

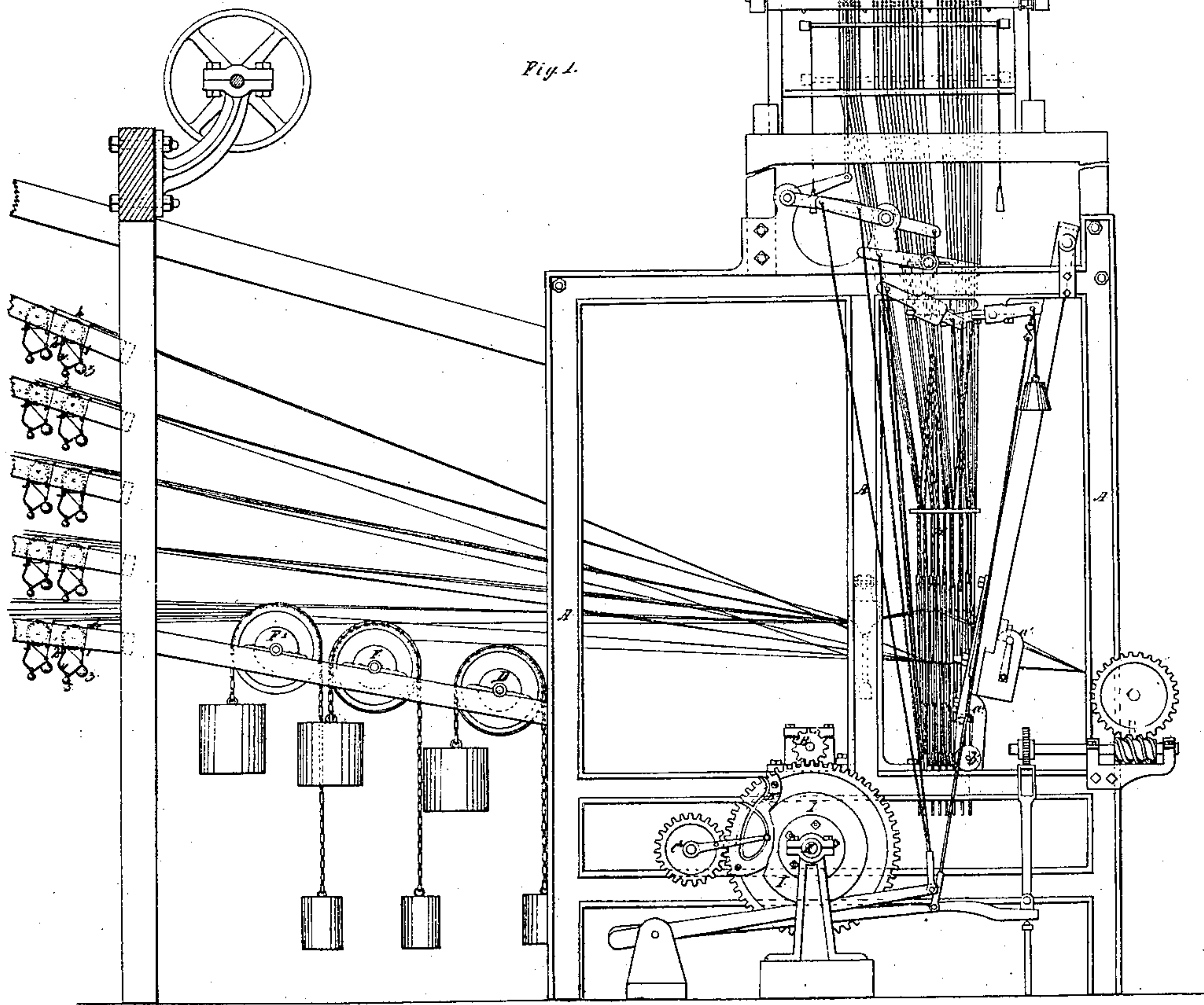
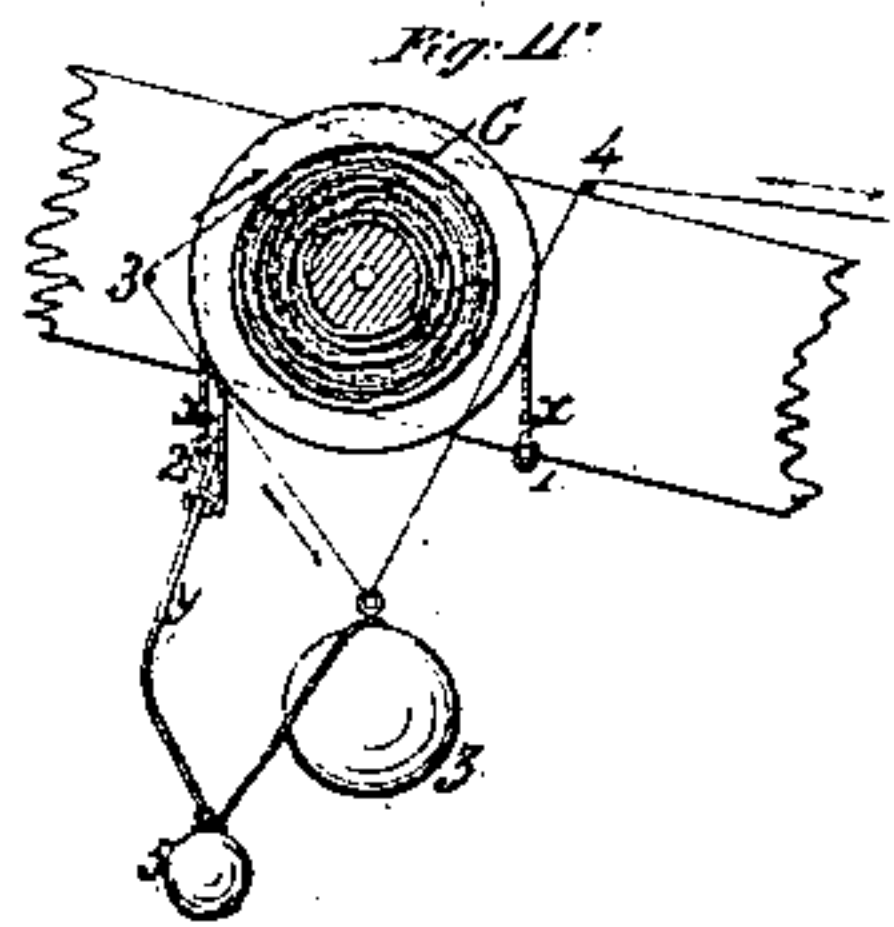
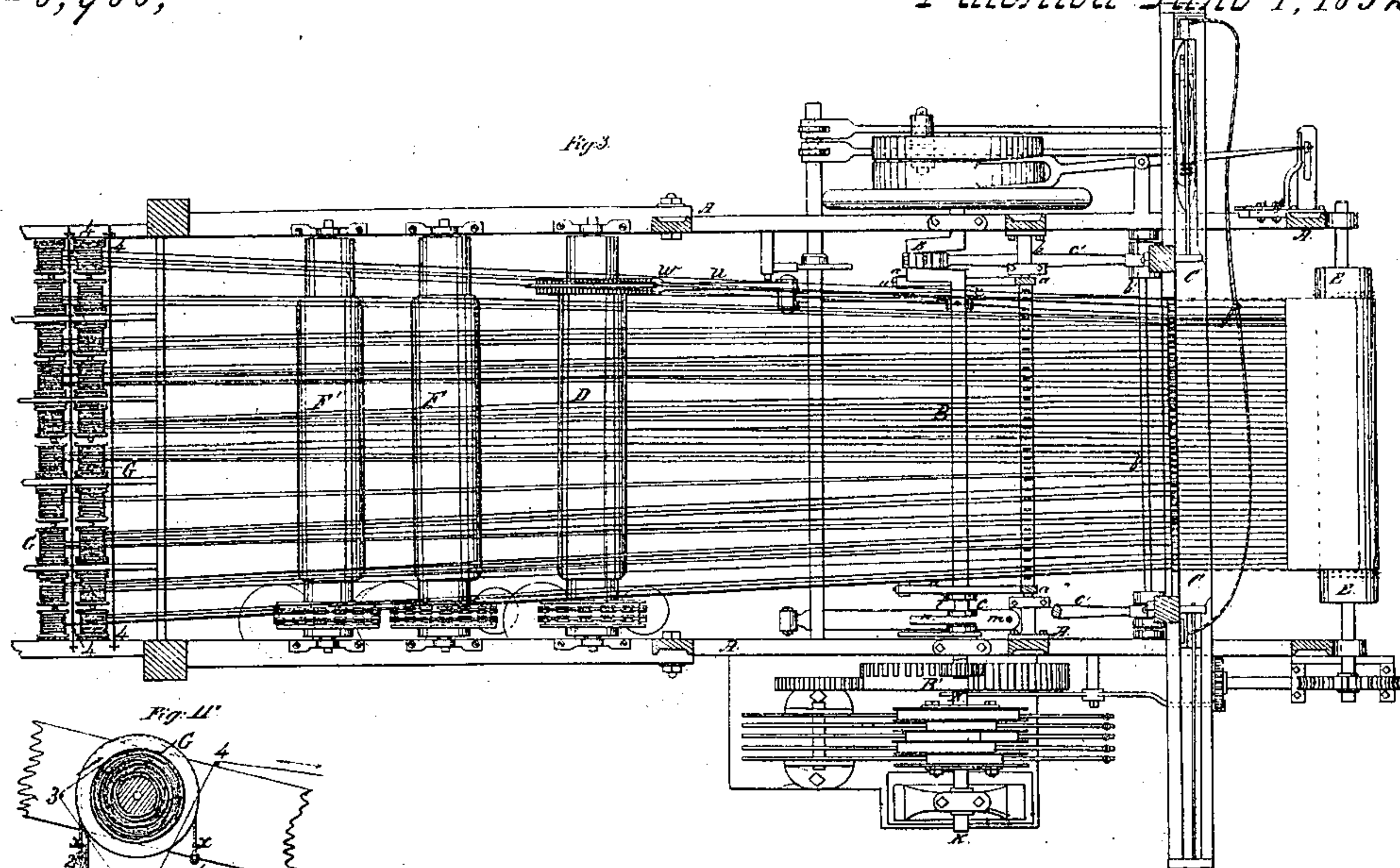
R. W. Sievier,

4 Sheets-Sheet 1.

Loom,

No 8,988,

Patented June 1, 1852.

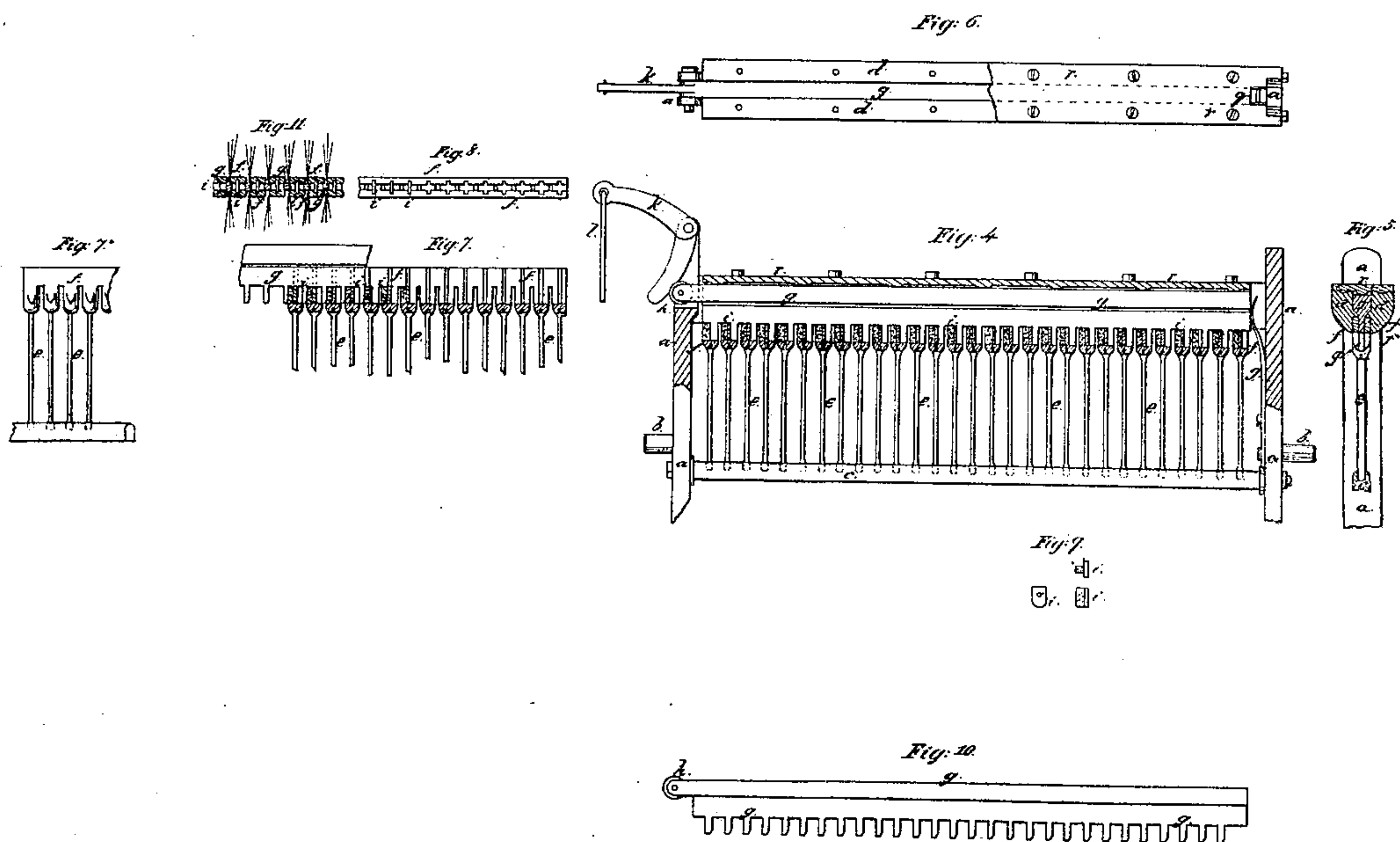
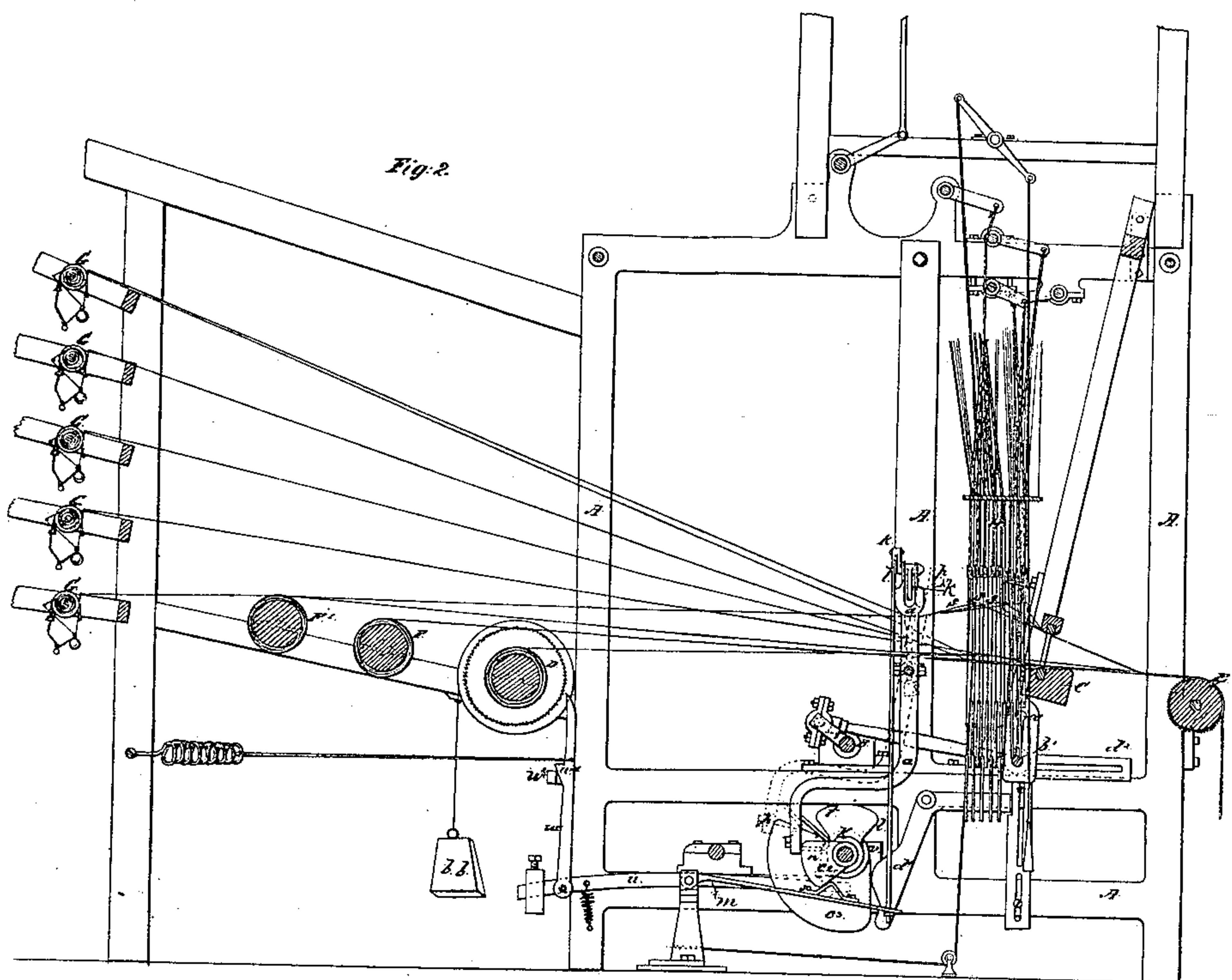


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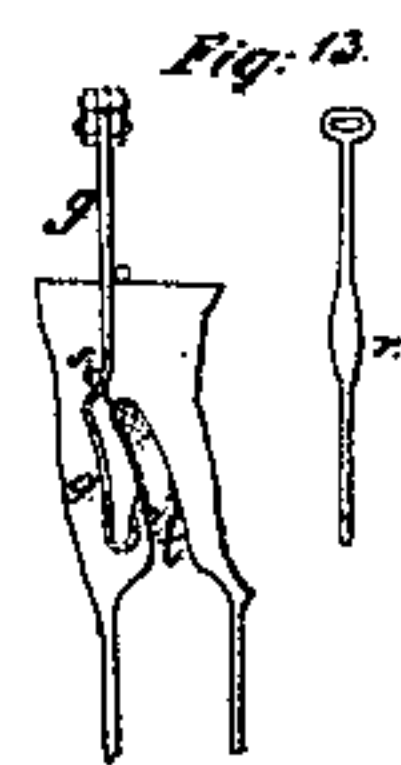
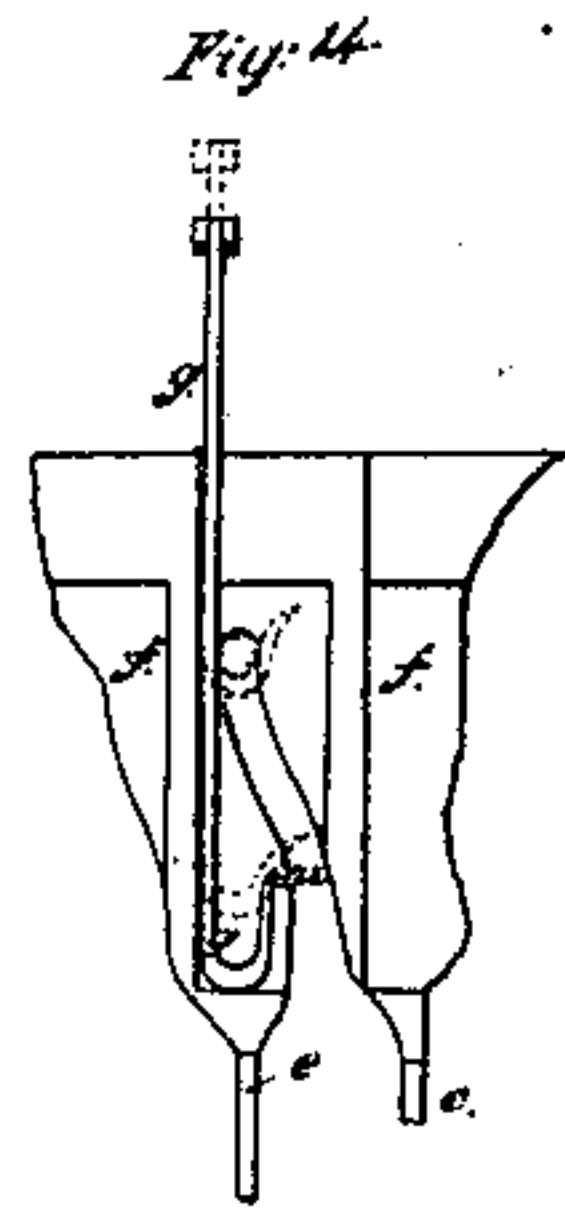
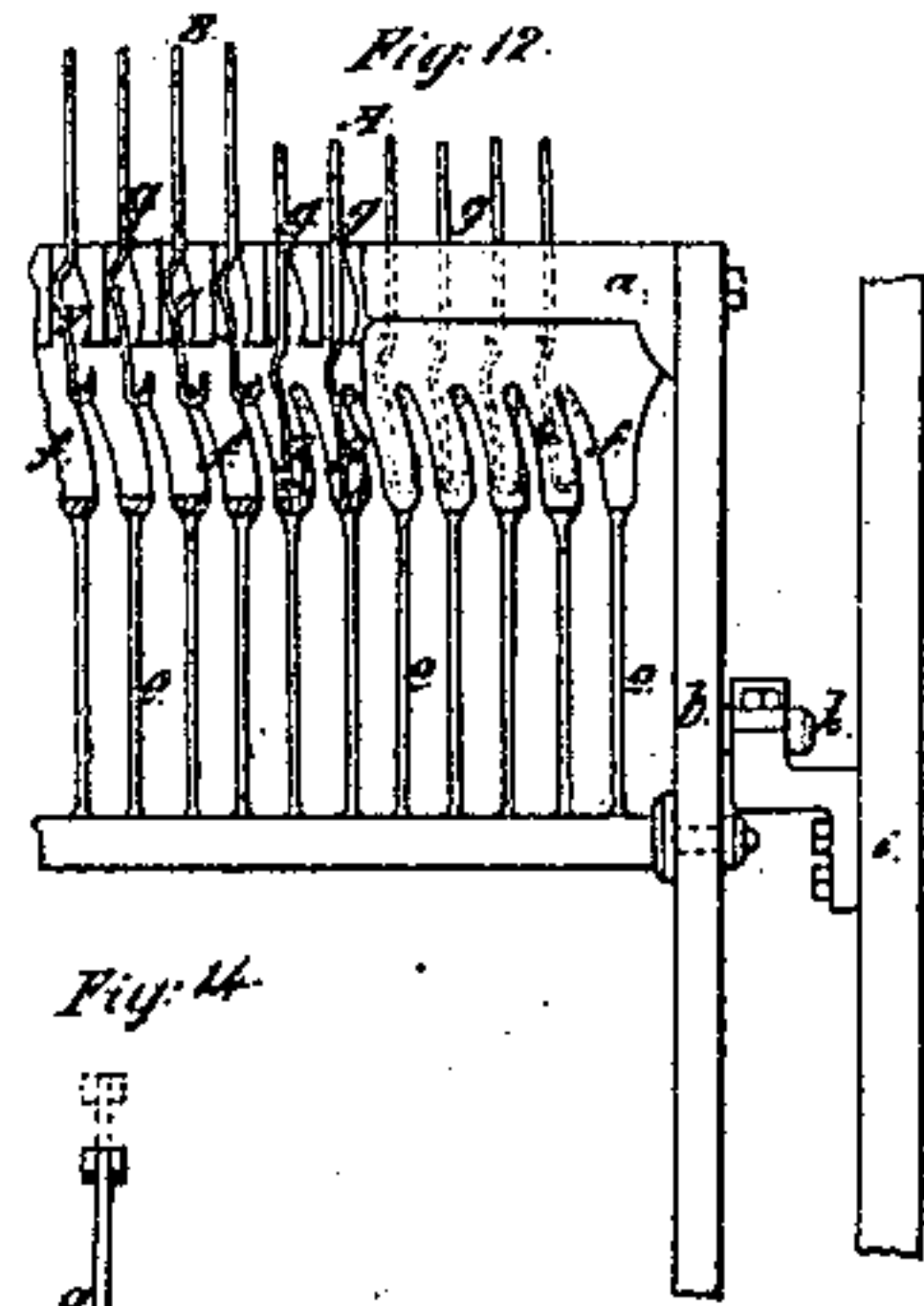
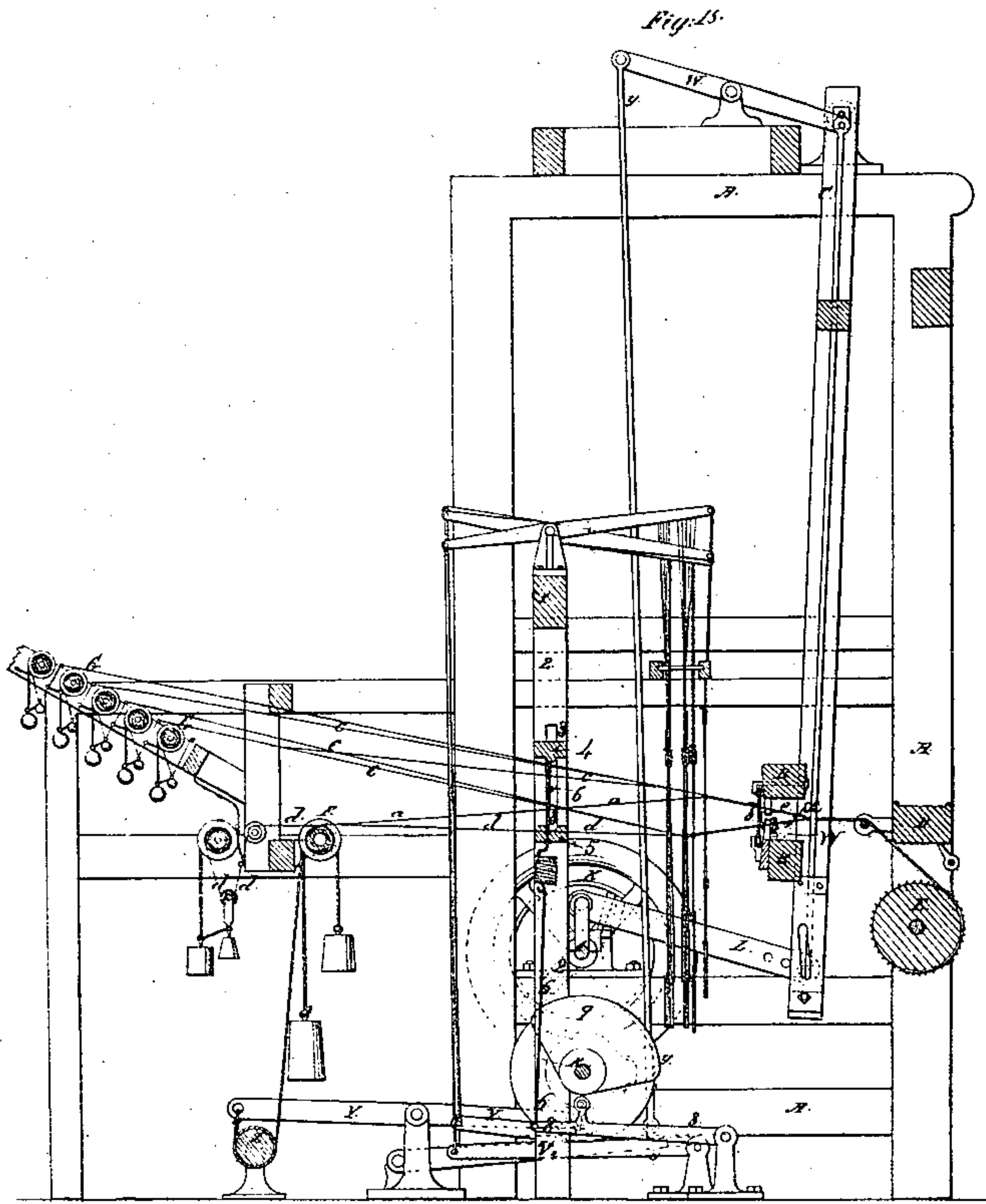
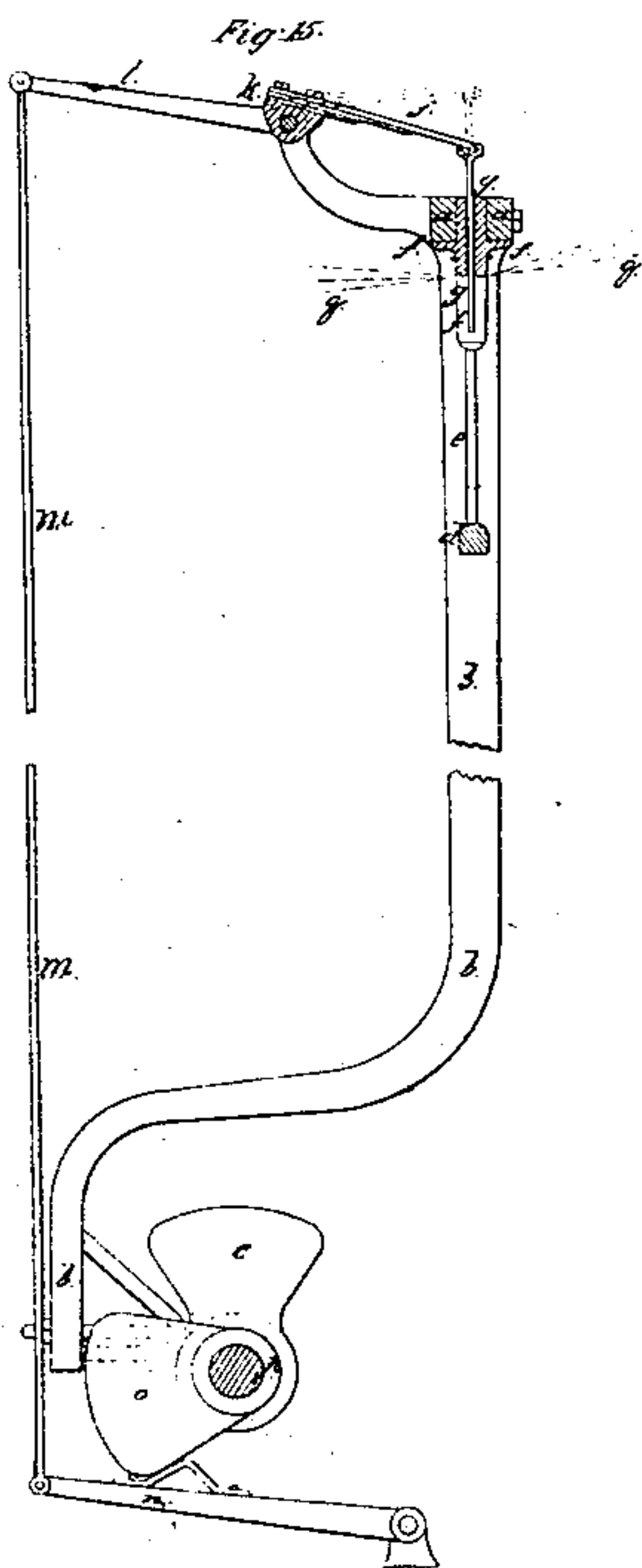
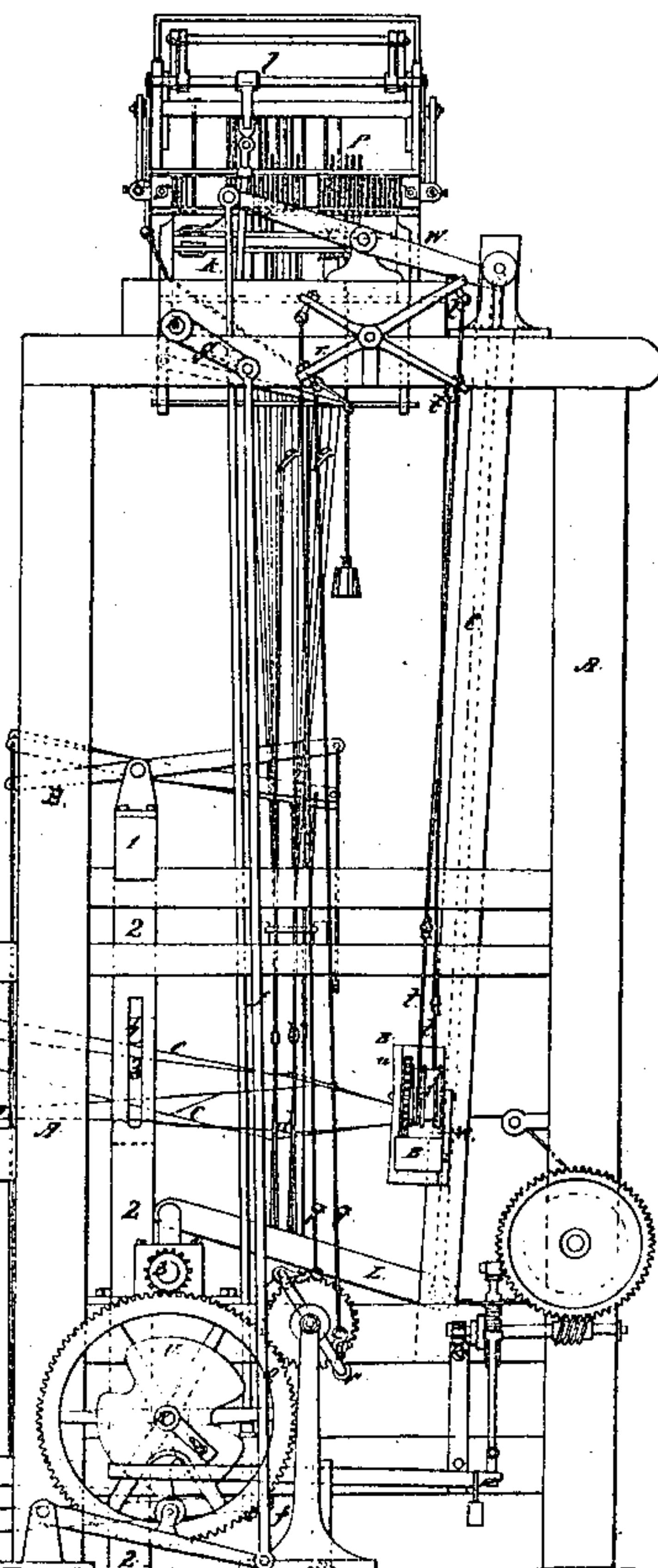


Fig. 11



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Fig. 19

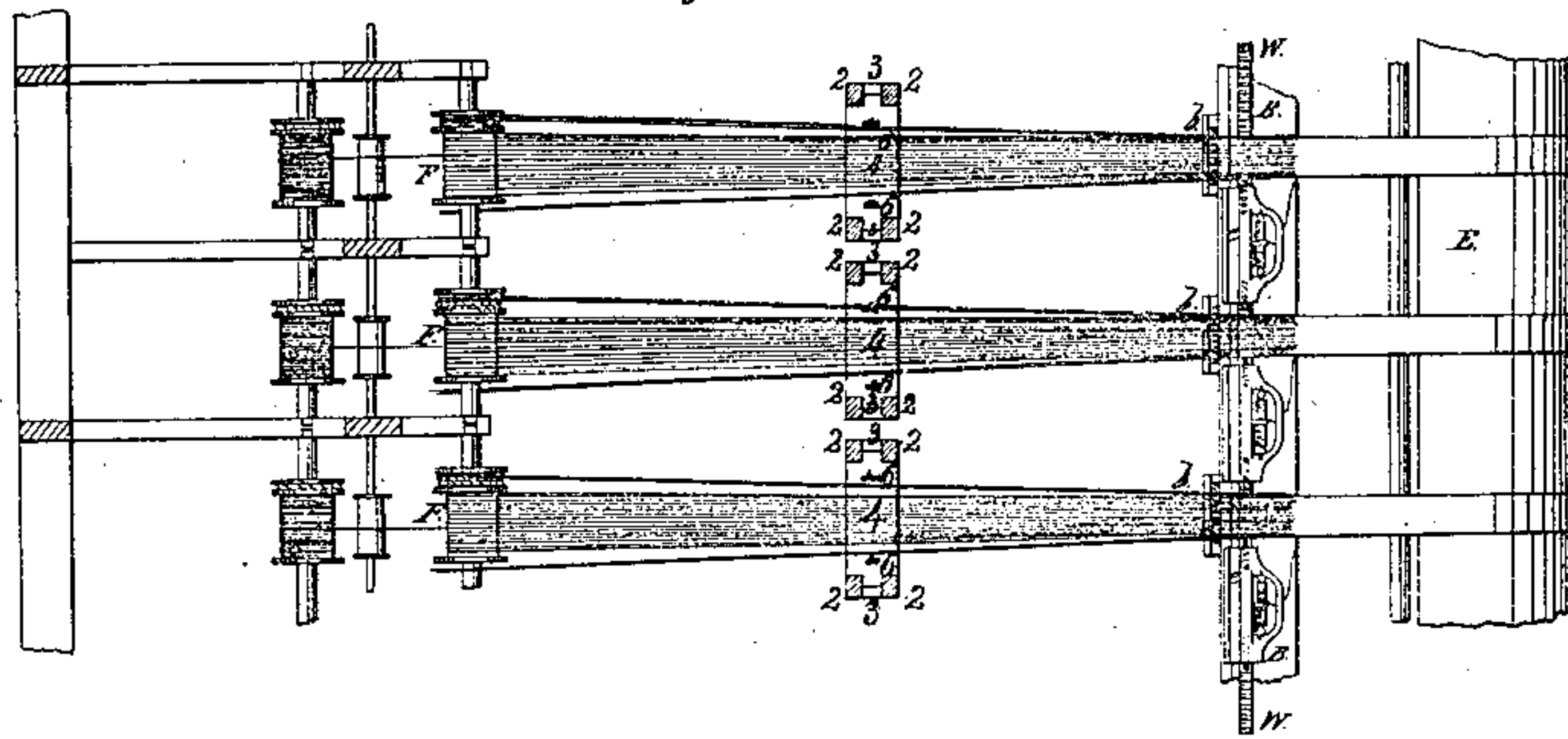
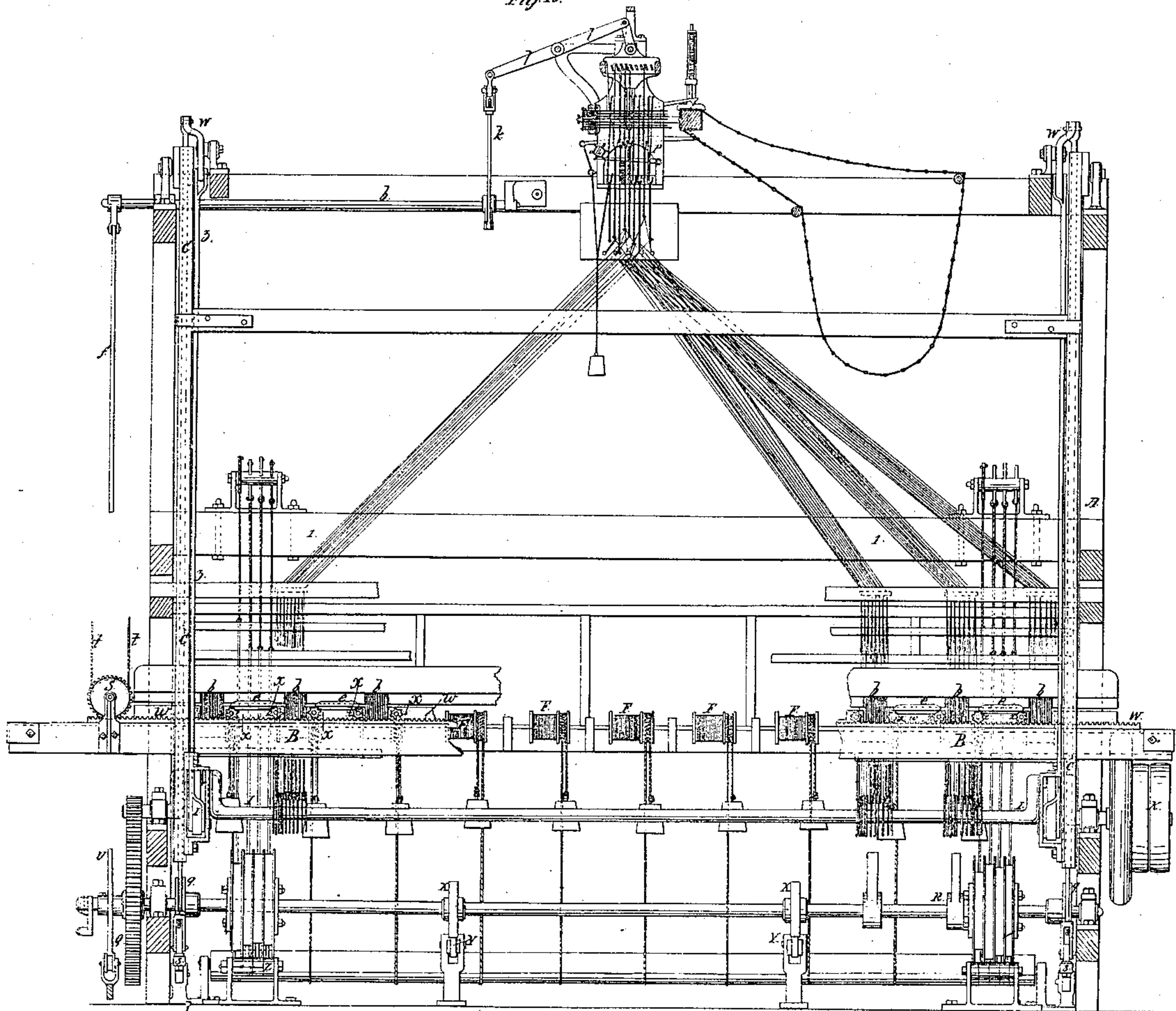


Fig. 16



UNITED STATES PATENT OFFICE.

R. W. SIEVIER, OF CAVENDISH SQUARE, ENGLAND.

LOOM FOR WEAVING PILED FABRICS WITHOUT THE FIGURING-WIRES.

Specification of Letters Patent No. 8,988, dated June 1, 1852.

To all whom it may concern:

Be it known that I, ROBERT WILLIAM SIEVIER, of Henrietta street, Cavendish Square, in the county of Middlesex, in the Kingdom of England, gentleman, a subject of the Queen of Great Britain, have invented Improvements in Looms for Weaving and in the Mode or Method of Producing Plain or Figured Goods or Fabrics; and I do hereby declare that the following is a full and exact description of my said invention.

My invention consists firstly in a peculiar mode of producing and raising the terry or loops of such fabrics as Brussels carpeting, coach lace, velvets or other similar fabrics and which are woven by me without the aid of intervening wires or tags as commonly employed to form such terry or loops or raised surfaces and secondly in certain improvements in looms in order to render the same more capable of effecting that object.

The mode by which I produce the loops or terry is in the first place by partially beating up certain picks of the shoot or weft threads as they are woven into the warps (that is, leaving a considerable space between two of the picks or shoots) and that following with a number of close shoots and after that has been done sliding or driving the whole of these successive shoots of weft firmly up upon the base or foundation threads to the previously formed work by means of which the terry parts of the work occupying the space between the open picks will be puckered up in loops on the surface of the fabric and form that raised portion of the warp heretofore produced by passing those parts of the warp threads over transverse wires or elevated ribs of metal or other materials.

In effecting the above object it will be necessary to hold such portions of the warps as are required to form the loops or terry and also to tighten the ground warps or draw threads while the slay is beating up the weft to make fast or secure the terry loops. By means of these contrivances I am enabled to employ from two to seven or more frames containing any convenient number of bobbins as arranged in common for weaving coach lace carpets or figured velvets and similar fabrics.

Another feature of the loom consists in weighting the bobbins in order to keep an

equal tension upon the threads during the operation of weaving. By reference to the accompanying drawings I shall be enabled to explain clearly how these improvements are effected and by what mechanical means.

In the drawings hereto annexed Figure 1, Plate 1, represents an end elevation of my improved loom completed and suited for weaving carpets or figured fabrics. Fig. 2, Plate 2, is a sectional elevation of the same taken a short distance within the side framing. Fig. 3, Plate 1, is a horizontal section of the same loom taken a little above the level of the shuttle race in which similar letters of reference point out the same part of the loom and its appendages.

Presuming the general features of a loom worked by rotary power to be well understood I do not think it necessary to describe all its details; it will therefore be sufficient to say A A in Fig. 1, Plate 1, points out the framework or standards. B is the main rotary axle actuated from any first mover. Upon this shaft is the crank that works the batten C.—Fig. 1, Plate 1. The beam D Fig. 1, Plate 1, carries one of the foundation warps or what I have called the draw threads. The beam E, Fig. 3, Plate 1, is the breast roll. FF' Fig. 3, Plate 1, are beams carrying binding threads and G. G. G. Fig. 3, Plate 1, are bobbins containing the warp threads for producing the surface figures. H Fig. 1, Plate 1, is the mounture or harness through which the warps pass and by which the figuring warps are raised and depressed through the agency of a jacquard the draw and binder warps being worked by cams I Fig. 1, Plate 1, upon the shaft K, Fig. 1, Plate 1.

Having thus generally described the loom I proceed to point out those parts or mechanical agents adapted thereto by which my present improvements in weaving terry goods are effected. *a, a* Fig. 2, Plate 2, represent the sides of a vibrating frame mounted by its pivots *b*, in the vertical standards of the machine as shown in Fig. 2, Plate 2. This frame is represented detached and in front view at Fig. 4, Plate 2, consisting of the two sides *a, a*, (which are bent as in Fig. 2, Plate 2), connected by a transverse rail *c* at bottom and two rails *d, d*, above (seen best in the section Fig. 5, Plate 2, and horizontal view Fig. 6, Plate 2). Into this bottom rail *c*, are inserted a series of vertical rods *e, e, e*, which are screwed at top

into a notched bar f , f , confined between the rails d , d , as shown at Fig. 5, Plate 2. The peculiar form of the notched bar f , will be seen in the two detached Figs. 7 and 8, Plate 2, the latter of these represents the bar f , as it would appear in a horizontal view taken on the upper side, the latter is a vertical section of the bar taken through the middle of it longitudinally and Fig. 7, Plate 2, shows a part of the notched bar externally. The transverse notches seen in the upper side of the bar f , at Fig. 8, Plate 2, are intended to receive a series of small iron plates i , shown detached in three positions at Fig. 9, Plate 2, one side of each plate having a piece of felt or other soft substance attached to it. Fig. 10, Plate 2 is a longitudinal view of a sliding rack bar g , which is to be partially inserted into the groove in the top of the bar f , the teeth of the rack g , being in the groove between the plates (i) in the bar as partially shown in Fig. 7, Plate 2. The rack bar g is intended to move longitudinally its ledges bearing upon bevels in the inner sides of the bars a , a , and at the end of the rack bar there is a small antifriction roller h , working in a slot in the end of the frame a , to relieve the friction of the double armed or bell crank lever k . This lever k is acted upon by a rod l , (see Fig. 2) Plate 2, connected to a lever m , below which is worked by a rotary cam n , on a transverse shaft K by the depression of the lever m .—rod l , and bell crank lever k .—the rack bar g , is slid toward the right and when the pressure of the lever k , is withdrawn the spring g , at the opposite end slides the rack bar back again. The parts connected with the rack are confined in their places by a cap plate r , r , (see Figs. 4, 5 and 6) Plate 2.

Having now described the mechanism by which I effect the holding of the threads to form the terry I proceed to explain its mode of operating. It will be understood that it is necessary to slacken certain of the warp threads for the purpose of driving up by the slay such slack threads at intervals to form loops for the terry. This object is effected by holding such selected and raised warp threads as are intended to make the terry loops and slackening such threads by bringing the holding apparatus slightly forward in order that such slackened threads may be driven up by the slay and formed into the loops. The manner of doing this is as follows—Having raised those portions of the warp threads that are to form the terry (as at s , s , s , Fig. 2) Plate 2, by the ordinary means of the jacquard or otherwise and these said threads being then by their elevated situation severally brought into the spaces between the teeth of the rack g , and the felted sides of the plates i , represented in Fig. 4, Plate 2, the rotary cam n , then

acting upon the lever m , will depress the rod l , and work the bell crank k , which will push the rack g , (see Fig. 4, Plate 2), toward the right and cause the said threads to be severally pinched and firmly held between the teeth of the rack and the felted plates as shown in Fig. 11, Plate 2. When this taking hold of the threads has been effected, it is necessary to slacken them toward the breast beam for the purpose of affording the means of forming the terry loops, which is done by the rotary cam t , on the shaft K , acting as it comes around against the bent or tail end of the frame a , and throwing the frame into the situation shown by dots at p in Fig. 2, Plate 2.

At the time that the figuring warps are to be driven home to form a range of loops, the picks that have been thrown at a distance from the last formed range of loops are caused to slide on the foundation warps from the beam D , and to insure this sliding, these warps at this time must be drawn and held tight, and as at all other times they are only held by the force of a weight b , b , hung to a cord around a pulley on the beam, that the warps may be readily drawn off by the pull of the take up motion on the cloth, an additional mechanism is brought into action at this time to turn back the beam and draw these warp threads tight and keep them so during this beat of the slay. This is done by a cam a^2 on the shaft k , which comes in contact with one end of a lever w the other end of which is jointed to a hand w which engages the teeth of a ratchet wheel on the beam D and there holds it until the beat of the slay is completed, and so soon as the cam leaves the lever w the hand is drawn down by the preponderance of a weight or spring on the outer end of the lever w —and as the hand is drawn down a cam formed projection w' on the stem of the hand comes in contact with a stud w^2 attached to the frame which disengages the hand from the ratchet teeth that the beam may be free to yield to the taking up of the cloth. If however it is desired to hold the foundation warps tight during the second pick after the loops have been made, then the cam c^2 must be so extended as to continue the lever w depressed until after the completion of this second pick.

In order to make the varying beats of the slay (first to weave in the picks at a distance from the last formed range of loops and then to beat up home these picks and form the loops and then to further bind the loops), the swords C of the slay are formed with grooves as at a' and in these forms plays a rod b' —the connecting rods from the cranks of the slay shaft take hold of the rod b' so that when this rod is lifted up to the upper end of the grooves a' the slay will be carried forward to a greater

distance than when at the bottom of the grooves. The up and down motion of the rod b' is effected by levers d' (one on each side) one arm of which is acted upon by a cam c^3 on shaft k represented at Fig. 2, Plate 2, the other arm of the said levers being jointed to or acting on slides d^2 grooved as before stated for the rods b' to work in.

A mode of giving at all times an equal tension to the bobbin carrying the terry threads is effected by the following means—At the back part of the loom shown in Fig. 2, Plate 1, the axles of the bobbins G, G, G , hang in frames ranged one above another. Each bobbin has a pulley or groove formed at its side and a weighted cord passed over it in order to produce sufficient friction to hold the warp thread with a suitable tension. The auxiliary Fig. 11, Plate 1, represents one of these bobbins and its appendages upon an enlarged scale. The tension cord x is fastened to a staple under the frame at 1. and passes thence over the pulley of the bobbin and is at its other end attached to a wire Y at 2. which wire (or it may be a continuation of the cord) is passed through the eye of a staple fixed in the frame and a wire y is weighted at bottom which draws the cord tight around the bobbin. The thread from the periphery of the bobbin is carried over a transverse wire fixed in the frame in the direction of the arrows at 3. and thence is passed through an eye in the weight z . and then led onward over a transverse wire 4. at top of the frame from whence it proceeds through the harness which arrangement will be found to give at all times equal tension to the threads.

The action of the bobbins is as follows, as the warp is taken up in the direction of the arrows by the weaving the weight Z is drawn up and when it is of sufficient height to raise the smaller weight 5. which is attached to it by a string it relieves the tension of the band x . over the pulley or groove in the edge of the bobbin and allows a sufficient quantity of warp to be unwound by the gravity of the larger weight Z . It is not absolutely necessary to use the wire y . as the string or any fibrous band may be made to continue from the staple 1. over the pulley on the bobbin to the weight 5. but I prefer the use of the wire.

In order that the weaver may have every facility to make the fabric according to this specification I will state what course of shoots of the weft and what are the lifts of the warp necessary to form such a fabric as what is technically termed a "five framed carpet" not in any way confining myself to these ties as it is in the power of the weaver to vary the shoots or lifts according to the appearance he wishes to give to the face or back of his work.

The first shoot of the weft is made with that part of the figure warp raised which is to constitute the next row of loops or terry and with it the binder on the roll F Fig. 2 Plates 1, and 2. This shoot is the one laid at a distance from the last terry or loop as mentioned above. After this shoot the batten or stay beats it up to distance short of the last terry or loop made. This is immediately followed by the second shoot which is made with the whole of the figure warps down and the two binders F and F' up. This shoot is then driven up by the batten or stay to the one previously thrown. After this the portion of warp necessary to make the figure is drawn up in the usual way and it is held up by the action of the rack g , of the pinching or holding apparatus holding the raised warp firmly between itself and the felt on the plates marked i and seen best in Figs. 2 and 11, Plate 2. It now becomes necessary to slacken that portion of the figure warp which is held by the pinching apparatus for the purpose of forming the terry or loop. This is effected by the cam t , which acts against the bent arms $a-a$ and forces their lower ends backward and by that action the upper part comes forward and the figure warp threads are slacked toward the breast beam then the batten drives up the two shoots above mentioned, home to the last woven terry or loop thereby forming an additional loop or terry. It will be necessary that the draw threads on the roll D should be tightened while the above mentioned two shoots are being driven home which is effected in the manner before described, Fig. 2, Plate 2, so as to facilitate the raising of the terry or loop as before mentioned. During this action of the loom the shuttle is at rest and does not pass through the warp as there is a portion of the wheel B^* (See Fig. 23, pl. 1) which is not furnished with teeth consequently the shuttle shaft C^* which is actuated by this wheel stands still during this operation.

In the fourth operation of the loom the warps are all raised up excepting the binder warp on the roller F and the shuttle now passes through the shed and the weft is beaten up home so as to secure the terry or loops just completed. The rack bar which has been holding that portion of the figure warp which forms the terry is now released from the cam n and the spring g Fig. 1, Plate 2, forces it back to its former position and the figure warp threads are then released and the pinching apparatus returns to its former position.

In the fifth operation that portion of the figure warp is to be raised up that is intended to form the next row of loops or terry, the draw threads are also raised with it and the shoot or weft now passes under them both and the batten or stay beats it up home

by one or more blows if necessary. This I call a clearing shoot as it clears the row of loops for the commencement of a fresh row of terry or loops. I have now described the mode of forming a complete row of terry or loops which may be continued at pleasure so as to form any length of carpet or other terry or looped fabric.

In the small ware loom for weaving coach lace and narrow goods where a terry or looped figure is desired the pinching or holding apparatus is constructed upon a different plan to that above described but with certain modifications may also be employed for weaving carpets. In this loom the mode of pinching or holding the threads produces the slack upon the warp, and is to make the terry or loop in a totally different manner, and is effected in the following way. I will describe in the first place the loom generally, and then more particularly the pinching apparatus, and its action in the loom. A A Figs. 16, 17, 18 and 19 represents the framework of the loom, B is the batten, C the fiddlestick, D the breast beam, E the work or roll, F the draw thread warp roll, I the crank shaft, K the driving pulley, L the crank lever for communicating the motion from the crank shaft to the batten, P the jacquard apparatus, Q the tappet wheel for driving the tappet shaft R, S the toothed wheel for working the rack *w* which moves the shuttles *l* by means of the pinions *x* as best seen in front view Fig. 16. X is the cam on the shaft R which depresses the lever Y at its inner end and elevates the opposite end to which is attached a cord or chain for tightening the draw threads; *a, a*, are the draw threads, *b, b*, the slays or reeds through which the warps pass, *c, c*, the figure warps, *d, d*, the binder warps, *e* the shuttles, *f* the rod worked by the cam U, which moves the lever *g*, attached to the shaft *h*, which by means of another lever gives motion to the rod *k*, attached to one end of the lever *l*, which works the jacquard, all of which is clearly seen in the front view, Fig. 16.

Having given a general description of the loom, I will now proceed to explain the modifications which I have contemplated of my improvements as regards the pinching or holding apparatus: In Fig. 18 Plate 3 I represents a horizontal beam extending the whole width of the loom, and 2, 2, are uprights mortised into this beam as seen in Figs. 18 and 19. These uprights have slots 3 cut in them (as seen in Fig. 18) for the purpose of receiving the ends of a movable piece 4, to the ends of which springs or cords 6, 6, are attached, (best seen in Figs. 18 and 19). These cords are furnished with helical springs 7 for the purpose of giving them a slight degree of elasticity. The lower ends of the cords are connected to the

levers 8, 8 (see Fig. 18) which are acted upon by a cam 9 on the tappet shaft. Immediately beneath the movable pieces 4, 4, are fixed stationary cross pieces 5, 5, which are furnished with semicircular grooves for the purpose of receiving a projecting rib formed on the under side of the movable pieces 4, 4, as seen best in the cross section. The action of this apparatus is as follows: Suppose that portion of the pattern part of the warp which is intended to form the terry or loops has been drawn up by the jacquard apparatus as seen in Fig. 16; the movable piece 4 is brought down between the uprights 2, 2, onto the top of the stationary piece 5, by means of the rotation of the cam 9 depressing the lever 8. The effect of this will be that the pattern warps will be pulled down into the stationary pieces 5, and consequently as the jacquard keeps the pattern of the warp up, while the whole of the warps are being punched, it follows that this part by being bent out of a straight line will be longer than that which more nearly approaches a straight line; then the jacquard being lowered (by a portion of its cam being cut away to effect that object) the formerly raised portion of the pattern warp becomes slack and admits of its being driven up to form a terry loop in the same way as in the carpet loom before described. The spring 7 by its elasticity prevents a heavy pinch from cutting or breaking the threads of the warp.

I have shown in Figs. 12, 13, 14 and 15 another mode of pinching or holding that portion of the pattern warp which is required to form the terry or loop. In this plan instead of pinching the threads by means of a rack as above described, I effect this object by hooking up a certain number of the threads and holding them tight against the undersides of slots, recesses or notches formed in a bar for that purpose.

Fig. 12, represents a front view of part of a pinching apparatus a part of the front bar *a* being removed the better to show the internal construction. *b, b*, are the bent arms or side bars of a vibrating frame, and *c, c*, the cam or tappet which acts against the lower end of the bent arms; *d, d*, is the bottom rail in which is inserted a row of upright bars *e, e, e, e*, between which the warp threads are placed as in the carpet loom. The upright ends of the bars *e, e, e, e*, are attached to the lower end of the teeth of a brass notched bar *f, f, f*, the teeth of which are slit longitudinally nearly to their bottom and inclose a bent or hooked wire *g, g, g*, as seen in the figures. The vibrating frame *b, b*, is mounted on a pivot *h* connected to the frame *i* of the loom at each end, and upon which it vibrates. The hooks *g, g*, are attached to a series of springs *j* (seen in Fig. 15) which are mounted on a horizontal

bar *k*, supported in bearings attached to each end of the pinching or holding apparatus. The bar *k* is actuated by a lever *l* which is connected by means of a rod *m, m*, to another lever *n* below. This lever *n* is acted upon by the cam *o* on the tappet shaft *p*. The operation of this apparatus is as follows. When the jacquard apparatus raises a portion of the pattern warp for the purpose of forming the terry or loop it draws up those threads into the inclined notches of the brass bar *f, f*, (as seen at *g* in Fig. 15) by the dots the hooks or bent wires *g, g*, being retained or shielded within the notched bar as seen at A, Fig. 12. Then the cam *o* Fig. 15 by acting on the lever *n* depresses it and merely draws down the rod *m* and lever *l* above. This elevates the springs *j* as seen by the dotted lines and draws up the hooks *g, g*, into the position shown at B in Fig. 12, and thereby collects together and pinches up the warp threads against the end of the notch so as to hold them firmly, then the tappet shaft *p* continuing to revolve brings the cam or tappet *c* against the end of the vibrating arm *b, b*, and forces it back thereby causing the upper end to come forward toward the breast beam and slacken the pattern warp threads in the same way as mentioned in the carpet loom.

Figs. 13 and 14 are mere modifications of the plan just described. In Fig. 13 the hook is made of steel wire but is flattened in a part of its length as seen at *r* for the purpose of giving greater flexibility so as to allow the bent part of the wire to pass the projecting stud *s* easily which it must do so as to bring the hook into the position shown by dots for the purpose of taking up any straggling thread of the warp. Fig. 14 represents a hook at the end of a straight shaft of wire having its pointed end much thinner and very flexible so as to be easily pushed back by the stud *u*. When the hook is raised it assumes the shape and position shown by dots for the purpose of catching and gathering up straggling threads as in the former instance.

I would observe in conclusion that the carpets or other fabrics produced by the above described machinery may be either figured in many colors by means of the jacquard apparatus or they may be simply

made with a terry loop with one uniform color and in that case the terry or loop thread will be made from one bobbin or beam and when so made they may if desired be passed through a cutting shearing or cropping machine for the purpose of cutting off or removing the ends of the loops and giving them the appearance of a piled carpet or a velvet face which in plain goods may if required be block printed or painted with any pattern that may be desired.

Having now described the particular feature of my improvements in looms for weaving and the mode or method of producing plain or figured goods or fabrics I desire it to be understood that I claim as my invention—

1. The novel mode or method of producing plain or figured goods or fabrics having terry or looped surfaces of the kinds above described, by partially beating up certain picks of the shoot or weft threads and afterward further beating up or driving home those picks or shoots in order to cause certain portions of the terry warp to pucker up in loops but I do not confine myself to any particular number of picks or shoots or weft but have described a method by which my improvements in producing plain or figured goods or fabrics having a terry or looped figure may be accomplished as the number of picks or shoots of weft may be varied to produce a different appearance in the face of the fabrics woven under my patent according to the desire of the weaver.

2. I claim varying the forward stroke of the batten to produce the open or close beating up of the weft, substantially as described in combination with the apparatus for holding the surface threads or yarns and carrying them forward in the manner described or any other substantially similar means for the purpose of aiding in forming in the loom the loops of terry fabrics.

In witness whereof I the said ROBERT WILLIAM SIEVIER have hereunto set my hand this fourth day of September in the year of our Lord one thousand eight hundred and fifty.

R. W. SIEVIER.

Witnesses:

WM. TUDOR MAHLEY,
JOHN COOK.