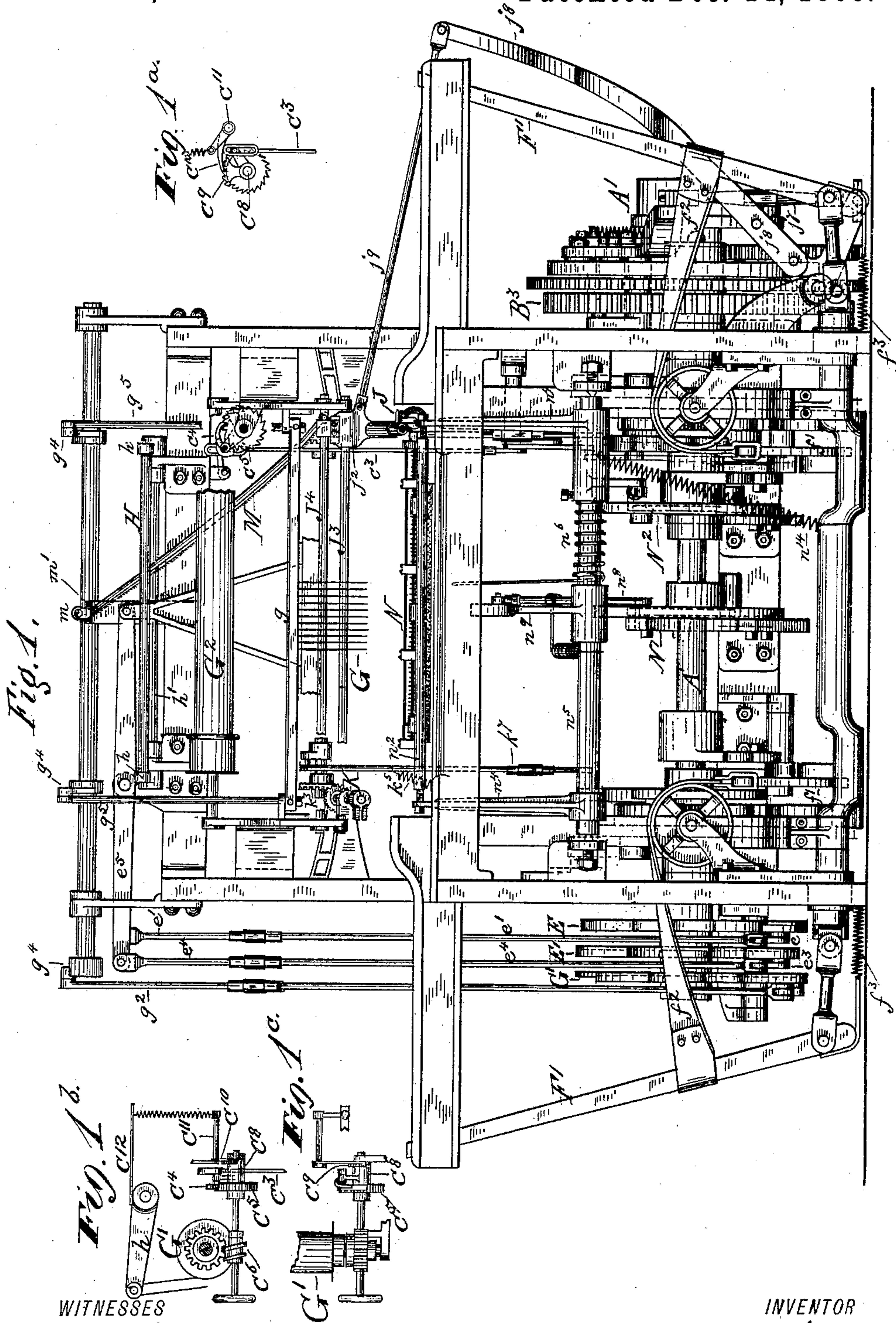


(No Model.)

9 Sheets—Sheet 1.

H. SKINNER.

LOOM FOR WEAVING CHENILLE OR FUR PILE FABRICS.
No. 354,256. Patented Dec. 14, 1886.



WITNESSES
Gabriel J. W. Galster.
Jas. D. Harner

INVENTOR
Halcyon Skinner
By his Attorney
S. L. Kenwick

(No Model.)

9 Sheets—Sheet 2.

H. SKINNER.

LOOM FOR WEAVING CHENILLE OR FUR PILE FABRICS.
No. 354,256.

Patented Dec. 14, 1886.

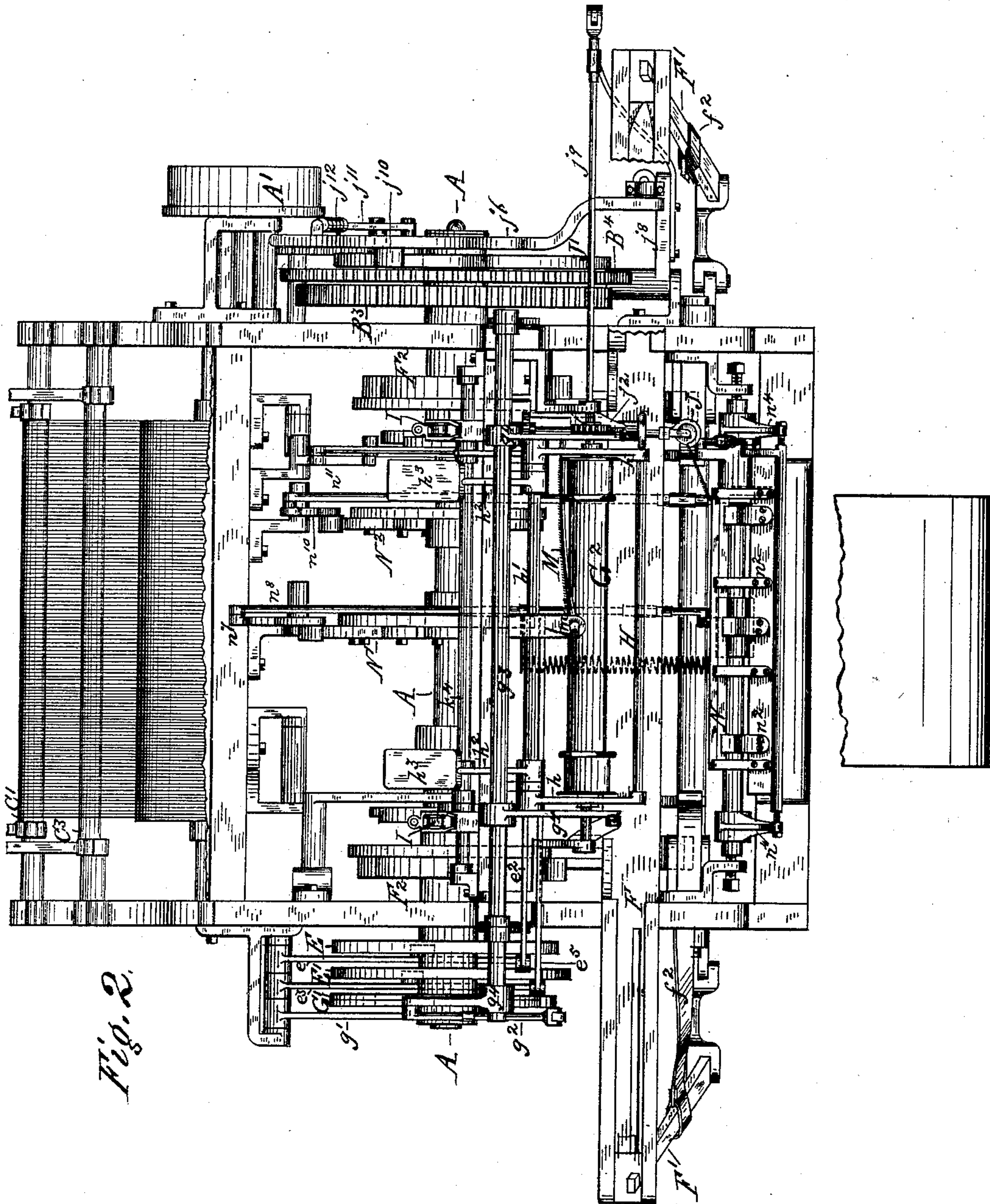


Fig. 2.

WITNESSES

Gabriel J. W. Gahler.
Jas. E. Warner

INVENTOR

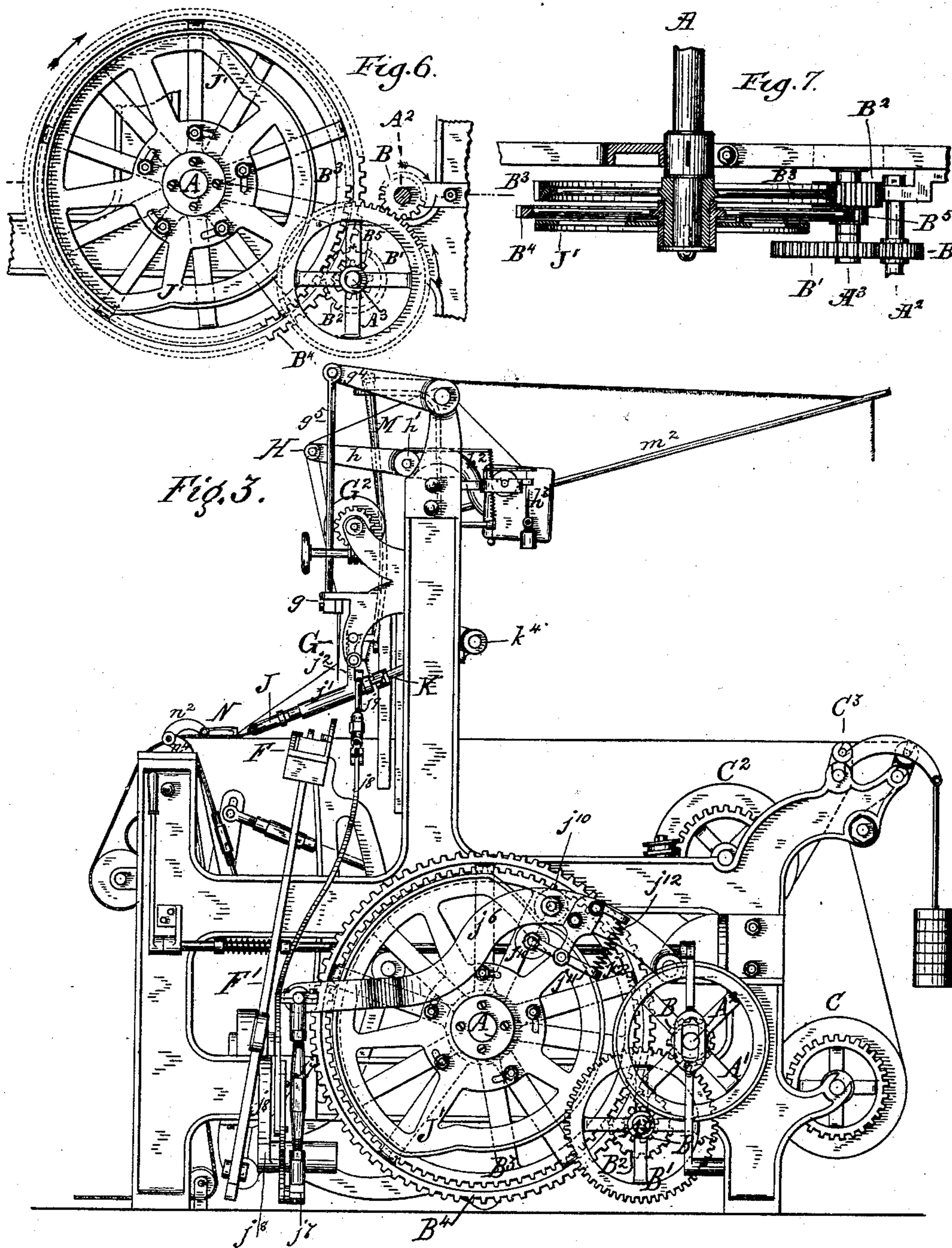
Haleyon Skinner
By his Attorney
C. S. Remick

(No Model.)

9 Sheets—Sheet 3.

H. SKINNER.

LOOM FOR WEAVING CHENILLE OR FUR PILE FABRICS.
No. 354,256. Patented Dec. 14, 1886.



WITNESSES

Gabriel J. W. Caliter
Jas. E. Harner

INVENTOR

Haleyon Skinner
By his Attorney
C. L. Remick

(No Model.)

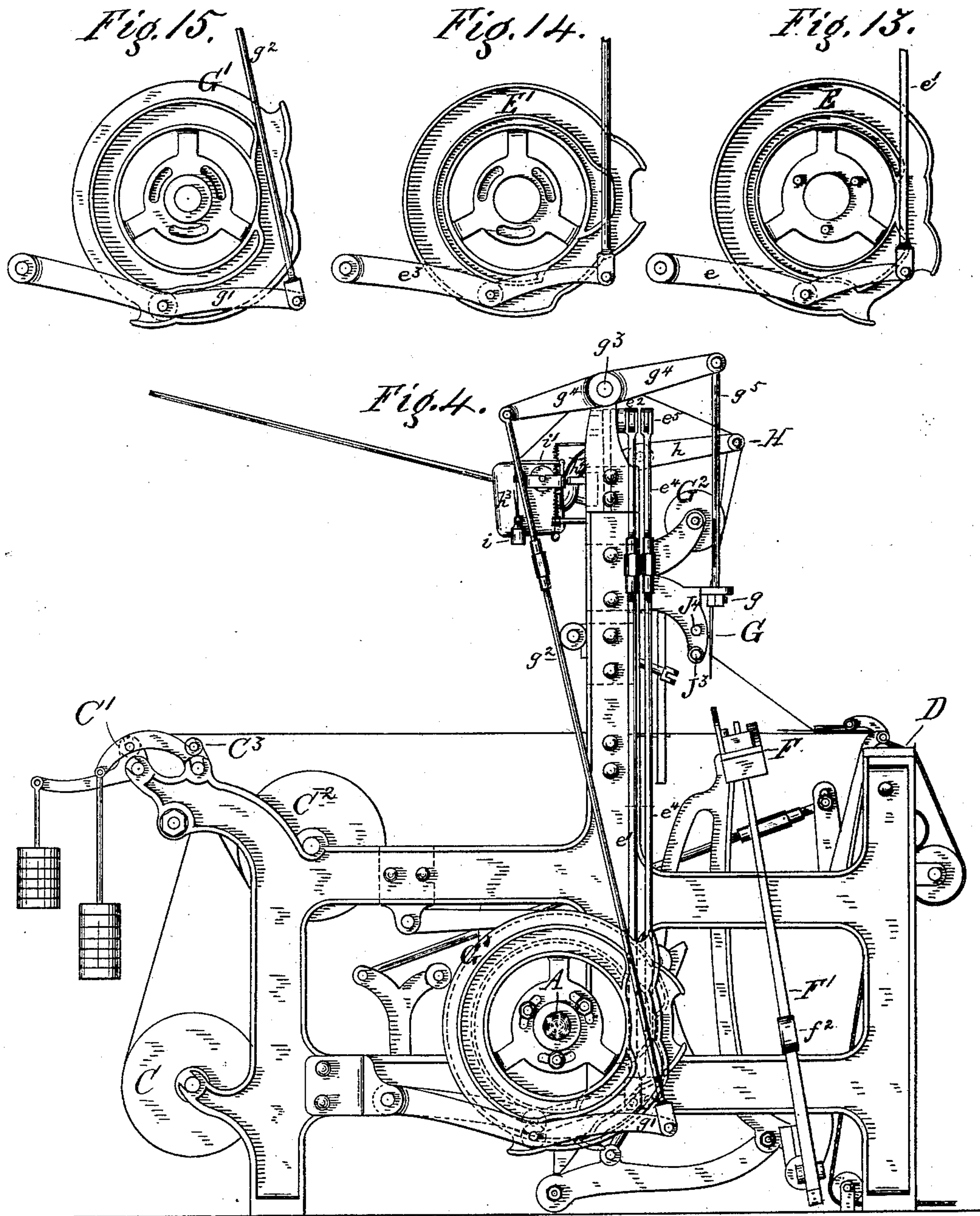
9 Sheets—Sheet 4.

H. SKINNER.

LOOM FOR WEAVING CHENILLE OR FUR PILE FABRICS.

No. 354,256.

Patented Dec. 14, 1886.



WITNESSES

Gabriel J. W. Galster
James E. Warner

INVENTOR

Halcyon Skinner
By his Attorney
C. S. Remwick

(No Model.)

H. SKINNER.

9 Sheets—Sheet 5.

LOOM FOR WEAVING CHENILLE OR FUR PILE FABRICS.

No. 354,256.

Patented Dec. 14, 1886.

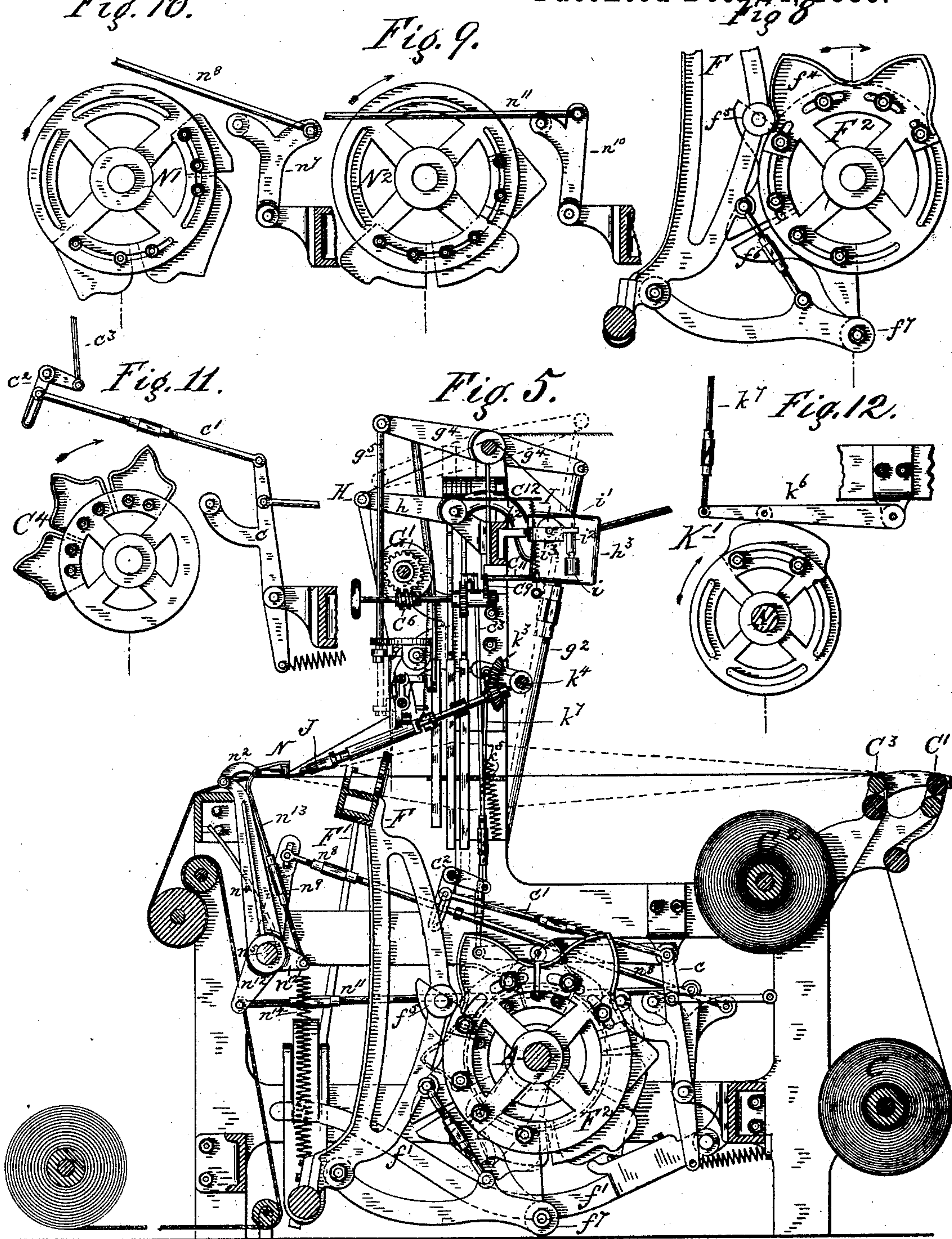


Fig. 5.*

Diagram A shows a circle with a shaded center. A horizontal line passes through the center of the circle, extending to the left and right edges. The center of the circle is filled with diagonal hatching.

WITNESSES

Gabriel J. W. Galster
Jas. L. Warner

INVENTOR

Halcyon Skinner

By his Attorney

C. S. Kenwick

(No Model.)

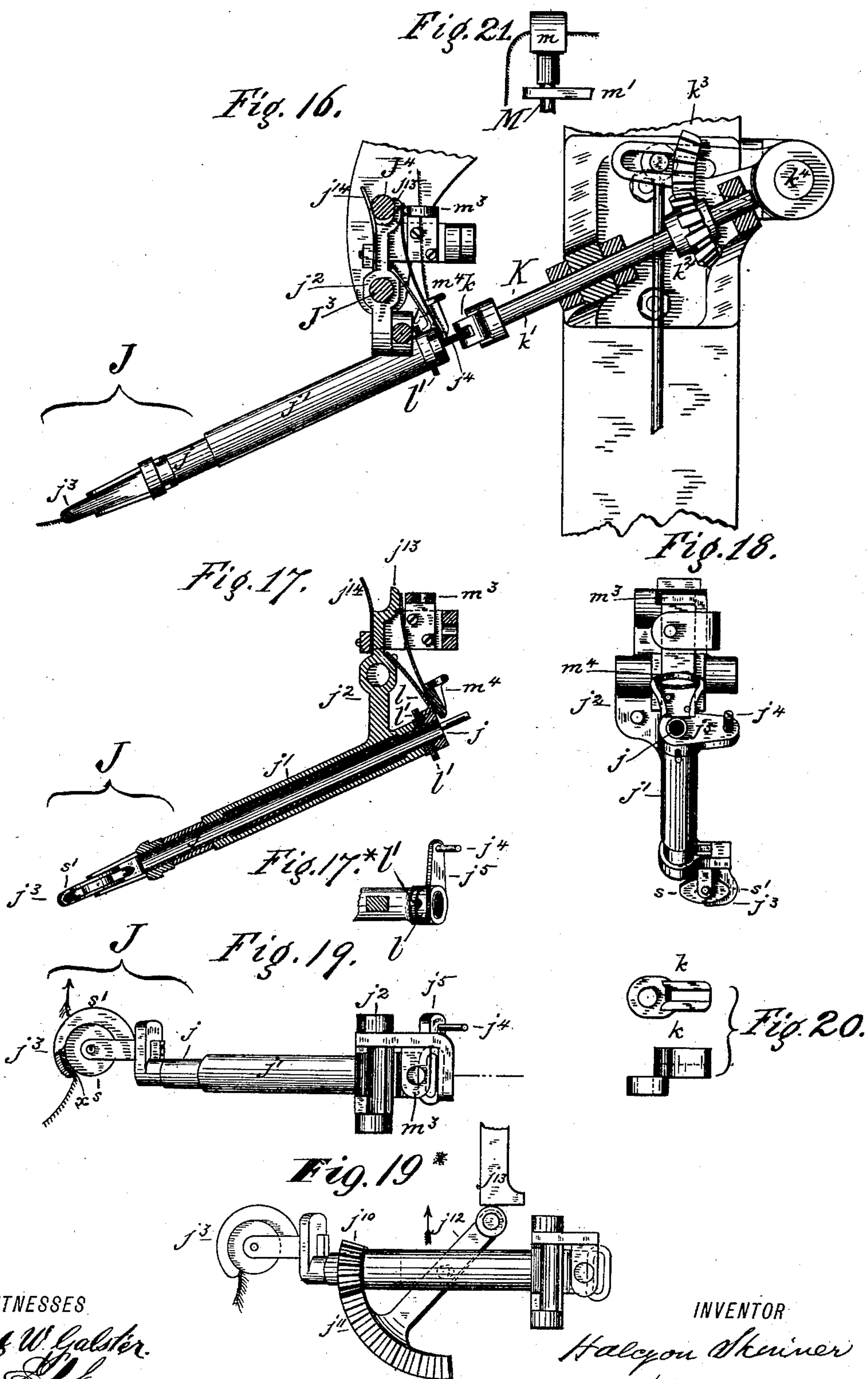
9 Sheets—Sheet 6.

H. SKINNER.

LOOM FOR WEAVING CHENILLE OR FUR PILE FABRICS.

No. 354,256.

Patented Dec. 14, 1886.



WITNESSES

Gabriel J. W. Galster.
 Jas. Barker

INVENTOR

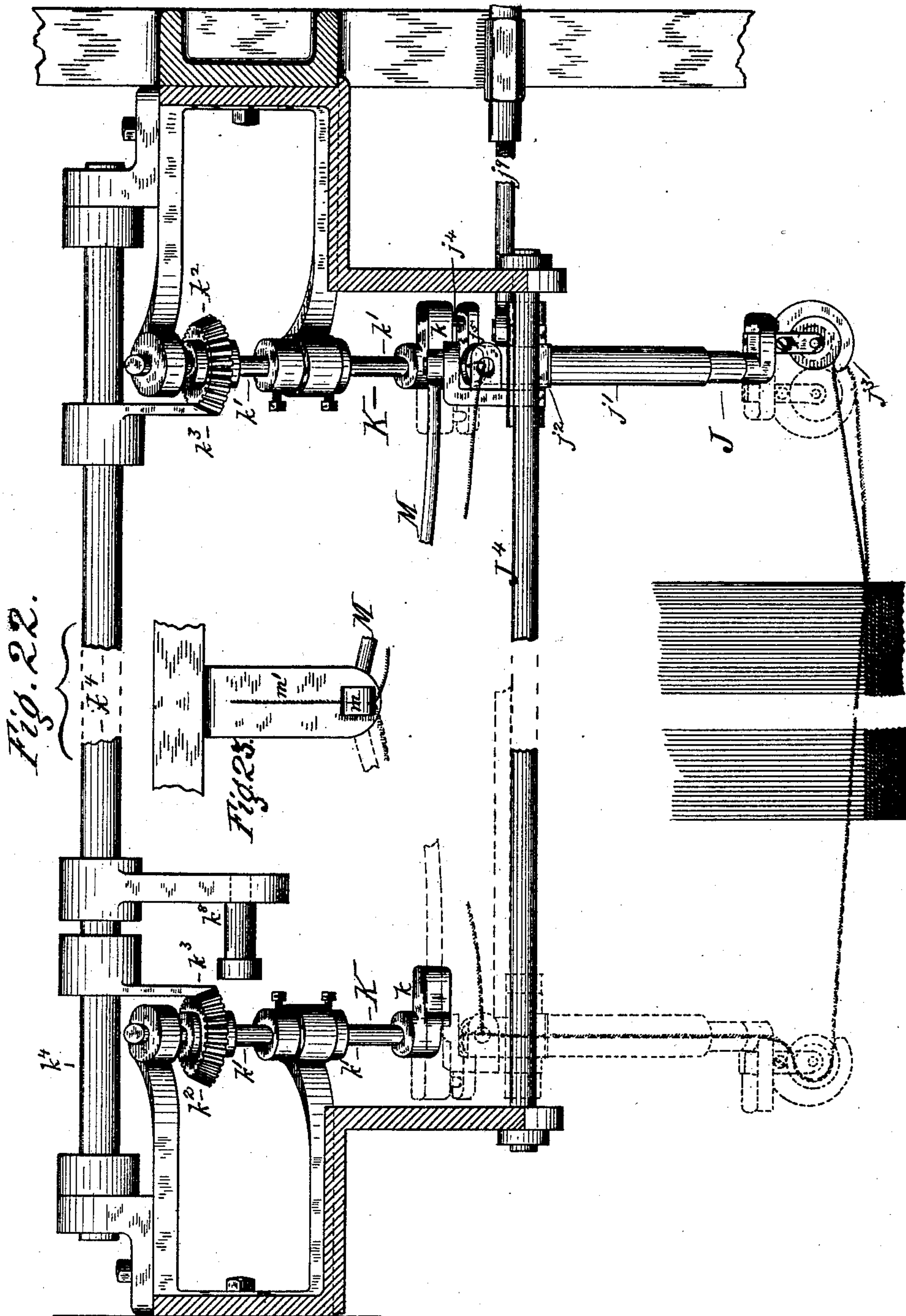
Halcyon Skinner

By his Attorney

By ^{Attorney} *C. S. Penwick*

9 Sheets—Sheet 7.

LOOM FOR WEAVING CHENILLE OR FUR PILE FABRICS.
No. 354,256. Patented Dec. 14, 1886.



WITNESSES
Gabriel J. W. Galster
Jas. O. Kirner

INVENTOR
Halgou Skinner
By his Attorney
C. L. Kenwick

(No Model.)

9 Sheets—Sheet 8.

H. SKINNER.

LOOM FOR WEAVING CHENILLE OR FUR PILE FABRICS.

No. 354,256.

Patented Dec. 14, 1886.

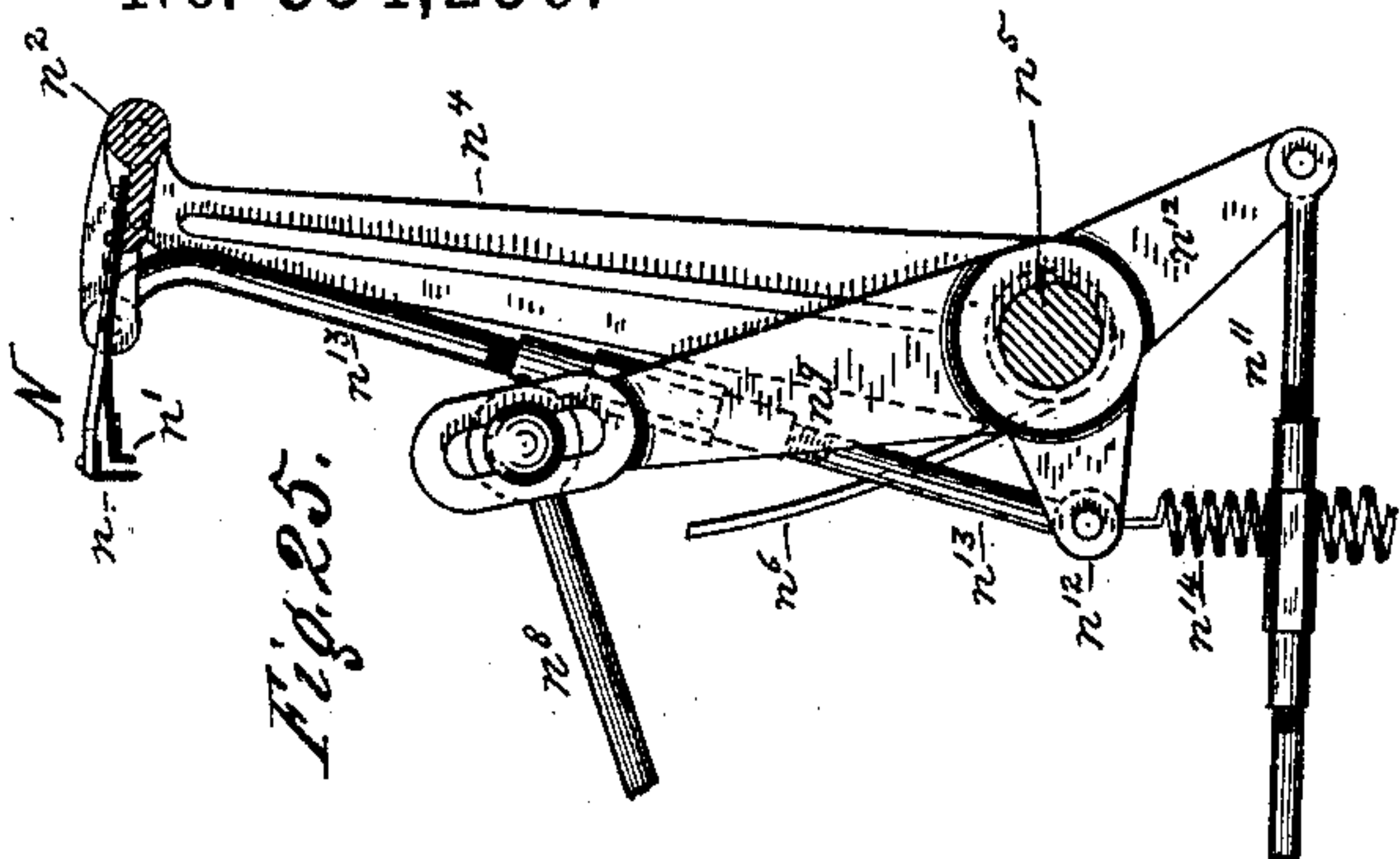


Fig. 25.

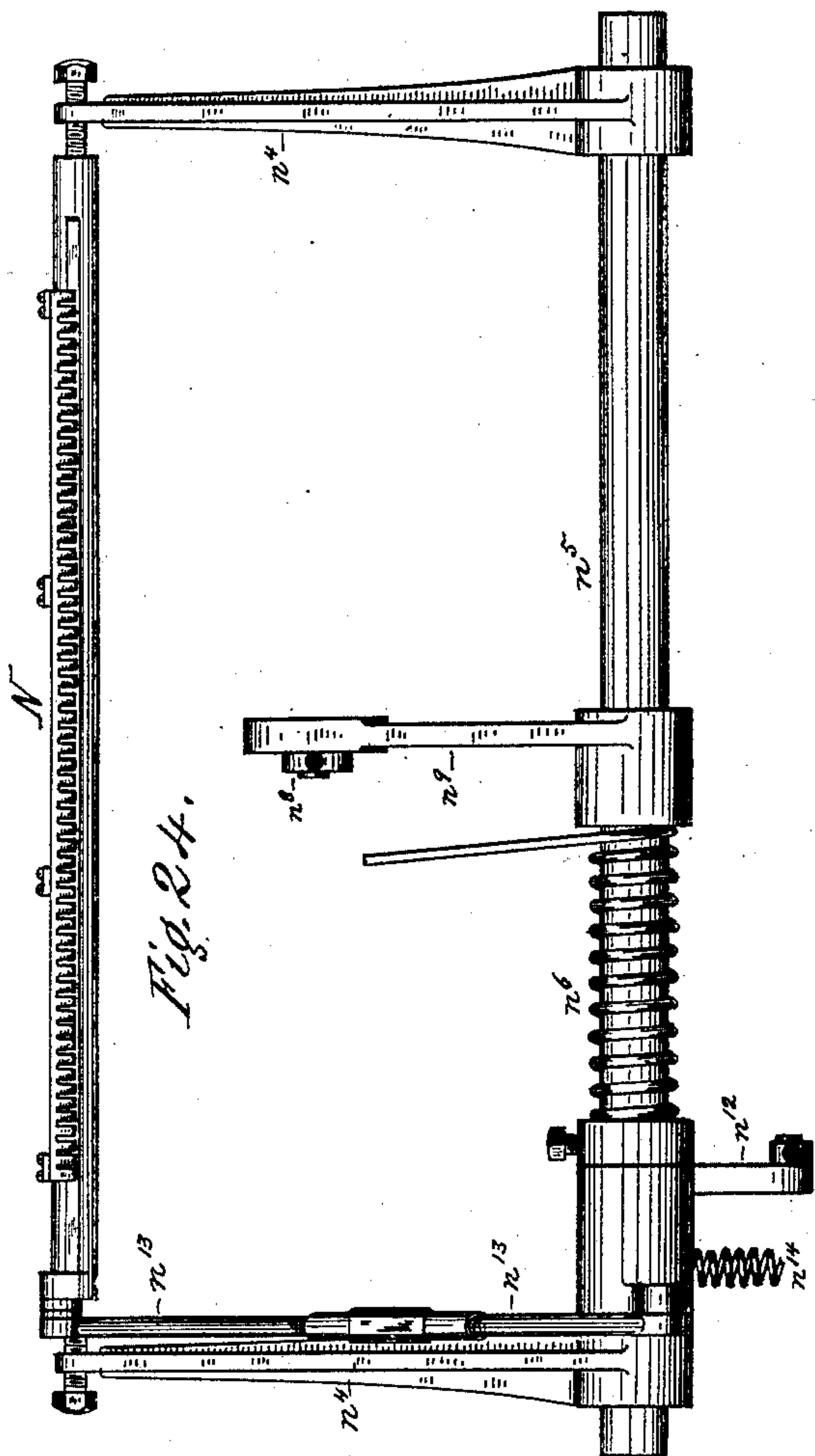


Fig. 24.

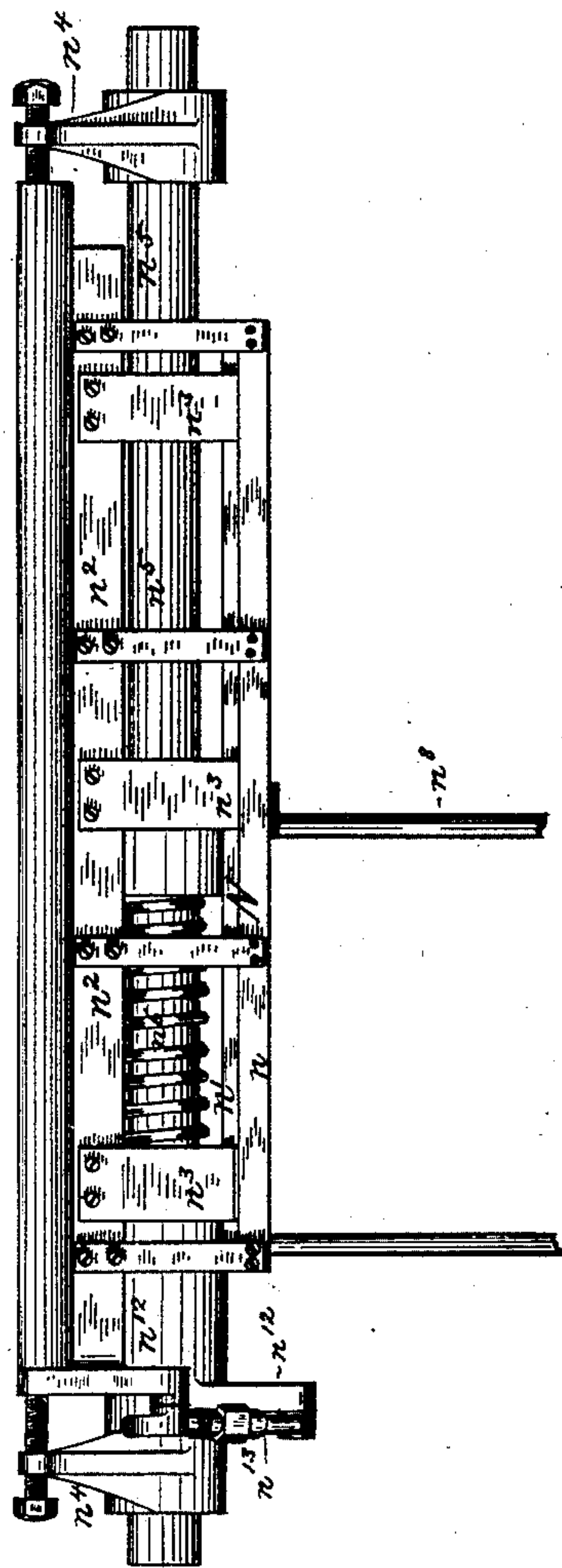


Fig. 26.

WITNESSES

Gabriel J. W. Galster.
Jas. O. Karner

INVENTOR

Harcour Skinner
By his Attorney
C. S. Remwick

(No Model.)

9 Sheets—Sheet 9.

H. SKINNER.

LOOM FOR WEAVING CHENILLE OR FUR PILE FABRICS.

No. 354,256.

Patented Dec. 14, 1886

Fig. 27.

*N Fig. 27.**

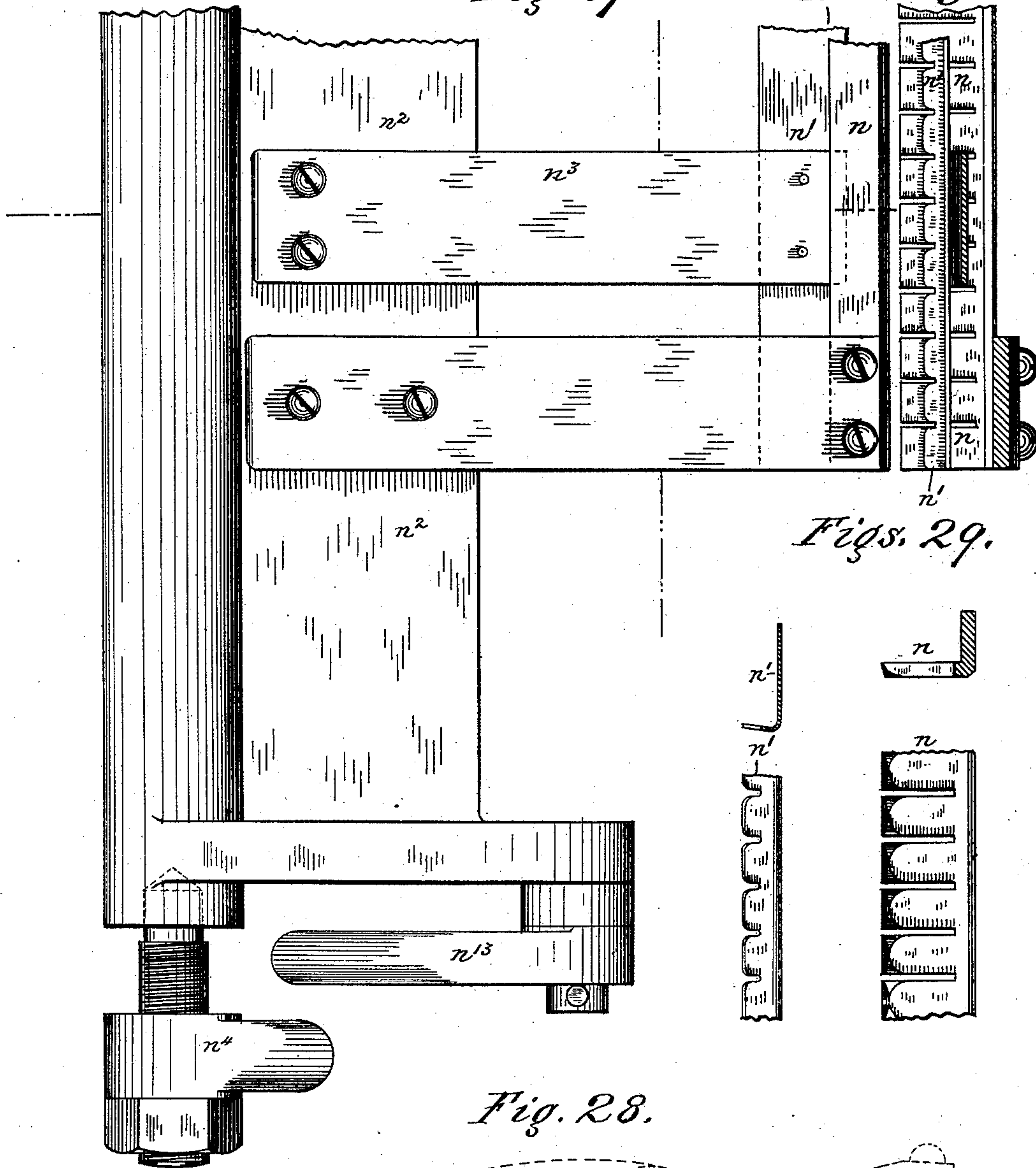
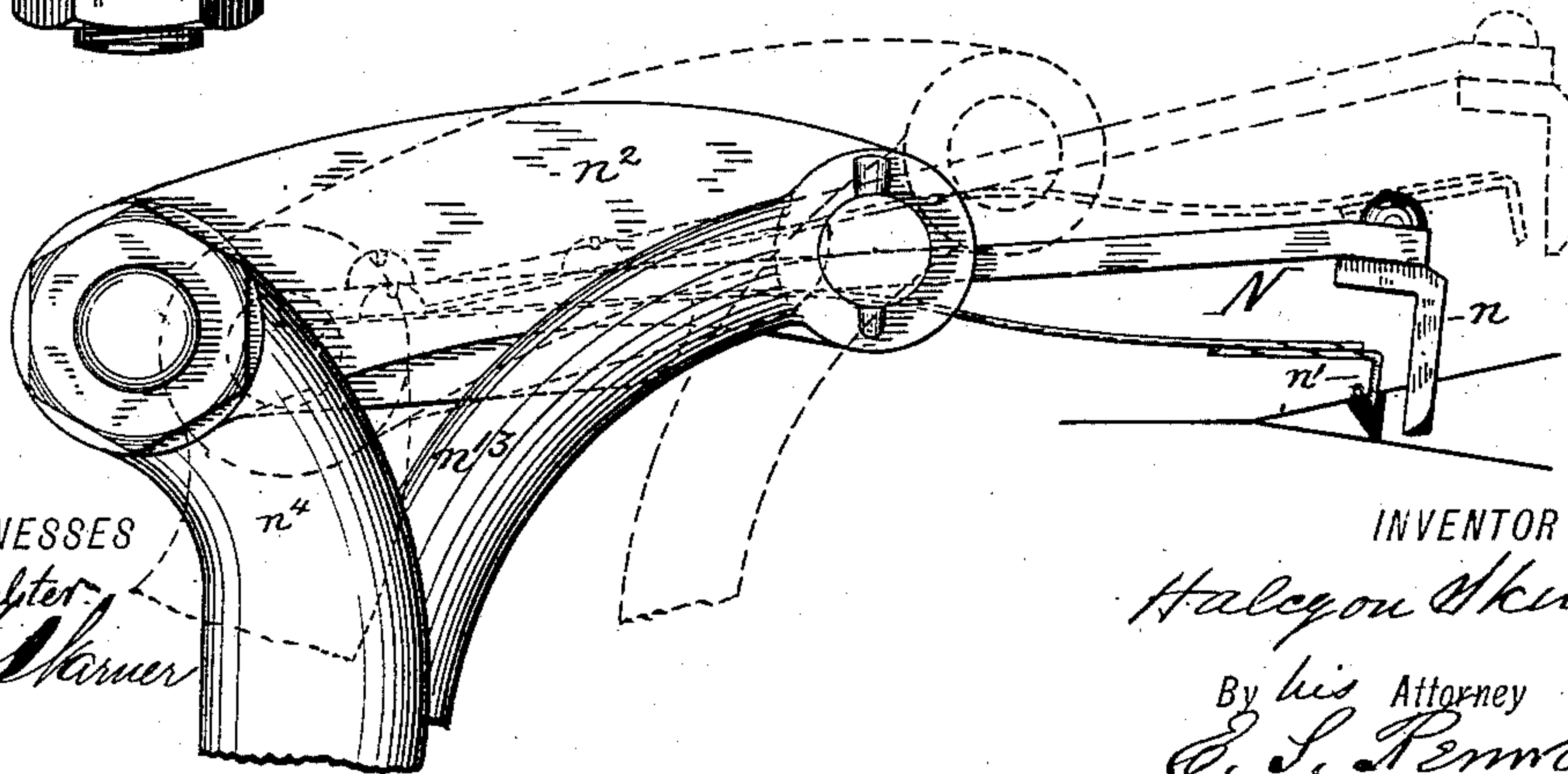


Fig. 28.



WITNESSES

Gabriel J. Walster
Jas. C. Warner

INVENTOR

Halcyon Skinner

By his Attorney

C. S. Penwick

UNITED STATES PATENT OFFICE.

HALCYON SKINNER, OF YONKERS, NEW YORK, ASSIGNOR TO ALEXANDER SMITH & SONS CARPET COMPANY, OF SAME PLACE.

LOOM FOR WEAVING CHENILLE OR FUR PILE FABRICS.

SPECIFICATION forming part of Letters Patent No. 354,256, dated December 14, 1886.

Application filed January 23, 1886. Serial No. 189,459. (No model.)

To all whom it may concern:

Be it known that I, HALCYON SKINNER, of Yonkers, in the county of Westchester and State of New York, have made an invention of certain new and useful Improvements in Looms for Weaving Chenille or Fur Pile Fabrics; and I do hereby declare that the following, in connection with the accompanying drawings, is a full, clear, and exact description and specification of the same.

The object of this invention is mainly to facilitate the weaving of chenille or fur pile fabrics by means of looms in which the body-warp threads are operated by heddles or their equivalents, and the catcher-warp threads are operated by means of a reciprocating gang of needles; and the invention has reference to the devices for operating the catcher-warps by which the chenille or fur is secured to the body of the fabric, to the device and its appurtenances for laying the fur in its proper position in the shed, and to the devices for combing the fur after it is laid in the shed of warp threads, so as to cause the pile to stand erect in the fabric.

According to my invention the catcher-warp threads are wound upon a warp beam or roller, which is stationary in the loom, and the warp threads are conducted from this roller to reciprocating needles (which open and close the shed of catcher-warp threads) past a movable take-up mechanism or whip-roll, which gives up the requisite amount of slack of catcher-warps and takes it up as required for the movement of the needles.

According to my invention, also, the chenille or fur is laid in the shed by means of a reciprocating finger or fur-carrier having a turning-beak, which lays the chenille always the same way, and with the fur pile in the proper position, whether the finger is passing through the shed from the right hand or from the left hand side of the loom.

According to my invention, also, the combing of the chenille or fur after it is laid in the fabric is effected by means of a double dented comb, which is connected with the breast-beam of the loom, or its equivalent at the front of the loom in front of the fell of the fabric being woven.

The invention consists of certain combina-

tions of mechanical devices, which are recited in the claims at the close of this specification. In order that they may be fully understood, I have represented in the accompanying drawings, and will proceed to describe the principal parts of a loom in which I have embodied the said combinations in the best form at present devised by me for practical use, it being understood that the various devices and the mechanism for imparting motion to them may be varied as circumstances or the views of different constructors or owners of looms may deem expedient.

Figure 1 of the said drawings represents a view of the front of the said loom with certain parts removed in order to permit others to be more clearly seen. Fig. 1^a represents a rear view of certain parts of the let-off mechanism. Fig. 1^b represents a side view of parts of the same. Fig. 1^c represents a top view of parts of the same. Fig. 2 represents a plan of the said loom. Fig. 3 represents a view of the right-hand side of the said loom. Fig. 4 represents a view of the left-hand side of the loom. Fig. 5 represents a vertical transverse section of the loom. Fig. 5* represents a view of one of the picker-levers and its wiper. Figs. 6 and 7 represent in detail, in elevation, and in section the means of revolving the traverse-cam of the fur-carrier or finger which lays the fur in the shed. Fig. 8 represents a view in detail of the cam for operating the lay, and of the parts of the lay upon which said cam acts. Fig. 9 represents a view of the cam by which the rise and descent of the comb is controlled, and of the lever upon which that cam acts. Fig. 10 represents a view of the cam by means of which the forward and backward movements of the comb are controlled, and of the lever upon which that cam acts. Fig. 11 represents a view of the let-off cam and the lever upon which it acts. Fig. 12 represents a view of the cam by which the turning of the beak of the fur-carrier is controlled, and of the lever upon which that cam acts. Fig. 13 represents a side view of the heddle-cam and treadle of the heavy or jute warp of the body of the fabric. Fig. 14 represents a view of the heddle-cam and treadle of the light or cotton warp of the body of the fabric. Fig. 15 represents a view of the cam for operating the

needles of the catcher-warp, and of the treadle upon which that cam acts. Fig. 16 represents a side view of the finger or fur-carrier and its appurtenances, some of which are represented in section. Fig. 17 represents a section through the axis of the fur-carrier. Fig. 17* represents a top view of part of the fur-carrier with the shank of the spring-holder in section. Fig. 18 represents a rear view of the said fur-carrier. Fig. 19 represents a top view of the said fur-carrier. Fig. 19* represents a top view of a modification thereof. Fig. 20 represents views of one of the clutches of the beak-turner through which the fur-carrier is rocked on its axis. Fig. 21 represents a view of the head of the fur take-up. Fig. 22 represents in detail a plan of the fur-carrier and means for turning its beak. Fig. 23 represents a top view of the upper end of the fur take-up and its guide-bracket. Fig. 24 represents a rear view of the comb and its connections. Fig. 25 represents a side view of the same. Fig. 26 represents a top view of the same. Figs. 27, 28, and 29 represent views in detail of the comb and its appurtenances.

The frame of the loom represented in the accompanying drawings is constructed in the usual manner, and it is fitted with a cam-shaft, A, which is caused to revolve by power transmitted through a driving-belt to the driving-pulley A', mounted upon the driving-shaft A², which is connected with the cam-shaft A, through the intervention of the pinion B, intermediate wheel, B', pinion B², and wheel B³, the last of which is secured to the cam-shaft A, while the intermediate wheel, B', and pinion B² are secured to a counter shaft, A³. The said cam-shaft carries the various cams by means of which the requisite movements are imparted to the devices for operating the warp-threads, filling or weft threads, and the chenille or fur. I prefer to form the body of the fabric of jute, hemp, or other heavy warp-threads, and cotton or other light warp-threads combined with a jute filling or weft thread, which is introduced into the shed of warp-threads by means of a shuttle. The heavy warp-threads are wound upon a warp-beam, C, at the rear of the loom, and the warp-threads are conducted from this warp-beam over a whip-roll, C', and thence forward, through the eyes of the heddles, to the cloth-making point, and to and over the breast-beam D. The light warp-threads are wound upon a second warp-beam, C², at the rear of the loom, and are conducted thence over a whip-roll, C³, forward, through the eyes of the heddles, to the cloth-making point and to and over the breast-beam D.

Each of the warp-beams is fitted with a let-off mechanism of the usual description, which, being well known, need not be described, and the several let-off mechanisms of the loom are operated by the cam C⁴, (seen more clearly in Fig. 11,) which cam is secured to the cam-shaft A. The heddles for operating the heavy warp-threads are raised and depressed by

means of the cam E, (seen more clearly in Fig. 13,) which operates upon the respective leaf of heddles through the intervention of the lever *e*, the rod *e'*, and the lever-beam *e''*, Fig. 2. The heddles for operating the light warp are raised and depressed by means of the cam E', (seen more clearly in Fig. 14,) through the intervention of the lever *e'*, rod *e'*, and lever-beam *e''*.

The shuttle for the filling of the ground fabric is carried by the lay F in the usual manner, and is driven to and fro in the shuttle-race by the picker-staffs F' F', one for each side of the loom, each picker-staff being moved to throw the shuttle by a wiper, *f*, Fig. 12, which operates upon the picker-staff through the intervention of the treadle *f'* and strap *f''*, the said strap being passed over a pulley to change the direction of movement, and the picker-staff being returned by a spring, *f'''*. The lay F of the loom is caused to move toward and from the breast-beam by means of the cams F², (seen more clearly in Fig. 8,) each of the said cams being fitted with two sets of grades, one set, *f⁴*, of which effects the forward movement of the lay by operating upon the truck *f⁵*, while the other set, *f⁶*, operates upon a second truck, *f⁷*, and effects the rearward movement of the lay. The employment of a cam to operate the lay renders the use of a crank-shaft distinct from the cam-shaft unnecessary, and the employment of two sets of cam-grades makes the movement of the lay positive both forward and rearward.

The series of needles G for holding and operating the catcher-warp threads are secured to a bar, *g*, which is raised and depressed or reciprocated at the proper times by means of the cam G', (represented more clearly at Fig. 15,) the said cam operating the reciprocating needle-bar through the intervention of the treadle *g'*, rod *g''*, rock-shaft *g'''*, rock-shaft arms *g⁴*, and rods *g⁵*, the lower ends of which last are secured to the needle-bar *g*. The catcher-warp threads are wound upon a catcher-warp beam, G², which is stationary in the loom, so that the necessity of raising and lowering the whole body of catcher-warp threads is obviated. This warp-beam is fitted with a let-off mechanism of the usual construction, which is operated by the let-off cam C⁴, Fig. 11, through the intervention of the lever *c*, rod *c'*, elbow-lever *c''*, and rod *c'''*, the last of which operates the pawl *c⁴*, Fig. 1, which acts upon the ratchet-wheel *c⁵*, of the let-off mechanism. The ratchet-wheel *c⁵* is secured to the shaft of the screw *c⁶*, which operates the wheel *c⁷*, that is secured to the catcher-warp beam G².

In order that a sufficient quantity of slack of the catcher-warp threads may be let out during the descent of the needle, and that this slack may be taken up during its ascent, a whip-roll, H, is provided. This whip-roll is held by arms *h*, which project forward from a rock-shaft, *h'*, which is fitted also with arms *h²*, that project rearward from it, and have counterpoise-weights *h³* at their ends suffi-

ciently heavy to impart the proper tension to the catcher-warp threads. This whip-roll controls the let-off motion of the catcher-warp beam in the usual manner of whip-rolls. The devices which I have used to enable this control to be effected are represented in Figs. 1, 1^a, 1^b, 1^c, and 5. The pawl c^4 of the let-off mechanism is pivoted to a sleeve or hub, c^8 , which is fitted to vibrate freely upon the shaft of the let-off screw c^6 , and the same hub is fitted with a ratchet-segment, c^9 , whose teeth are commanded by a pawl c^{10} . This pawl c^{10} projects from one end of a rock shaft, c^{11} , whose other end is fitted with an arm that is connected with the rear end of a lever, c^{12} , projecting rearward from the hub of one of the arms h of the whip-roll H. Whenever the whip-roll H is drawn sufficiently downward by the using up of the catcher-warps, the rise of the lever c^{12} lifts the pawl c^{10} out of engagement with the teeth of the ratchet-segment c^9 , thereby freeing the pawl c^4 and permitting it to vibrate downward as the rod c^3 descends. Consequently the next raising of the rod c^3 by the let-off cam C^4 compels the pawl c^4 to vibrate in a forward direction against the ratchet-wheel c^5 , thereby turning the screw c^6 and partially turning the catcher-warp beam G^2 to let off the catcher-warp. The letting off of the warp permits the whip-roll H to be raised by its counter-weights h^3 , and the lever c^{12} to be correspondingly depressed, thus lowering the pawl c^{10} into engagement with the ratchet-segment c^9 , and locking the let-off pawl c^4 from vibrating backward when the rod c is lowered. Consequently the let-off of catcher-warp is stopped until additional warp is required.

As the quantities of catcher-selvage-warp threads used in weaving vary from the quantities of the intermediate catcher-warp threads, these selvage-catcher-warp threads are wound upon spools I, (one at each side of the loom,) and each of these spools is provided with a device by which the thread is let off of the spool, as required. The requisite amount of slack of selvage-thread is given up during the descent of the needles, and is taken up during their rise by causing each selvage-thread on its way from the spool to the needles to pass through the eye of a weight, i , which descends and ascends as the needles rise and descend. The weight i is fitted with a rod, i^2 , which is passed upward through a guide-eye in the spool-holder i^3 beneath the friction device i' , which controls the turning of the spool I. Whenever the weight is drawn up too far by the gradual working up of the selvage-thread the rod of the take-up weight i comes in contact with the friction let off device i' for the spool, and raising that device permits thread to unwind from the spool.

The strand of fur or chenille is introduced into the shed by means of the reciprocating turning fur-carrier, an essential characteristic of which is that its beak may be turned so as to point in one direction when traversed from the right-hand side of the loom toward the

left-hand side thereof, and in the reverse direction when traversed from the left-hand side of the loom toward the right-hand side thereof. The turning of the beak may be effected by turning the shank or body of the fur-carrier to which the beak is secured; or the beak may be turned independently of the body or shank of the fur-carrier.

As I prefer to turn the beak of the fur-carrier with its body, the fur-carrier J is constructed, by preference, as represented more fully in Figs. 16, 17, 18, and 19, with a tubular body, j , which is fitted to turn axially in a tubular bearing, j' , forming part of the carriage j^2 , by means of which the fur-carrier is carried crosswise from one side of the loom to the other, and the body of the fur-carrier has secured to its front end the beak or nozzle j^3 , from which the fur is delivered. By turning this beak j^3 the direction in which it points may be reversed. The beak of the fur-carrier is hollow, to permit the fur to pass through it, and is curved, as represented at Fig. 19, to avoid the abrupt change of direction of the fur strand.

The beak is constructed preferably of a grooved wheel, s , and sheath s' , as by this construction the friction incident to the passage of the fur through the beak of the fur-carrier is reduced. In the operation of the loom the fur-carrier is caused to lay the strand of fur through the shed by passing from one side of the loom to the other, and while the fur-carrier is passing in the direction indicated by the arrow in Fig. 19, its beak j^3 points backward, as represented in that figure, so as to deliver the fur properly into the shed. Before the fur-carrier is caused to pass the next time across the loom, it is rocked or turned axially a half-revolution, so that the direction in which its beak points is reversed, that it may deliver the fur properly in the shed.

The beak of the fur-carrier may be turned in various ways, so as to reverse the direction in which it points. I prefer to turn the beak and body of the fur-carrier simultaneously by operating upon the rear end of the body, and the means which I have devised for the purpose are represented more particularly at Fig. 22. They consist, substantially, of two beak-turners, K K, which are arranged at opposite sides of the loom, and the fur-carrier is alternately automatically connected with them as it approaches the end of its traverse movement at the side of the loom. Each of these beak-turners consists of a clutch-head, k , secured to the rock-shaft k' , which is sustained in a bracket bearing upon the frame of the loom with the clutch-head k in such a position relatively to the fur-carrier J that the pin j^4 of a crank-arm, j^5 , secured to the rear end of the inner tube of the fur-carrier, enters the groove of the clutch-head k of the beak-turner as the fur-carrier reaches the end of its traverse movement at the side of the loom. The engagement of the pin of the crank-arm with the clutch-head connects the fur-carrier and

its beak with the beak-turner, and then the turning of the beak-turner half a revolution on its axis turns the beak j^3 and changes its direction from that in which it is represented in continuous lines in Fig. 22 to that in which it is represented in dotted lines in that figure.

In order that each beak-turner may be turned, its shaft k' is fitted with a beveled wheel, k^2 , whose teeth engage with those of a beveled segment, k^3 , which is secured to a rock-shaft, k^4 , and a cam, K' , (represented more particularly in Fig. 12,) is provided to rock the said rock-shaft k^4 in one direction, the rocking in the reverse direction, when the cam permits that operation, being effected by a spring, k^5 , one of whose ends is connected through the intervention of the rod k^7 with an arm projecting from the rock-shaft k^4 . The beak-cam K' operates upon the rock-shaft k^4 , and consequently upon the beak-turners and beak of the fur-carrier J, through the intervention of the treadle-lever k^6 , the connecting-rod k^7 , and arm k^8 . The beak-cam K' is secured to the cam-shaft A of the loom, and is so set or timed that the turning of the beak of the fur-carrier takes place in the intervals between the traverse movement of the fur-carrier, and as the two beak-turners are in this example of my invention connected by means of the beveled wheels k^2 , the segments k^3 , and the rock-shaft k^4 , the beak-turner at one side of the loom is put in the position to engage with the pin j^4 of the crank-arm of the beak when the beak-turner at the opposite side of the loom is turned to turn the beak.

When the means above described for changing the direction of the beak of the fur-carrier are employed the said beak is disconnected from the beak-turner during the first portion of the traverse movement of the fur-carrier in each direction, and remains disconnected from either beak-turner until the fur-carrier approaches the end of its traverse movement.

In order that the beak of the fur-carrier may not change its direction materially during its disconnection from the beak-turners, means are provided to hold the beak in its proper position for delivering fur in the intervals between its connection with the two beak-turners. The means which I prefer to use for this purpose is a spring, l , with a notched head, which is secured to the fur-carrier carriage in the proper position, as represented at Figs. 16, 17, 17*, to engage with pins l' , which project radially from the rear end of the tubular body of the fur-carrier J. The notched end of this spring engaging with one of the pins l' holds the beak j^3 in its proper position during the traverse of the fur-carrier; but when the beak is turned by either beak-turner the spring yields to the pressure of the pin against it, permits the beak to turn, and re-engages with the other pin l' , when the turning movement of the beak is completed.

As has been previously stated, the beak of the fur-carrier may be turned independently of its body. One mode of effecting this is

represented at Fig. 19*. In this case the tubular shank of the beak j^3 is fitted with a beveled pinion, j^{10} , whose teeth engage with those of a vibrating segment, j^{11} , which is pivoted to the body of the fur carrier. An arm, j^{12} , having at its end a friction-wheel, protrudes from the segment rearward of its pivot in such position as to strike a stop, j^{13} , secured at one side of the loom. There is a stop, j^{13} , at each side of the loom. Whenever the fur-carrier in moving in either direction across the warps has delivered the strand of fur in the shed, the continued movement of the fur-carrier in the same direction carries the arm j^{12} against the stop j^{13} , and compels the segment j^{11} to vibrate and turn the pinion j^{10} and the turning-beak (to which that pinion is secured) half a revolution, thereby reversing the direction in which the beak points and setting it for its next movement across the warp.

In order that the fur-carrier may be passed across the loom at the proper times in the operation of weaving, its carriage j^2 is moved to and fro by means of the traverse-cam J' . This traverse-cam J' operates the fur carrier carriage through the intervention of the treadle-lever j^6 , the link-rod j^7 , the elbow-lever j^8 , and the connecting-rod j^9 . The treadle-lever is provided with two friction wheels or trucks, j^{10} , which embrace the inner and outer sides of the rim of the traverse-cam J' , and in order to provide for any variation there may be in the cam-rim, and to prevent excessive play, one of the said friction-wheels, j^{10} , is connected with the treadle-lever through the intervention of a lever, j^{11} , and spring j^{12} , so that this friction-wheel is pressed against the cam with a yielding pressure.

In whichever way the construction of the fur-carrier may be modified it is essential that the delivery-surface of its turning-beak (by which is meant the "internal surface," x , Fig. 19, against which the strand of fur bears during its delivery) shall face, substantially as represented in the drawings, backward, or backward and upward relatively to the breast-beam of the loom, or to the position of the fell of the fabric being woven, because it is a peculiarity of a strand of fur when under tension that its cord portion always bears against the delivery-surface of the beak, and if this surface faces backward, (or backward and upward,) as described, the fur proceeding from the beak is delivered into the shed with its pile portion pointing backward (or backward and upward) of its cord portion, so that the pile when in the shed is in the proper position to be turned or raised erect by the action of a comb, or by the action of a suitably-constructed reed.

The fur-carrier is not required to operate at each revolution of the cam-shaft. In order that it may be operated by a cam having but two grades, its traverse-cam J' is not secured rigidly to the cam-shaft A, but is fitted to turn freely thereon, and is caused to revolve at a slower rate than the cam-shaft by means of

gearing, consisting of the cog-wheel B^4 and pinion B^5 , the first of which is secured to the fur-carrier cam J' , while the pinion B^5 is secured, by preference, to the counter-shaft A^3 .

5 When the cam of the fur-carrier is placed and operated as above described, the axis of the said cam is in line with the axis of the main cam-shaft, so that said cam does not occupy materially more space than it would if made
10 fast to said cam-shaft, but is nevertheless caused to revolve at a slower rate than the latter.

In the operation of the loom it sometimes happens that the shuttle which carries the fill-
15 ing for the body-warps stops in the shed and remains there when the fur carrier is traversed, so that the fur-carrier in its traverse movement comes in contact with the shuttle. In order that breakage may not ensue from such
20 contact, provision is made for an upward yielding movement of the fur-carrier. For this purpose the traverse-bar J^3 of the fur-carrier carriage j^2 is made round, so that the fur carrier and its carriage may rock upon the trav-
25 erse-bar in an upward direction to permit the fur-carrier to pass over the shuttle in case the latter stops in the shed. In order that the fur-carrier may be held in its proper downward po-
30 sition, with the capacity of rocking upward, as above described, the fur-carrier guide-bar J^4 is provided and the fur-carrier carriage j^2 is fitted with a guide-arm, j^{13} , which is held in contact with the said guide-bar by a spring, j^{14} . The
35 said guide-arm j^{13} and spring j^{14} are arranged at the opposite sides of the said guide-bar J^4 , and when there is nothing to prevent the regular traverse movement of the fur-carrier the said spring and guide-arm occupy the positions in which they are represented in Figs. 16 and
40 17; but whenever the shuttle obstructs the traverse movement of the fur-carrier the spring j^{14} yields and permits the fur-carrier to rock upward and pass over the shuttle.

It is expedient that the can or other holder
45 for the fur should be placed upon the floor or in some other stationary position. On the other hand, the fur-carrier traverses in a line whose distance from any stationary point varies. In order that excessive slack of fur may
50 not be made between the fur-carrier and the fur-holder by such variation, a fur take-up is provided. The form in which I prefer to construct this fur take-up is that of a rod, M , whose lower end is jointed to the fur-carriage
55 j^2 , and whose upper end, m , is fitted with an eye or guide for the fur. The upper end of this rod is passed through a hole in a guide-bracket, m' , arranged above the central point of the path traversed by the fur-carrier, and
60 as the fur-carrier traverses the fur take-up vibrates, while the length of fur between the eye at its upper end and the fur-carrier remain substantially the same. The strand of fur is guided from the fur-holder to the fur take-
65 up by means of a guide-arm, m^2 , Fig. 3, whose rear end has an eye-guide in it, through which the fur from the fur-holder is passed. Fur-

guides m^3 m^4 , Figs. 16, 17, 18, and 19, also are provided to guide the fur from the fur take-up to the rear end of the fur-carrier J .

The strand of fur which is laid in the shed
70 of warp-threads by the operation of the fur-carrier is drawn forward by a comb, and is driven up by the lay after a shoot of weft-
75 thread has been inserted, the lay being provided with an open-topped reed, as is customary in weaving chenille goods. In order
80 that the pile of chenille or fur may stand erect in the fabric, the strand of fur is combed toward the breast-beam, and the comb N , by
85 which the combing is effected, is arranged at the front or breast-beam side of the fell of the fabric being woven, and is separated from or independent of the lay, so that the necessity
90 of giving any special movement to the lay or to the reed for the purpose of causing it to raise the pile of the fabric is avoided. The
95 comb is provided with dents, as shown on a larger scale in Figs. 22 to 29, inclusive, and when my complete invention as respects the
100 comb is used the comb is constructed duplex, or with two sets of dent-plates, n n' , Figs. 22 to 29, inclusive, one of the said dent-plates, n , being connected rigidly with the comb-stock
105 n^2 , and the other dent-plate, n' , being connected with the comb-stock through the intervention of spring-arms n^3 , so that this second dent-plate may yield when its descent is prevented
110 by contact with the catcher-warp, or with the chenille or fur. A descending and rising movement is imparted to the comb, to cause
115 it to engage with and disengage from the chenille or fur. A rearward movement (or movement backward from the breast-beam of the
120 loom) and a forward movement also are imparted to the comb, to enable it to reach far enough backward over the fabric and warp-
125 threads to take hold of the fur, and to cause it to draw the pile of fur forward so that it may stand erect. In order that the said move-
130 ments may be imparted to the comb, the comb-stock n^2 is connected by pivots with two arms, n^4 , which project upward from a rock-shaft, n^5 . The rearward and forward movements of the
135 comb are effected by the action of the comb-cam N' , (represented more fully in Fig. 10,) and by a spring, n^6 , which operates antagonistically to the said cam. The said comb-cam is
140 secured to the cam-shaft A , and I prefer to construct its cam-grades as represented in Fig. 10, so as to cause the comb to operate twice upon
145 each shoot, strand, or crossing of fur which is laid in the shed by the fur-carrier. The comb-cam acts upon the comb-stock through the in-
150 tervention of a lever, n^7 , and a connecting-rod, n^8 , and arm n^9 , the last of which is secured to the comb rock-shaft. The descending and
155 rising movements of the comb are determined by the lifting-cam N^2 , (represented more fully in Fig. 9,) which operates upon the comb-
160 stock n^2 through the intervention of the lever n^{10} , connecting-rod n^{11} , elbow-lever n^{12} , and link-rod n^{13} , the upper end of which last is
165 jointed to the comb-stock n^2 . The hub of the

elbow-lever n^{12} is arranged, by preference, to rock upon the comb rock-shaft n^5 . The cam N^2 is arranged, by preference, to impart the upward movement to the comb, and a spring, n^{14} , is provided to operate antagonistically to the cam and effect the downward movement of the comb.

The grades of the comb-cam N' and lifting-cam N^2 are constructed, by preference, as represented in the drawings, to cause the comb to operate twice upon each strand of fur which is introduced into the fabric being woven; and I prefer to so set the cams relatively to the cams F^2 , which operate the lay, that the comb is operated to draw the fur forward before the lay drives up the next succeeding shoot of weft-thread, and that the comb is operated the second time immediately after the lay has driven forward the said shoot of weft-thread. The advantage of constructing the comb duplex is that one of the dent-plates, n' , may engage in the fur pile, while the other dent-plate, n , is behind the fur pile, and consequently the drawing of the fur pile to an erect position is insured.

The various parts of the loom which have not been specially described may be constructed and operated substantially as in other looms for weaving the same class of fabrics. The forms of the various cams which are represented in the drawings are those which I have used with success, and they are adapted to allow sufficient time between the laying of the fur in the shed and its beating up for the operator to adjust the fur to the pattern of fabric, as is usually done in weaving fur-pile or chenille fabrics. The forms of the cams, however, may be varied as circumstances or the views of users may render expedient, provided the devices which the cams control are operated at the proper times for the weaving of the fabric.

I claim as my invention—

1. The combination, substantially as before set forth, of a reciprocating fur-carrier, the reciprocating needles which operate the catcher-warp threads for securing the fur, the stationary warp-beam for the said warp-threads, and the yielding whip-roll over which said warp-threads are passed between the said warp-beam and the said needles.

2. The fur-carrier constructed, substantially as before set forth, with a turning-beak, the

delivery-surface of which is faced backward from the breast-beam of the loom, whereby the fur strand is laid in the shed with the pile in the proper direction to be combed to an erect position in the fabric.

3. The fur-carrier constructed, substantially as before set forth, with a turning-beak fitted to turn axially of its body.

4. The combination, substantially as before set forth, of the fur-carrier constructed with a turning-beak whose delivery-surface faces backward from the breast-beam of the loom with means of turning the same, whereby the direction in which the beak points is reversed.

5. The combination, substantially as before set forth, of the fur-carrier constructed with a turning-beak whose delivery-surface faces backward from the breast-beam of the loom with means for holding said beak in its proper direction during the transverse movement of the fur-carrier.

6. The combination, substantially as before set forth, of a fur-carrier constructed with a turning-beak with a wheel in said beak to facilitate the passage of the fur.

7. The combination, substantially as before set forth, of the fur-carrier constructed with a turning-beak with a reciprocating series of needles by which the catcher-warps are operated.

8. The combination, substantially as before set forth, of the fur-carrier and its transverse bar with the guide-bar, guide-arm, and spring.

9. The combination, substantially as before set forth, of the traversing fur-carrier, the fur take-up, the reciprocating series of catcher-warp needles, and the cam which operates said needles after a single movement of the fur-carrier across the loom.

10. The duplex comb constructed, substantially as before set forth, with two dent-plates.

11. The combination, substantially as before set forth, of the dent-plate of the comb with the comb-stock by means of spring-arms.

In witness whereof I have hereto set my hand this 29th day of December, A. D. 1885.

HALCYON SKINNER.

Witnesses:

HAROLD BROWN,
CHAS. E. POWELL.