary incline F, as shown in Fig. 6, and the pawl  $T^2$  is withheld from engagement with the disk E by the spiral spring  $n^2$ , which returns the lever N and the parts connected therewith to the position shown in Fig. 7, when the lathe swings forward. When, however, the revolution of the shaft  $a$  is arrested by the action of the detent or stop  $z$  in the manner above explained, the pawl  $T^2$  is disengaged from the notch Z in the disk E by pushing the pawl aside from the notch by means of the rod Q, to which the pawl is connected, one end of said rod striking against the inclined surface of the dog L in the manner before explained, as shown in Fig. 4, by the forward movement of the lathe.

In order to hold over or suspend the operation of the selecting device during the number of picks required in working the round of the figure in weaving hair-cloth, so that in case a weft fails to be supplied to the nipper by the selecting device its selecting operations when arrested by the means above mentioned shall be suspended during the determined number of picks until the vacant shed is reopened, I arrange in connection with the detent or stop above mentioned an index or counting device, which is fully shown in Figs. 2, 6, and 7, and consists of a notched segment V, extending from the pawl or lever  $T^2$ , and a pawl J, pivoted to the sliding rod Q and engaging with the notches of said segment to swing it and the pawl  $T^2$  against the action of the spiral spring C' in the direction indicated by the arrow to the extent of one of the notches with each sliding movement or impulse of the rod Q, produced by its striking against the inclined surface of the stationary dog L with each forward beat of the lathe, in the manner above explained.

The detent or notch Z is made sufficiently deep and acute to retain the pawl  $v^2$  when it is thrown up and becomes engaged therewith when no weft is selected, as above explained. On the other hand, the said notch is withheld from receiving and engaging the pawl  $v^2$  by the action of the first-mentioned stop  $h$  when a weft has been selected (the action of the second stop  $z$  being unnecessary) and the pawl  $v^2$  is allowed to withdraw itself out of the way without effecting an engagement. There are as many notches in the segment V as there are picks in working the round of the figure, which, in weaving hair-cloth, usually numbers five, and the pawl  $v^2$  is of such a width that it will slide laterally in the notch

Z during the intermittent sliding movement produced by the successive engagements of the pawl J with the first four (1 2 3 4) notches of the segment at the termination of the successive forward beats of the lathe and preceding the reopening of the vacant shed, when by the next engagement with the fifth, 5, notch of the segment the pawl  $v^2$  is pushed aside from the notch Z, and the selecting operation is permitted to resume with the reopening of the vacant shed. The engagement of the pawl  $T^2$  takes place when the selecting instrument fails to select a weft during the backward beat of the lathe, and the index or segment V determines by count the number of picks which should be worked during the suspension of the selecting operation, and permits said operation to resume automatically at the proper time, and so to suspend and resume automatically as often as the contingency occurs.

Having thus described my invention, I wish it understood that I do not limit myself to the particular construction of the parts as described; but I claim all merely formal variations thereof performing the same mode of operation by equivalent means; also, that I have successfully applied and connected the selecting mechanism, whose operation is governed and controlled by the index or counting device, as above explained, to the mechanism that lets off and delivers the warps to the "take up," so that when the selecting mechanism fails to select a weft in the proper time the progress of the warps will be suspended during the determined number of picks and resumed with the operation of the selecting mechanism, and the mode of operation resulting therefrom forms the subject-matter of a separate application.

What I claim, and desire to secure by Letters Patent, is—

1. Controlling the operations of the selecting mechanism by means of a detector, constructed and operating substantially as described.

2. The mode of operation, substantially as specified, by which, in case the selecting-instrument fails to select and present a length of weft to the instrument that places it in the open shed during the period allotted therefor, its selecting function is in consequence thereafter suspended during any determined number of picks, and resumed with the reopening of the proper shed, and so continues to suspend and resume its functions automatically until a length of weft is selected and inserted in the proper shed, and to do so repeatedly as often as such contingency occurs.

ISAAC LINDSLEY.

Witnesses:

ISAAC A. BROWNELL,  
GEORGE G. PHILLIPS.