

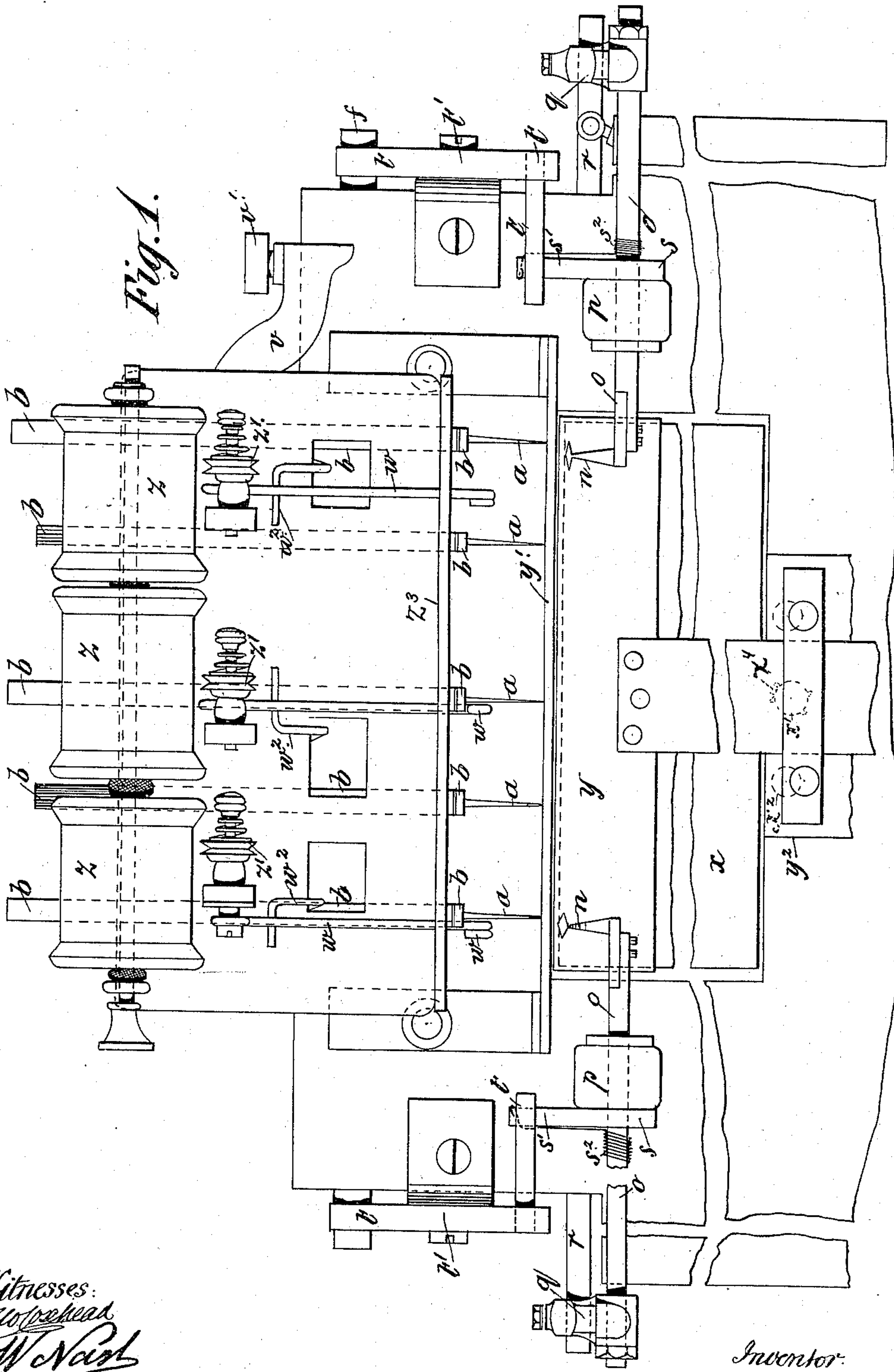
(No Model.)

7 Sheets—Sheet 1.

I. NASCH.  
MACHINE FOR SEWING BOOKS.

No. 558,832.

Patented Apr. 21, 1896.



Witnesses:  
*George H. Nash*

Inventor:  
*Isidor Nasch*

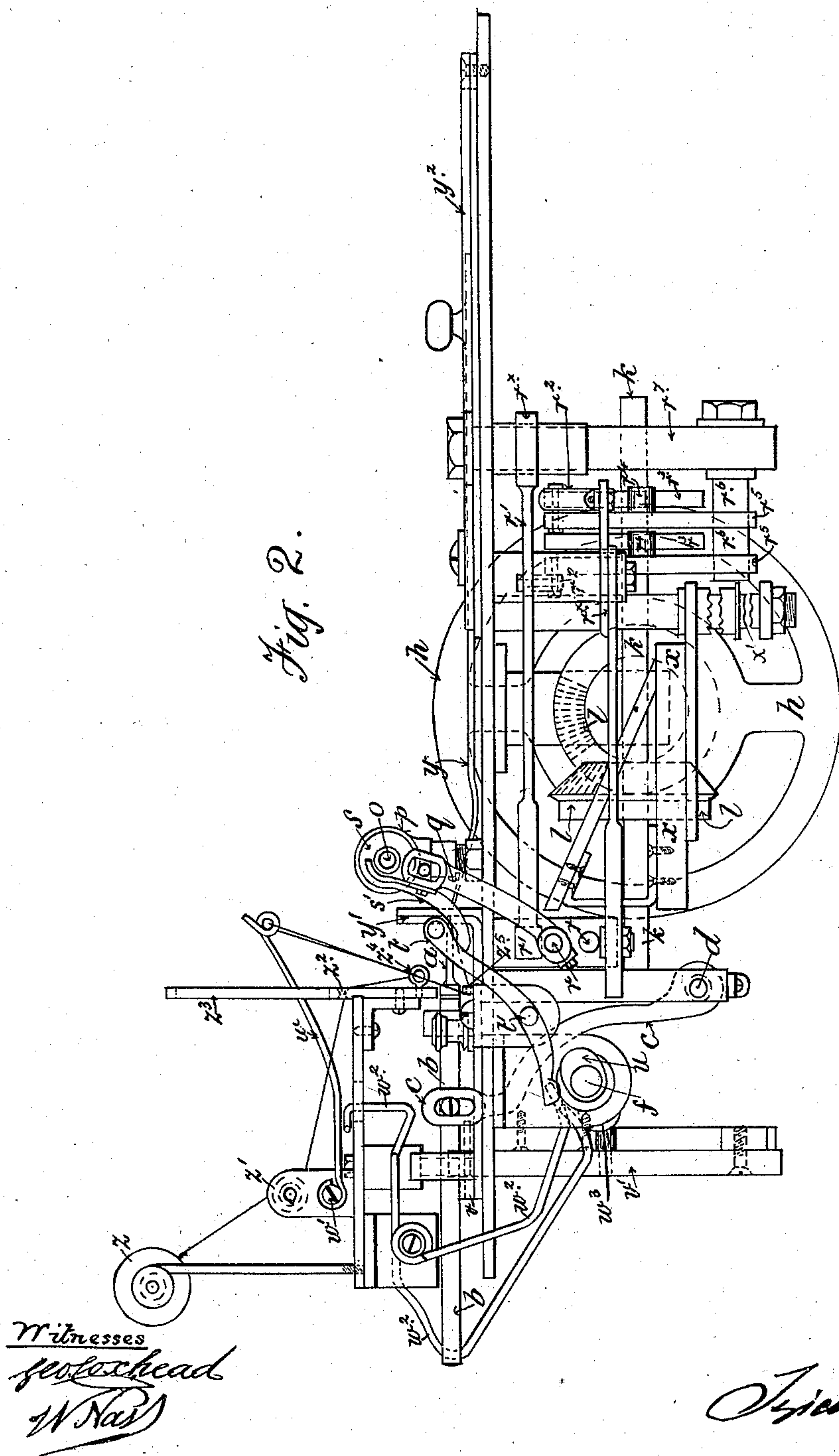
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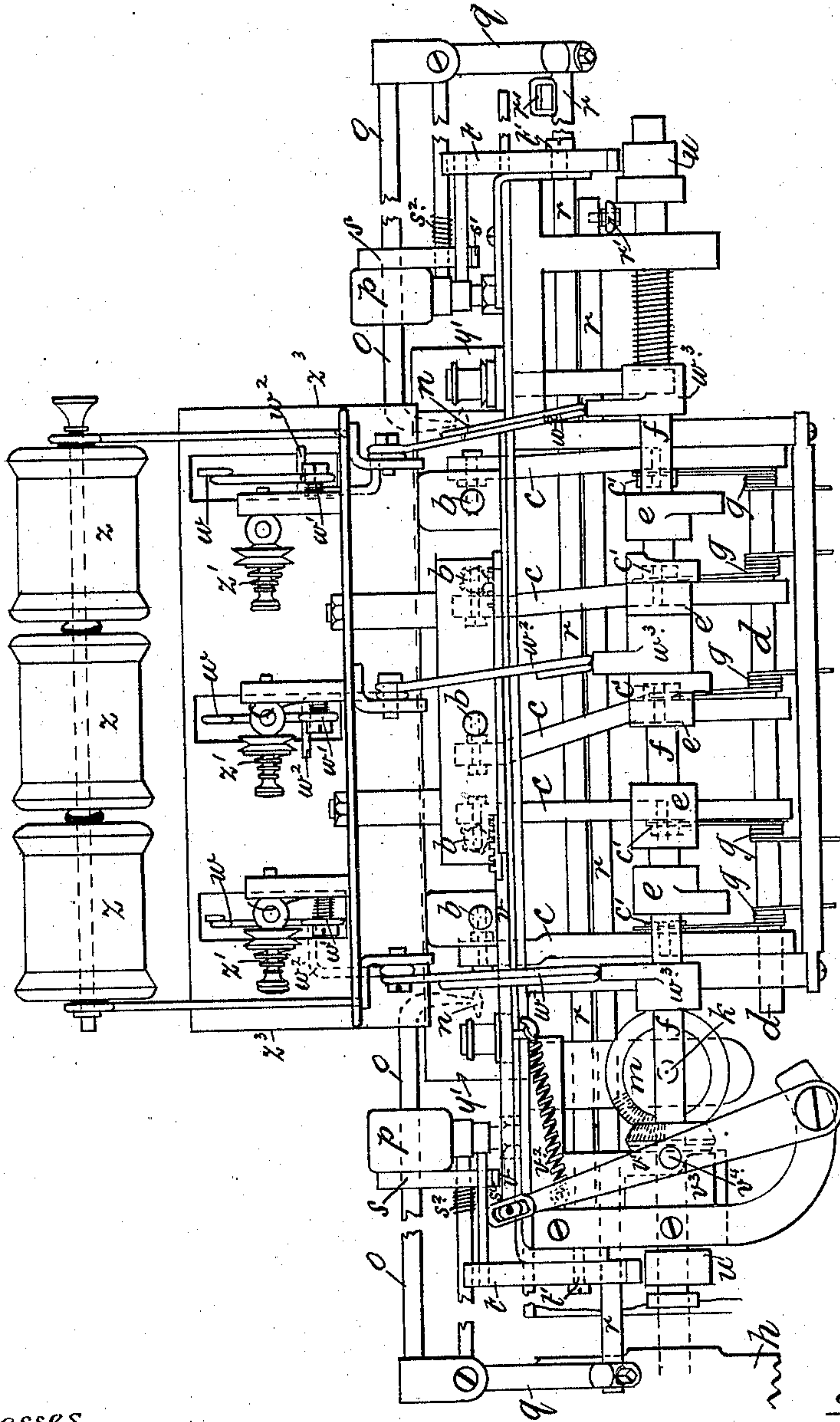
7 Sheets—Sheet 3.

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Fig. 3.



Witnesses.  
*Geo. Foxhead*  
*W. Nash*

Inventor.  
*I. Nasch*



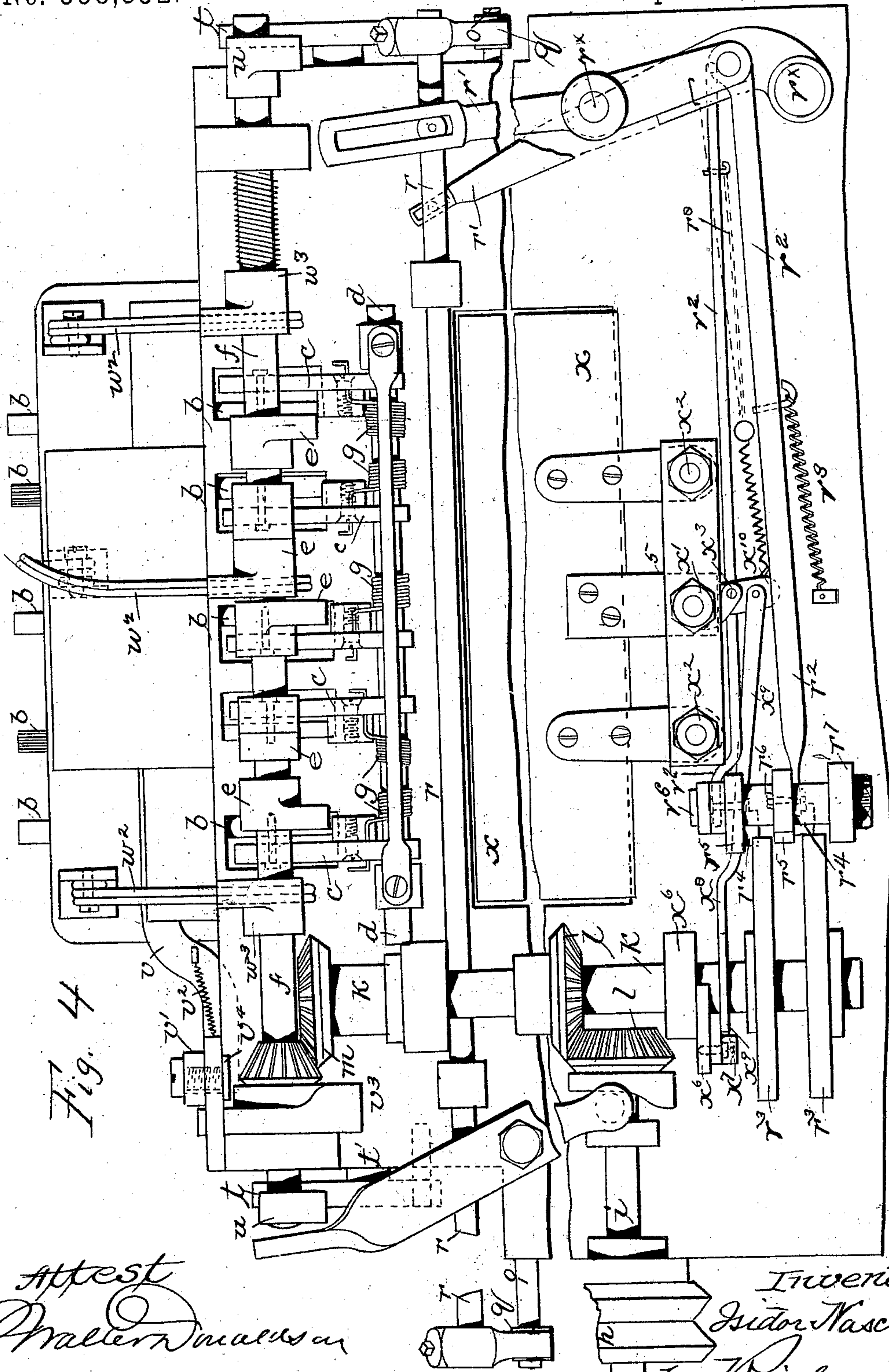
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Attest  
Walter D. Madsen  
Wm. F. Hall

Inventor  
Isidor Nasch  
by Richard D. Hall  
Attys.

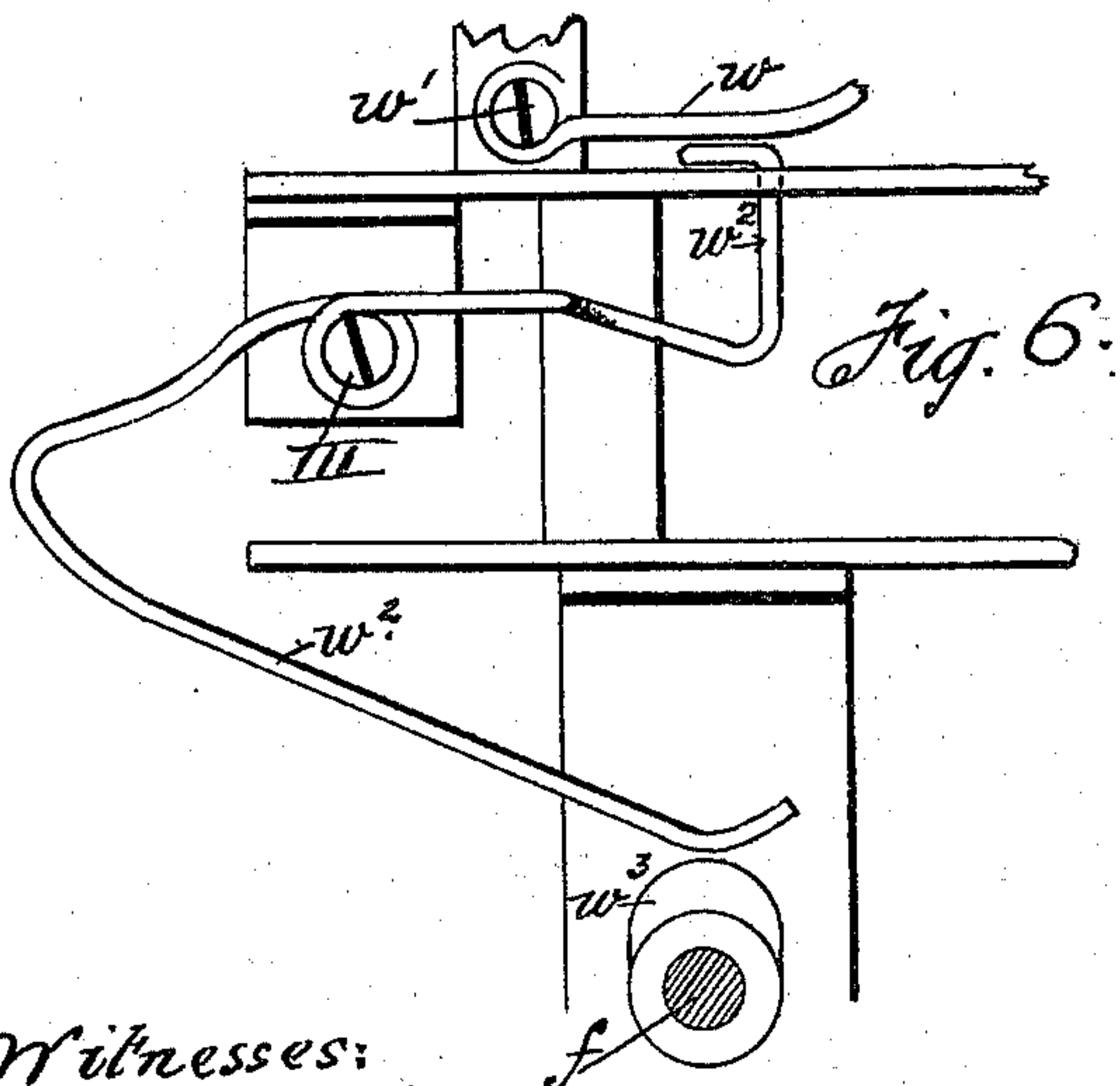
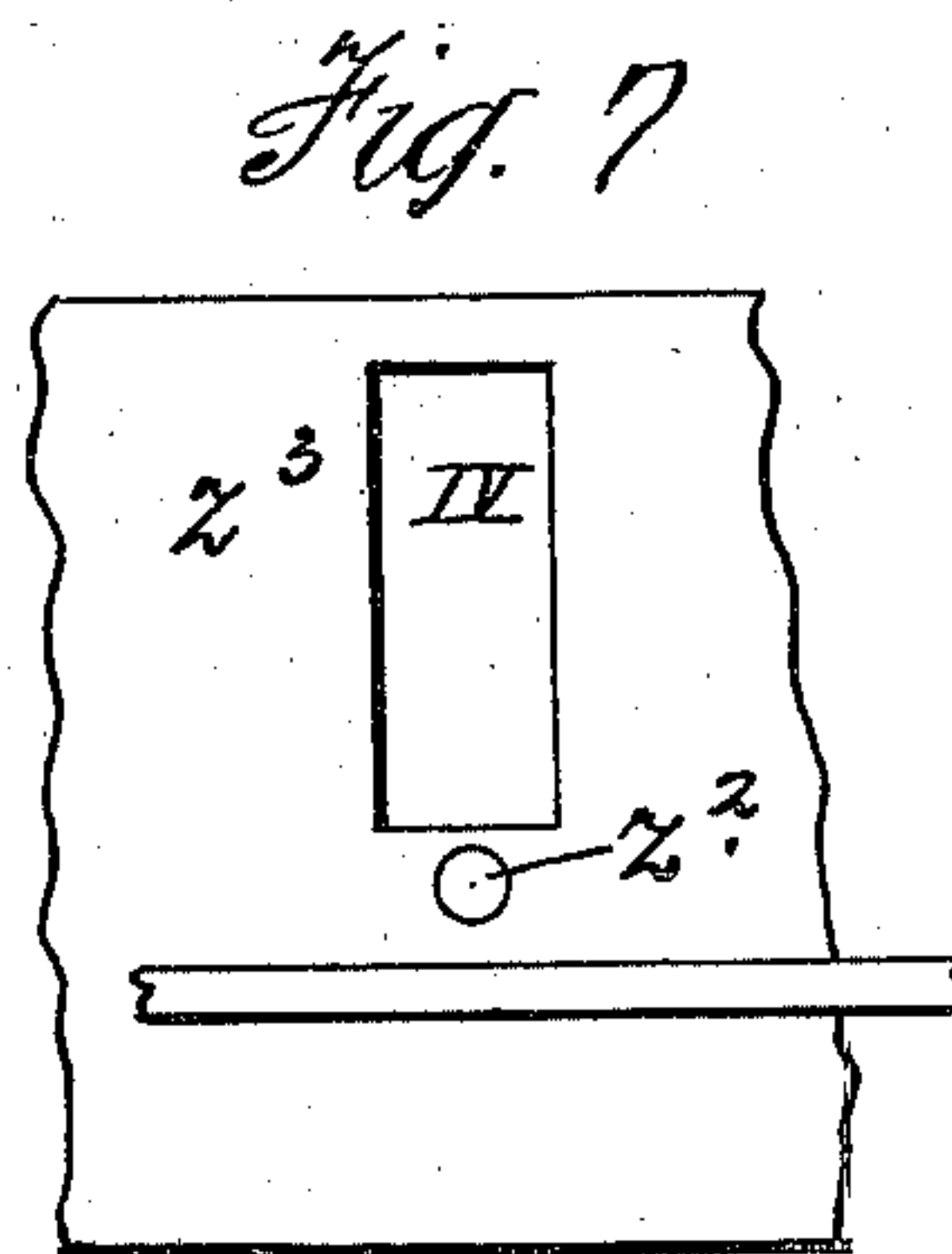
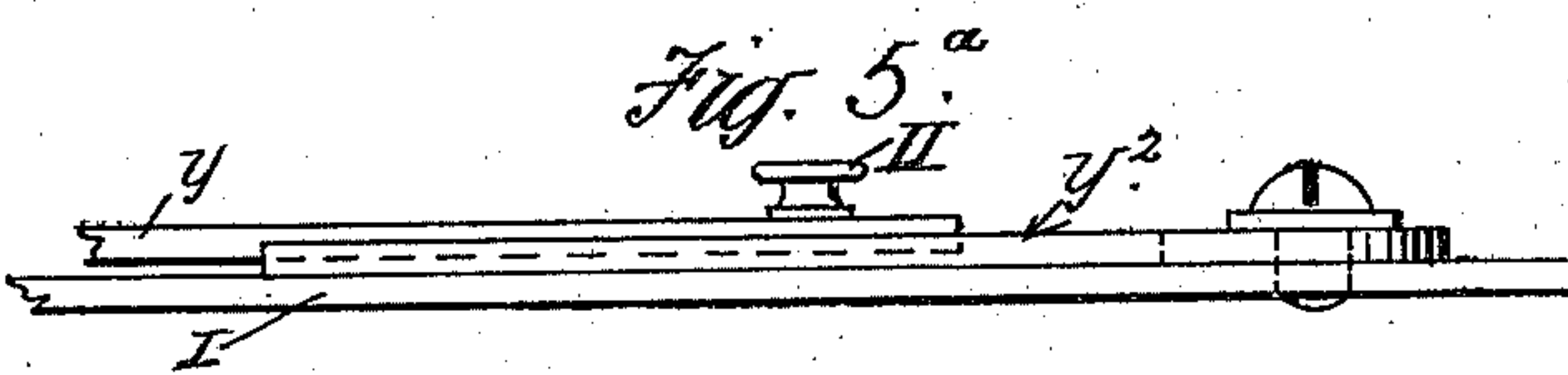
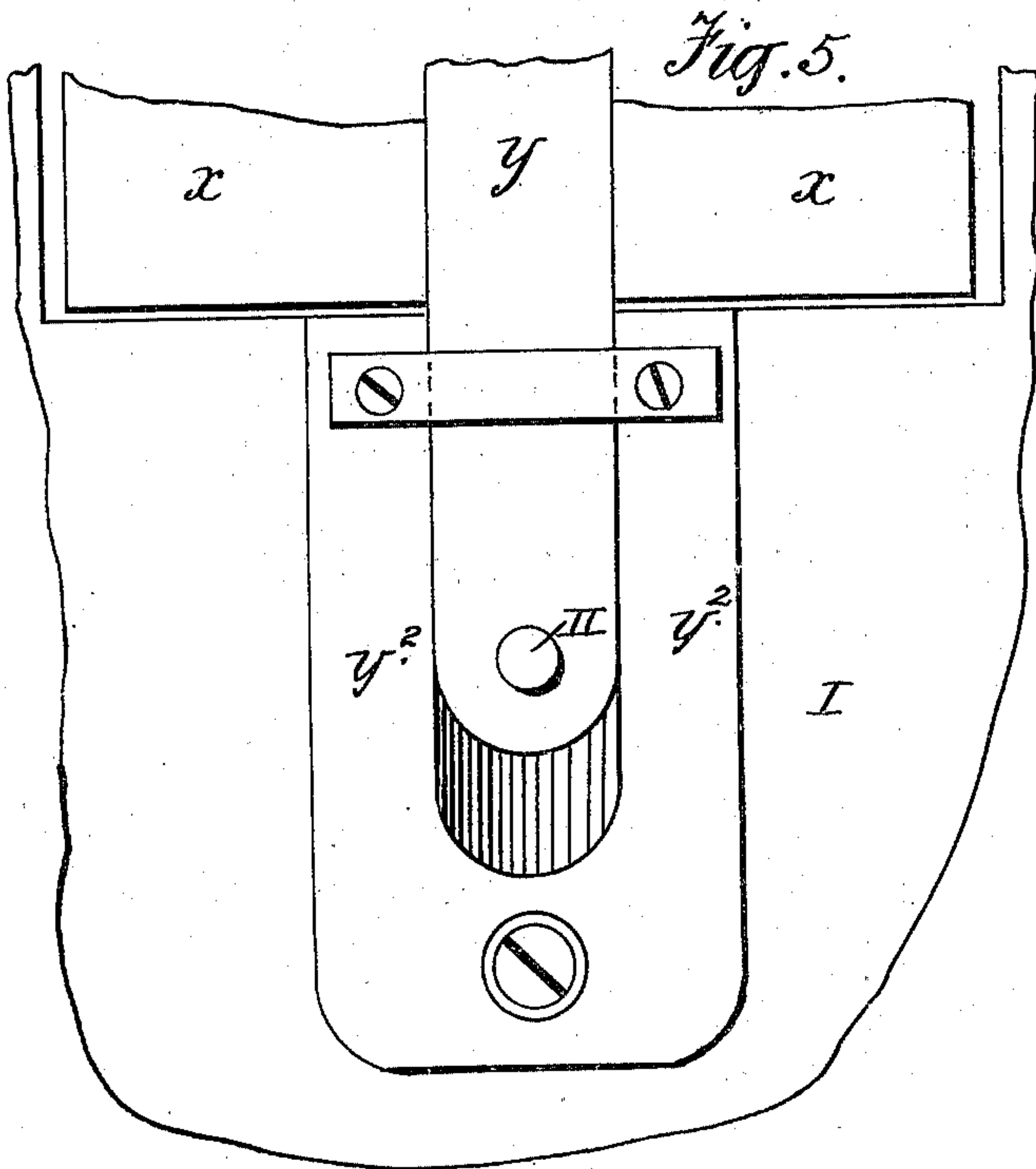
(No Model.)

7 Sheets—Sheet 5.

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Patented Apr. 21, 1896.



Witnesses:  
*W. Foxhead*  
*W. Nash*

*Inventor*  
*I. Nasch*

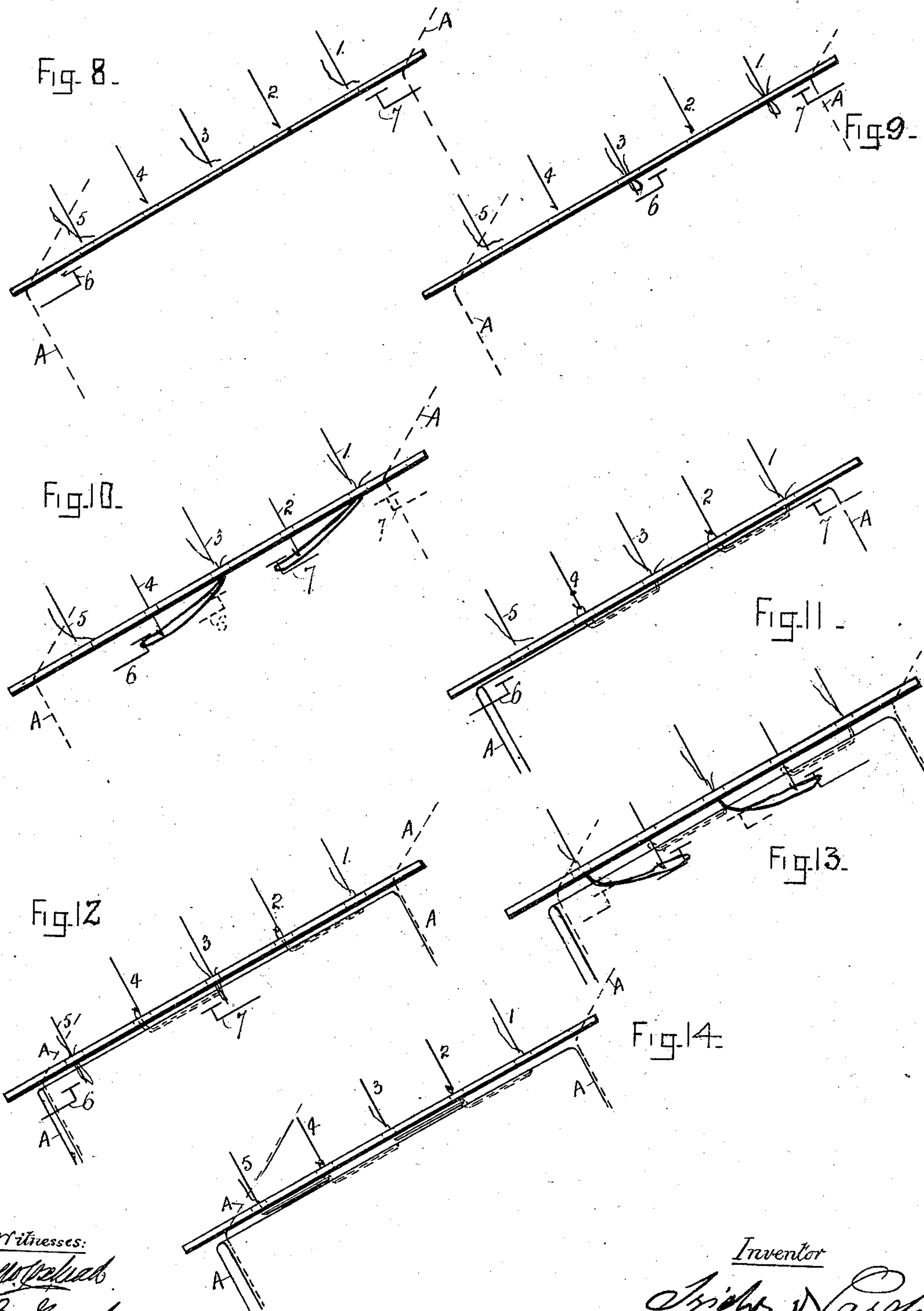
(No Model.)

7 Sheets—Sheet 6.

I. NASCH.  
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Patented Apr. 21, 1896.



Witnesses:  
*[Signature]*  
A. Nasch

Inventor  
*I. Nasch*



(No Model.)

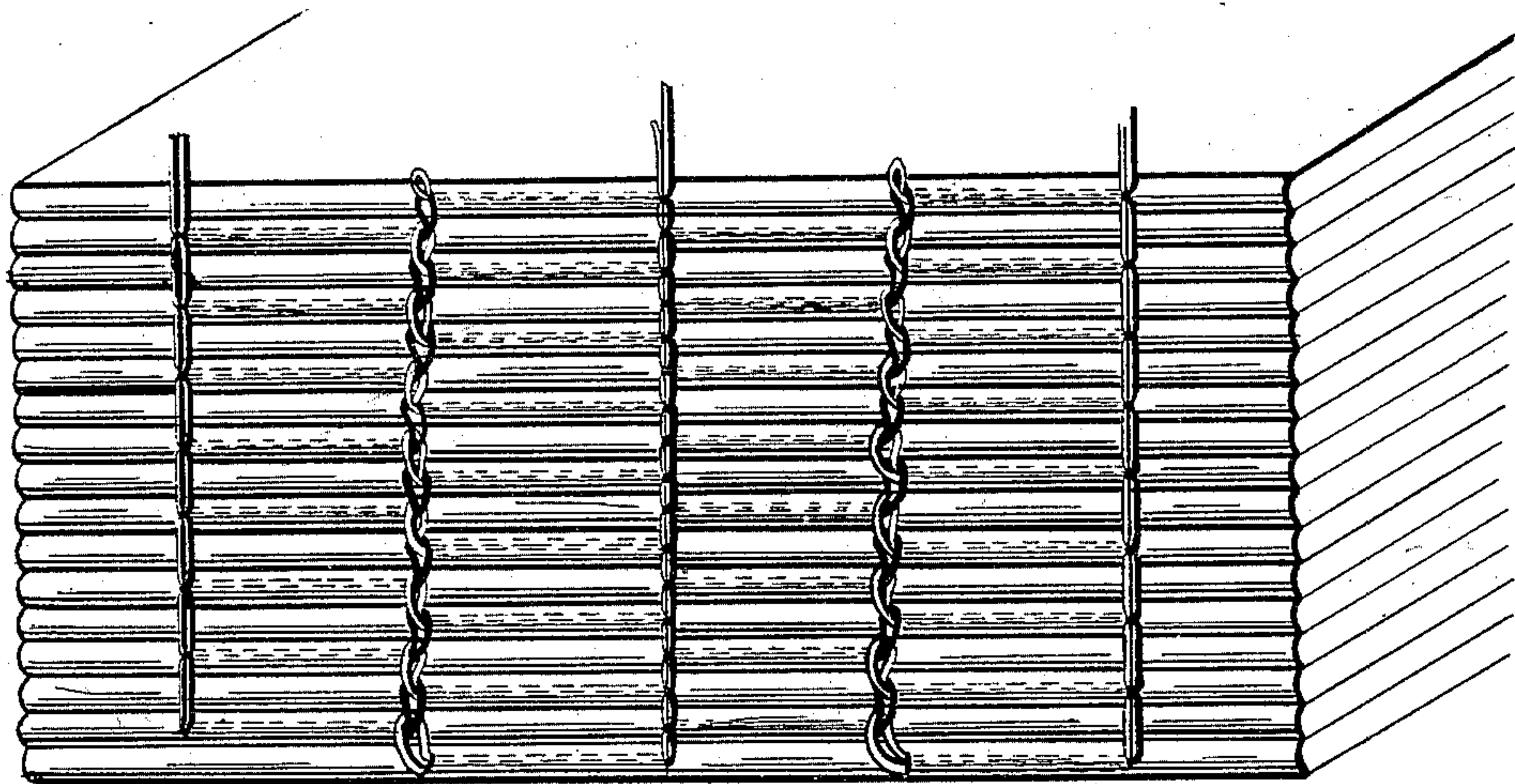
7 Sheets—Sheet 7.

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Patented Apr. 21, 1896.

*Fig. 15.*



Witnesses:

*Geo. C. Head*  
*W. Nasch*

Inventor.

*Ioside Nasch*



# UNITED STATES PATENT OFFICE.

ISIDOR NASCH, OF LONDON, ENGLAND.

## MACHINE FOR SEWING BOOKS.

SPECIFICATION forming part of Letters Patent No. 558,832, dated April 21, 1896.

Application filed July 5, 1892. Serial No. 438,914. (No model.) Patented in England June 10, 1891, No. 9,806, and in Germany September 1, 1892, No. 64,201.

*To all whom it may concern:*

Be it known that I, ISIDOR NASCH, a subject of the Queen of Great Britain, and a resident of Whitechapel, London, E., England, have  
5 invented certain new and useful Improvements in Machines for Sewing Together the Sheets or Signatures of Books, of which the following is a true description.

This invention has been patented to me in  
10 Great Britain on the 10th day of June, 1891, No. 9,806, and in Germany on the 1st day of September, 1892, No. 64,201.

By this invention I produce a machine for  
15 sewing together the sheets or signatures of books which is exceedingly simple in its construction, of very great rapidity in its action, and of small cost of manufacture. It is easy of operation and adjustment, durable, and highly efficient in service. The work effected  
20 by it is solid, strong, and regular, and the machine is adapted for use in binding together the sheets or signatures of books of any size and thickness.

According to this invention I make use of  
25 any convenient number of needles, mounted each in separate needle-bars. These needle-bars work independently of one another and are each attached to one end of an arm or lever, the other end of which lever is pivoted  
30 upon a carrying-shaft. A reciprocating motion is imparted to the needles by means of eccentrics or cams acting against the arms or levers aforesaid and operated by hand, treadle, or power. In front of the needle-  
35 plate I have two loopers, which have a lateral traverse from right to left, and vice versa, and which each take a thread from the eye of one needle to the hook of another. In the drawings accompanying I have shown three  
40 needles as being formed with eyes and two with hooks at their points; but the numbers of each may be varied to suit requirements. After the thread is taken from the eye of one needle by the loopers to the hook of another  
45 needle it is held by the latter till another thread is brought to it, when the two loops are interlocked and the stitch is formed; and in order that this invention may be fully understood and readily carried into effect I  
50 will proceed to describe same, with reference to the accompanying drawings, in which simi-

lar letters and numerals of reference indicate like parts in all the figures.

Figure 1 shows in plan my improvements as applied to a machine employing three threads, 55 though it must be understood that any number of threads desired may be employed with a necessary alteration in the number of the needles in accordance therewith. Fig. 2 is an end elevation. Fig. 3 is a back or rear 60 elevation, and Fig. 4 is an inverted plan, of the machine. Fig. 5 is an enlarged detail view illustrating the guides in which the table travels. Fig. 5<sup>a</sup> is a side elevation of the part shown in Fig. 5. Fig. 6 is a detail view in 65 side elevation of the central lever *w*<sup>2</sup>. Fig. 7 is a detail of a portion of the plate *z*<sup>3</sup>. Fig. 8 is a diagrammatic view showing the needles and loopers in the position they assume at the beginning of the operation. Fig. 9 is a 70 similar view showing two of the needles and the loopers in the position assumed in the act of sewing the first signature. Fig. 10 is a similar view showing the needles retracted and the hooks advanced and the loopers 75 moved to the left. Fig. 11 shows the hooks retracted and the loopers returned to normal position ready for sewing the second signature. Fig. 12 shows the second set of needles advanced in the act of sewing the second sig- 80 nature. Fig. 13 shows the hooks advanced and the loopers advanced to carry the thread to the hooks. Fig. 14 shows the needles returned to normal position at the completion of the sewing of the second signature, and 85 Fig. 15 shows a series of signatures which have been sewed according to the present invention.

*a* are the needles; *b*, the needle-bars in which the needles are mounted. 90

*c* are the arms or levers attached at one end to the needle-bars *b* and having the other end working loosely upon the carrying-shaft *d*.

*e* are the cams which, acting against the levers or arms *c*, impart motion in one direc- 95 tion thereto.

*f* is the driving-shaft and upon which the cams *e* are mounted. Springs *g* may conveniently, as shown, be fitted for causing the re- turn motion, or other cams may be arranged 100 for this purpose, if desired.

The driving-shaft *f* may be operated in any



convenient manner. In the drawings herewith it is shown as receiving its rotary motion from the driving-wheel  $h$  through intermediate shafts  $i$   $k$  and bevel-gears  $l$   $m$ . This motion will be seen more particularly upon reference to Fig. 4 of the drawings. The driving-wheel  $h$  is carried upon one end of the shaft  $i$ , the other end of which shaft is provided with the bevel-wheel  $l$ , the teeth of which latter take into the teeth of a corresponding bevel-wheel fitted upon the counter-shaft  $k$ . At the end of the counter-shaft  $k$  is fitted another bevel-wheel  $m$ , working in the bevel-wheel, as shown, carried upon the driving-shaft  $f$ . The loopers  $n$  are carried by rods or bars  $o$ , sliding in bearings  $p$ . The outer ends of these rods or bars  $o$  are connected by cross-levers  $q$  to shafts  $r$ , which have a lateral motion communicated to them by means of levers and rods  $r'$   $r^2$ , operated from the shaft  $k$  in the following manner:

Particularly referring to Figs. 2 and 4, it will be observed there are cams  $r^3$  fitted upon the shaft  $k$ . In revolving, these cams come in contact with the studs  $r^4$  upon the levers  $r^5$ . These levers  $r^5$  are pivoted at one end on the shaft  $r^6$ , carried in the standard  $r^7$ , and are each attached at other end to a pitman  $r^2$  and communicate motion to such pitmen upon the impact of the cams  $r^3$ . The levers or arms  $r'$  are also and at same time actuated as the pitmen  $r^2$  are connected to them. These levers  $r'$  are pivoted at  $r^x$  and have their other ends attached to the shafts  $r$  and give motion to these latter in their turn. Through them the looper-carrying bars  $o$  are actuated, being connected to same by the cross-levers  $q$  aforesaid. Springs  $r^8$  are shown as being provided for the return motion of the levers and looper-carrying bars.

Attached to the rod or bar  $o$  is a collar  $s$ , having a tailpiece  $s'$ , which is depressed at each revolution of the driving-shaft by means of the lever  $t$ , which is pivoted at  $t'$  and is acted upon by a cam  $u$ , fitted upon the driving-shaft  $f$ . This causes the looper  $n$  to be depressed slightly as it is placing the thread upon the hook of the needle, so as to carry said thread well within the jaws of the hook. A spring  $s^2$  (shown particularly in Fig. 3) acting upon the aforesaid tailpiece  $s'$  of the collar  $s$  causes the looper to resume its original position. To more easily disengage itself of the loop or stitch, the hook-needle is caused to partly revolve. This is accomplished by forming teeth at the end of the needle-bar  $b$ , which take into a rack  $v$ , which has a reciprocating motion given to it through the lever  $v'$ , spring  $v^2$ , and cam  $v^3$ . (See Figs. 3 and 4.) The cam  $v^3$  in revolving abuts against the stud  $v^4$  on lever  $v'$  and carries same forward, and this lever being attached at its upper end to the rack  $v$  causes same to advance. The spring  $v^2$  draws it back when the cam becomes free of the stud. To take up the slack of the thread, I provide thread-

controllers consisting of the arms  $w$ , pivoted at  $w'$ . Cams  $w^3$ , fitted upon the driving-shaft  $f$ , are revolved by the latter and take against the pivoted arms  $w^2$  and cause them to rise and lift the arms  $w$  at the proper times—i. e., at each revolution of the driving-shaft.

$x$  is the bed or stitch-board of the machine, which is lowered automatically at each revolution of the main shaft by means of a screw-column  $x'$ , around which engages a threaded collar 5, attached to the stitch-board. The column is caused to revolve by providing it with a toothed portion  $x^4$ , (see dotted lines, Fig. 1,) which is engaged by a pawl  $x^3$ , mounted on an arm  $x^{10}$ , which is journaled on the column  $x'$  and vibrated by suitable connections from the cam  $x^8$  on shaft  $k$ , and  $y$  the feeding-table sliding between guides  $y^2$ . Upon this table  $y$  the sheet or signature is placed and is carried by it to the stitch-plate  $y'$ .

$z$  are spools from whence the thread is taken through the tensions  $z'$  and through the aperture  $z^2$  in guard or face plate  $z^3$ , (this latter is provided with slots, through which the thread-controlling arms are free to work,) then through the eye  $z^4$ , thence it is taken to the thread-controlling arm  $w$ , and then downward, passing through the eye  $z^5$ , and on through the eye of the needle.

In the operation of the machine the signature to be sewed is brought into the position shown by dotted lines A in front of the needles, as in Fig. 8. On the further movement of the machine the needles 1 and 3 advance and penetrate the signature, and simultaneously the looper 6 is thrown to the right, so that the parts assume the position shown in Fig. 9. The needles 1 and 3 are then retracted; but before they do so the loopers 6 and 7 engage the threads and move to the left and carry the threads into the path of the hooks, which are advanced to take the threads, as shown in Fig. 10. The loopers then release the threads and return to normal position and the hooks recede and carry the threads into the position shown in Fig. 11, thus completing the sewing of the signature, which is here shown in full lines. The second signature is then fed forward into position, as shown in dotted lines, Fig. 12, whereupon it is penetrated by needles 3 and 5, the loopers moving into position to engage the threads, and upon the advance of the hooks the loopers move to the right and draw the threads into position to be engaged by the hooks, which then draw the threads through the signature, and as the previous loop has up to this time remained upon the neck of the hook the second loop is drawn through the first. The third signature then comes into position and is sewed by needles 1 and 3 in the manner first described, and so the operation goes on until the proper number of signatures has been sewed, as shown, for example, in Fig. 15. It will thus be seen that succeeding signatures are sewed in different



places, and thus the thickness of the back of the book is much reduced, compared with those stitched by other machines sewing them all in the same place. The book also opens 5 flatter and with a much better spring than any sewed by machines heretofore in use, and the sewing is much tighter, equaling in every respect the best hand-sewing, while excelling it in strength. The signatures require no 10 cutting at the edge, and should a stitch be cut or broken it will not loosen a sheet.

Having now fully described my invention, I declare that what I claim, and desire to have secured to me by Letters Patent of the United 15 States, is—

1. In machines for sewing together the sheets or signatures of books the combination of hooks or loopers *n*, sliding rods or bars *o*, cross-levers *q*, shafts *r*, and actuating-levers, 20 rods, cams, and springs described, with complementary stitch-forming mechanism; sub-

stantially as hereinbefore described and shown.

2. In combination with the needles with means for alternately reciprocating them in 25 sets, the hooks with means for reciprocating them once for each reciprocation of the needles, the loopers with means for reciprocating them across the face of the needles to transfer the thread from each set of needles 30 to the hooks, means for rotating the loopers to insure their leaving the thread upon the hooks, and means for rotating the hooks to release the threads, substantially as described.

In witness whereof I have hereunto signed 35 my name in the presence of two subscribing witnesses.

ISIDOR NASCH.

Witnesses:

GEO. LOXHEAD,  
WILLIAM NAST.