

No. 819,567.

PATENTED MAY 1, 1906.

H. MACKINTOSH.  
JACQUARD FOR WEAVING LOOMS.  
APPLICATION FILED APR. 28, 1904.

3 SHEETS—SHEET 1.

FIG. 1.

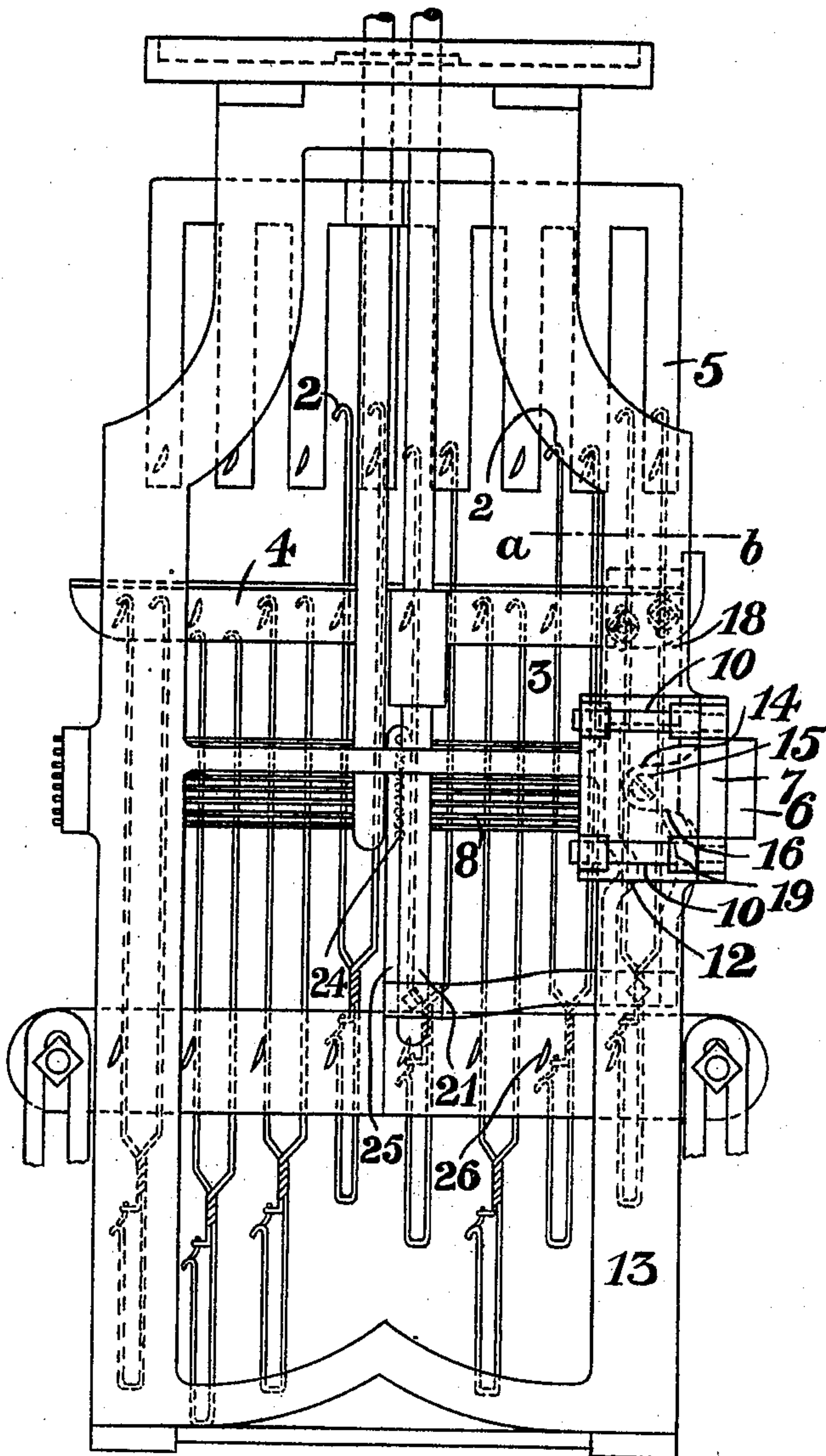


FIG. 4.

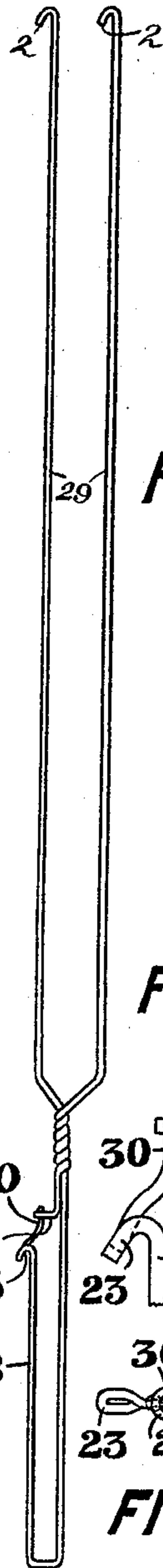


FIG. 5.

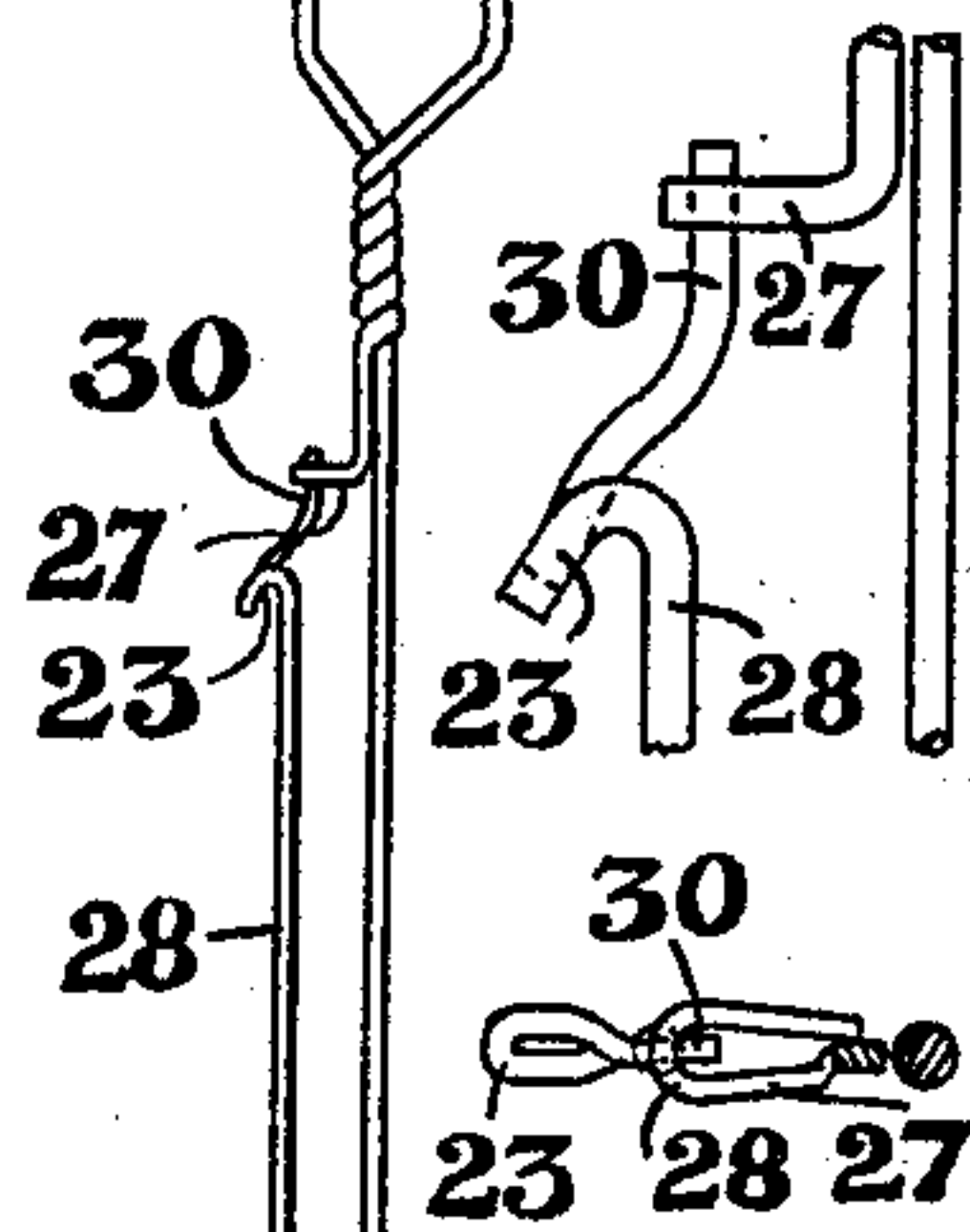


FIG. 6.

Witnesses

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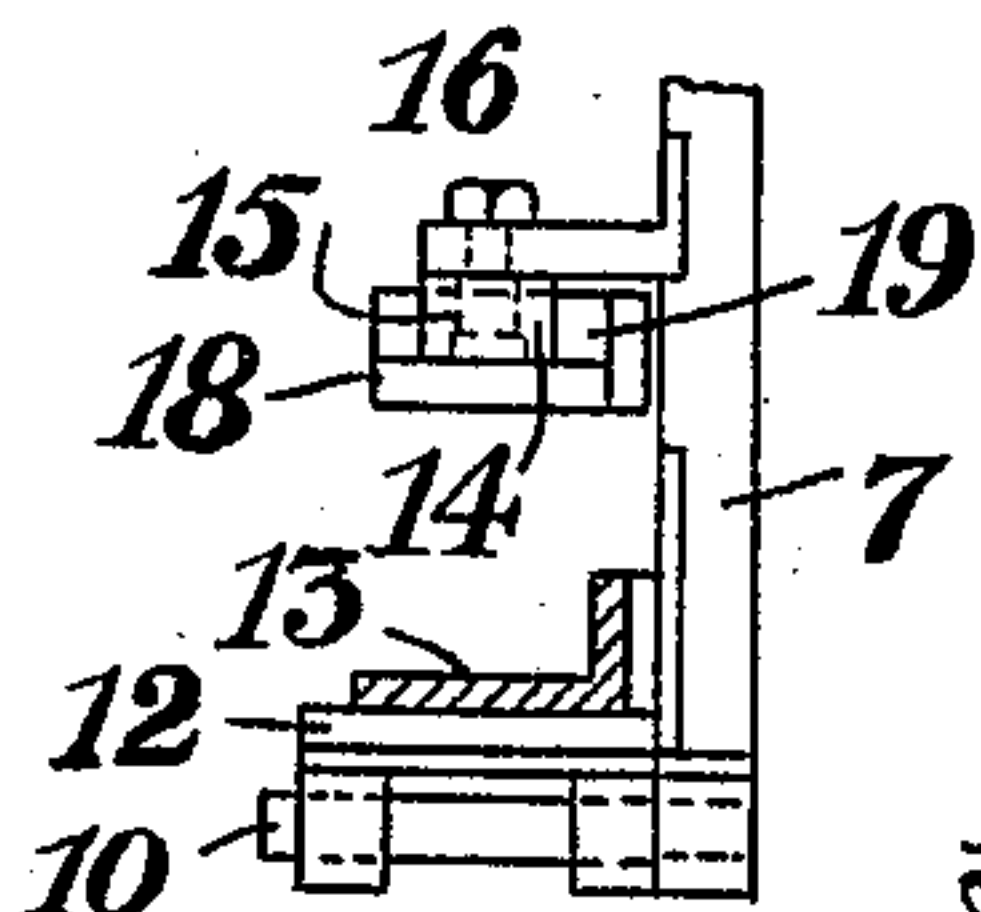


FIG. 3.

Inventor:

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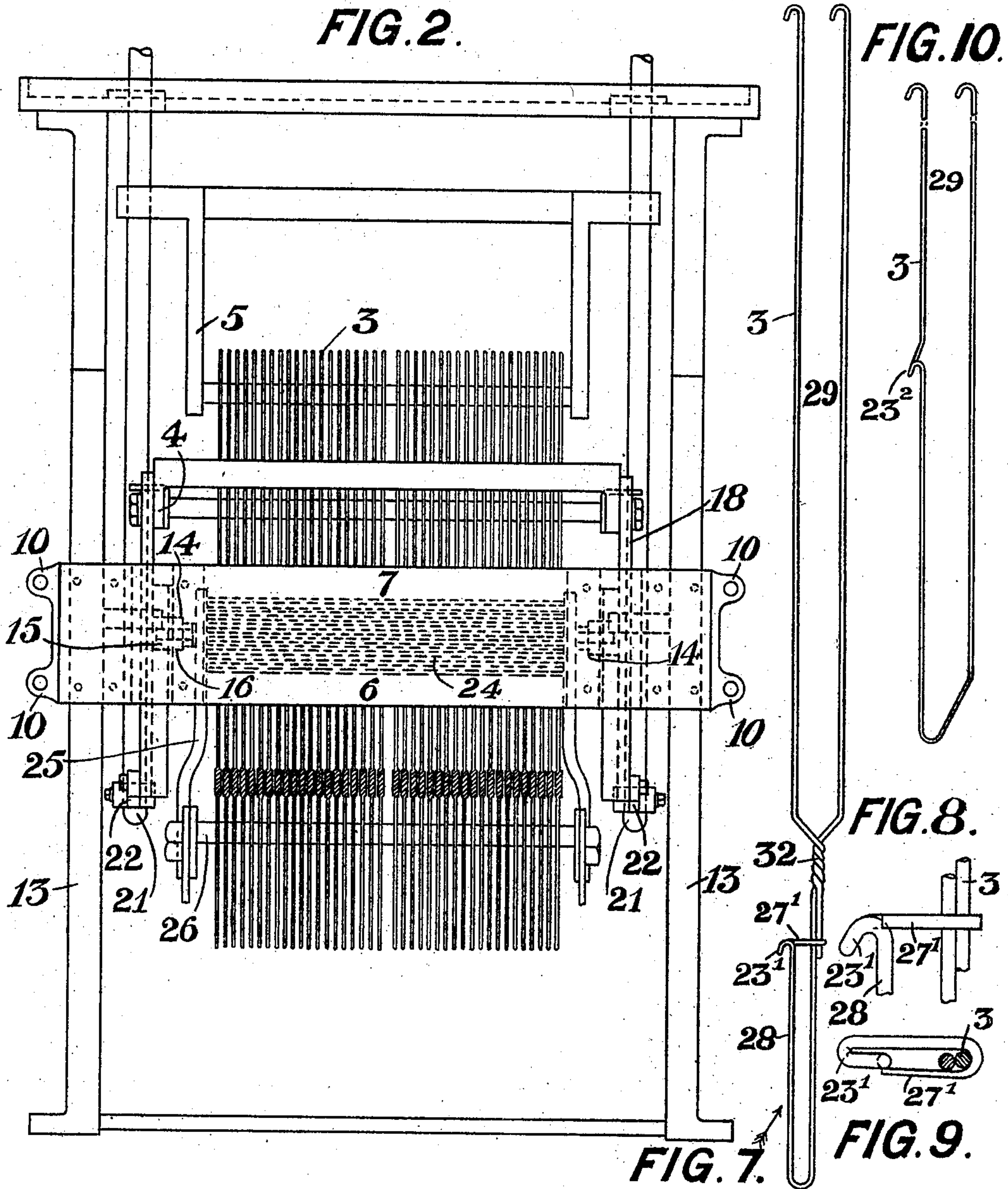
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3 SHEETS—SHEET 2.



Witnesses

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3 SHEETS—SHEET 3.

FIG. 11.

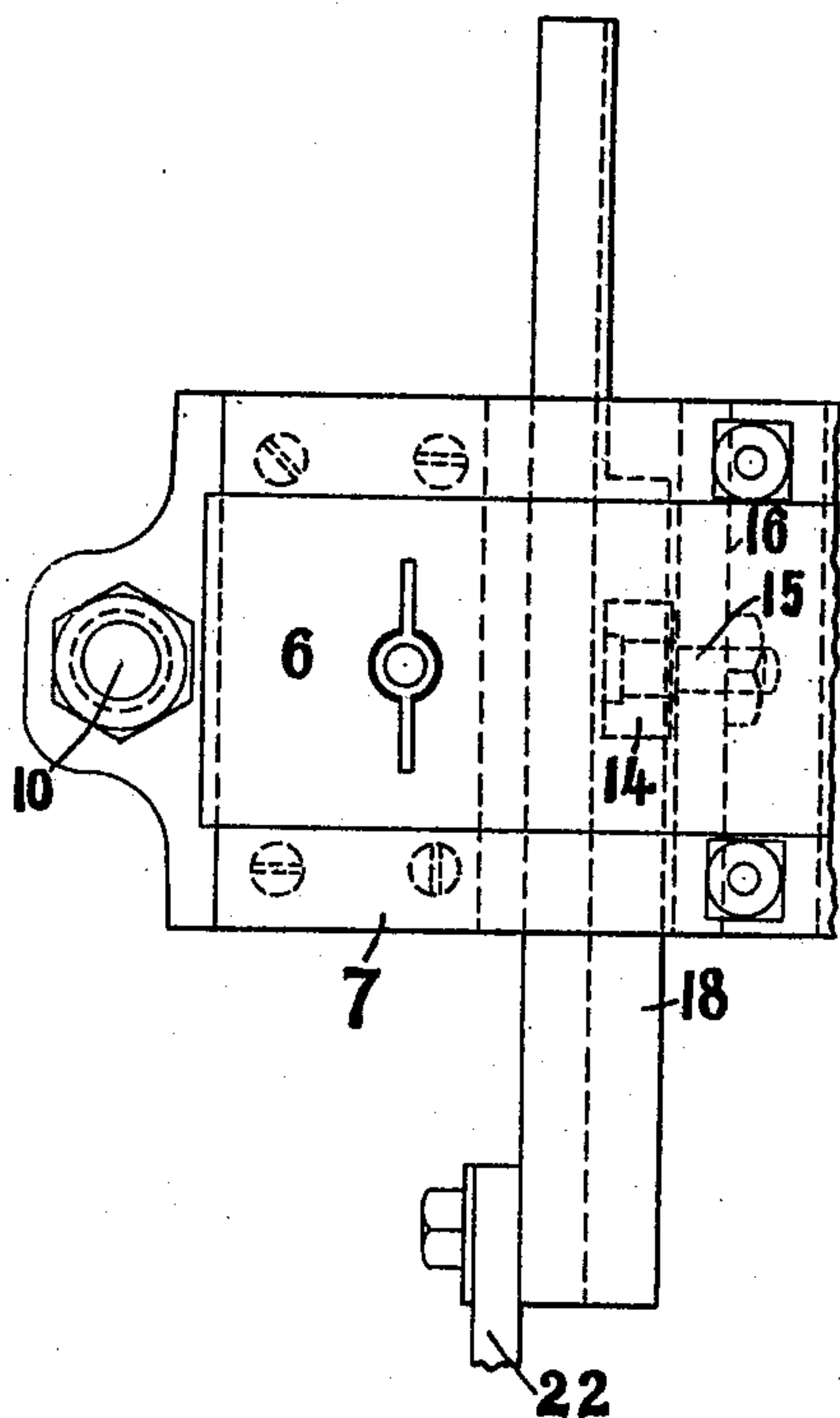
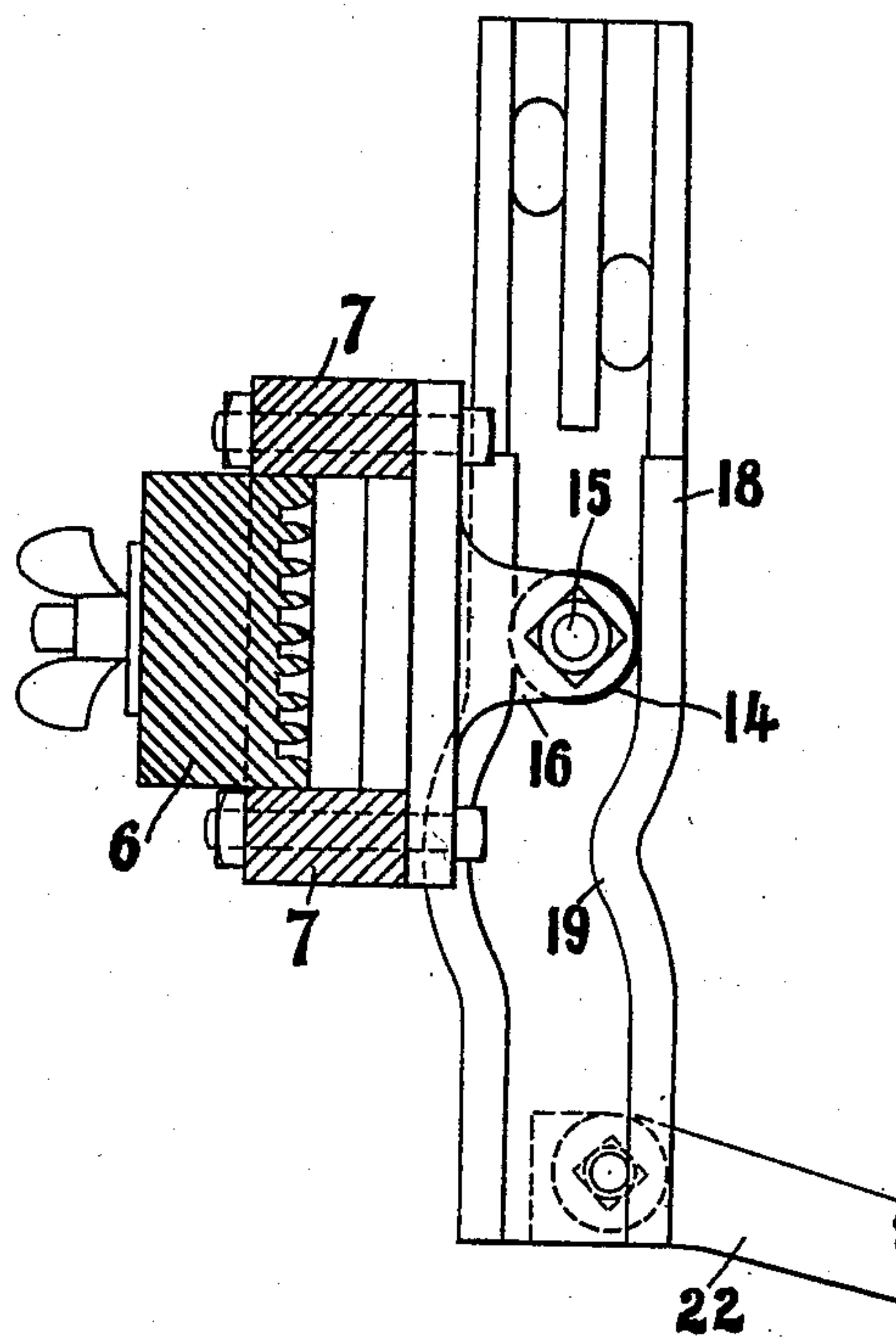


FIG. 12.



Witnesses  
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# UNITED STATES PATENT OFFICE.

HARRY MACKINTOSH, OF SHIPLEY, ENGLAND.

## JACQUARD FOR WEAVING-LOOMS.

No. 819,567.

Specification of Letters Patent.

Patented May 1, 1906.

Application filed April 28, 1904. Serial No. 205,401.

*To all whom it may concern:*

Be it known that I, HARRY MACKINTOSH, a subject of the King of Great Britain, residing at Shipley, in the county of York, in the Kingdom of England, (whose post-office address is Moorhead House, Shipley, aforesaid,) have invented certain new and useful Improvements in Jacquards for Weaving-Looms, (for which application has been made in Great Britain, No. 10,121, dated May 4, 1903; in France, filed March 14, 1904, and in Belgium, filed March 14, 1904,) of which the following is a specification.

This invention relates to improvements in double-lift open-shed jacquards for weaving-loom, in which a perch or dwell grate is employed to hold up such of the uprights that require to remain in the lifted position during two or more consecutive picks, the object of the improvements being to secure the advantages of open shedding without serious complications or accruing disadvantages.

To prevent the free hooks on the uprights as they are lowered from catching the rising grate as they pass, I impart an outward movement to the spring-box and back grate at the time the free hooks are passing the rising grate, and as the needles move with the back grate they spring the free limbs of the uprights that are being lowered back and obviate any necessity of the hooks at the top of such limbs catching the rising grate. To allow the spring-box and back grate to be moved in this way, I mount them on a stud or slide at each end. An antifriction-roller is secured at or close to each end of the spring-box, and vertical continuations are provided on the frame of the bottom grate having cam-grooves therein adapted to engage the antifriction-rollers and impart the required movement to the spring-box and back grate. To prevent the needles sagging or bending under the increased friction of the uprights thereon, I stay or support them in the middle by cross-bars above and below them. These supporting-bars may be in the form of a vertical grate with horizontal bars the same thickness as the vertical distance between the needles or thereabouts. Double or two-limbed uprights are used for the length required to allow of their movement through the lifting-grates. Below this the limbs are brought toward each other and twisted firmly together to unite them. A single wire is carried down from the twisted part to the distance required to complete the upright, and it is then

bent round and up again. A double hook to engage the perch-grate is formed on the bent-up part, and the end of one wire is looped round the other wire close to the twisted part. The loop is formed to allow the perch-hook to be sprung toward the single wire, but normally holds the two wires below this part parallel.

In the accompanying drawings, Figure 1 represents a side elevation of such parts of a jacquard as are necessary to illustrate my improvements. Fig. 2 is a back view of the same. Fig. 3 is a plan view (with the frame in section on the broken line *a b*) of the part of the back grate and mechanism appertaining thereto. Figs. 4 and 7 are elevations of two forms of double-limbed upright; Figs. 5 and 6, enlarged detailed views of the upright shown in Fig. 4, and Figs. 8 and 9 similar views of Fig. 7. Fig. 10 shows a much cheaper but not such a useful form of my apparatus; Figs. 11 and 12, detail views of the cam-plate and the attendant parts.

To prevent the free hooks 2 on the uprights 3 as they are lowered from catching the bars of the bottom grate 4 (or top grate 5, as may be) as it passes up, I impart an outward or backward movement to the spring-box 6 and back grate 7 at the time the free hooks are passing the bottom grate, and as the needles 8 are drawn back with the back grate they spring the free limbs of the uprights back and obviate any possibility of the hooks at the top of those that are being lowered catching the bottom grate. To allow the spring-box 6 and back grate 7 to be moved in this way, I mount them upon horizontal studs or slides 10, (shown also in Fig. 3,) fixed thereto at each end and working in guides formed in the fixings 12, secured to each side frame 13 of the jacquard. Two antifriction-rollers 14, working on studs 15, are provided, and these studs 15 are fixed in brackets 16, secured to the back grate 7. The vertical continuations 18, fixed on the frame of the bottom grate 4, have cam-grooves 19 therein, adapted to engage the antifriction-rollers 14 and impart the above-described movement to the spring-box 6 and back grate 7 as the lifting-grates rise and fall past the free hooks. The lower ends of the continuations 18 are preferably supported by the stays 22 to the bars 21, carrying the bottom grate 4.

To prevent the needles 8 sagging or bending in the middle under the increased friction



caused by the back pressure of the uprights thereon, I stay or support them in the middle by cross-bars 24 above and below them. These bars are preferably in the form of a vertical grate supported at each end by up-  
 5 rights 25, secured to the perch-grate 26 or other convenient part.

The double-limbed part 29 of the upright is long enough to allow of the movement between the lifting-grates, and below the double part they are bent toward each other and tightly twisted together at 32. One limb 28 only is then carried down and up again to form a spring projection. The projection 23  
 15 is distinctly of hook shape. In order to reduce the horizontal thickness of the upright about this part to better adapt it to "fine-pitch" or "fine-register" machines, I flatten the short end of the wire below the twisted  
 20 part 32, bend it horizontal, and form it into the loop 27, as shown in Figs. 4, 5, and 6. I also flatten the end 30 of the wire forming the hook 23 and carry it up into the loop 27.

In the modifications Figs. 7, 8, and 9 the loop 27' forms a part of the uprising limb 28 and embraces the uprights below 32, and also is so bent as to form the hook 23', corresponding to hook 23 of Fig. 5. The operation of this variation is precisely the same as  
 30 that of Figs. 4, 5, and 6, the difference being that the loop 27 is formed in one with the upright and encircles the end of the upturned limb 28, while in Figs. 7, 8, and 9 the loop 27' is formed in one with the upturned limb 28 and encircles the main part of the upright.  
 35

In Fig. 10, as in Figs. 4 and 7, the two top hooks have their shanks 3 running parallel for a long distance. The hook 23<sup>2</sup>, however, corresponding to 23' and 23 of the aforesaid  
 40 drawings is, as in those cases, projecting from a wire running in the same center line as one of the top wires.

I declare that what I claim is—

1. The combination in a jacquard of the type described with the spring-box and its  
 45 needles and the back grate, of a device adapted to move the spring-box and needles in a direction longitudinal to the needles and thus increase the lateral distance of the free  
 50 hooks from the lifting-grates when the two

are in close proximity whereby the free hooks are sprung back by the needles clear of said grates.

2. The combination in a jacquard of the type described, of the spring-box and needles, and the back grate, and a roller attached to the latter, of the bottom grate, and a vertical continuation on the frame thereof having a cam-surface adapted to come in contact with the roller when the free hooks of the jacquard are in the neighborhood of the lifting-grates whereby the free hooks are sprung back by the needles clear of said grates.  
 60

3. The combination of the spring-box 6, its needles carried therein, the back grate 7, and a roller carried thereon; with a bottom grate 4 having a cam-surface vertical continuation 18, substantially as described.  
 65

4. In a jacquard of the type substantially as described; the combination with the needles, of a substantially vertical supporting-grate located near their middle and rigidly fixed to the framework of the jacquard, said grate being formed of a series of horizontal spacing-bars and the end plates to which the bars are rigidly fixed.  
 75

5. An upright of a jacquard of the type described formed solidly in one near the bottom as at 32, and having one leg projecting downward turned round and rising upward and formed with a hook 23 and a loop confining the distance which the vertically-rising leg can spring from the main line of the upright substantially as described.  
 80

6. In a jacquard of the type described, a double-limbed upright having a hook at the top of each limb and a hook near the bottom, the wire below the hook being in the same axial line as one of the two upper limbs of the hooks pointing in the same direction substantially as described.  
 85

In witness whereof I have hereunto signed my name, this 18th day of April, 1904, in the presence of two subscribing witnesses.

HARRY MACKINTOSH.

Witnesses:

CECIL A. S. BAXTER,  
 DAVID NOWELL.