

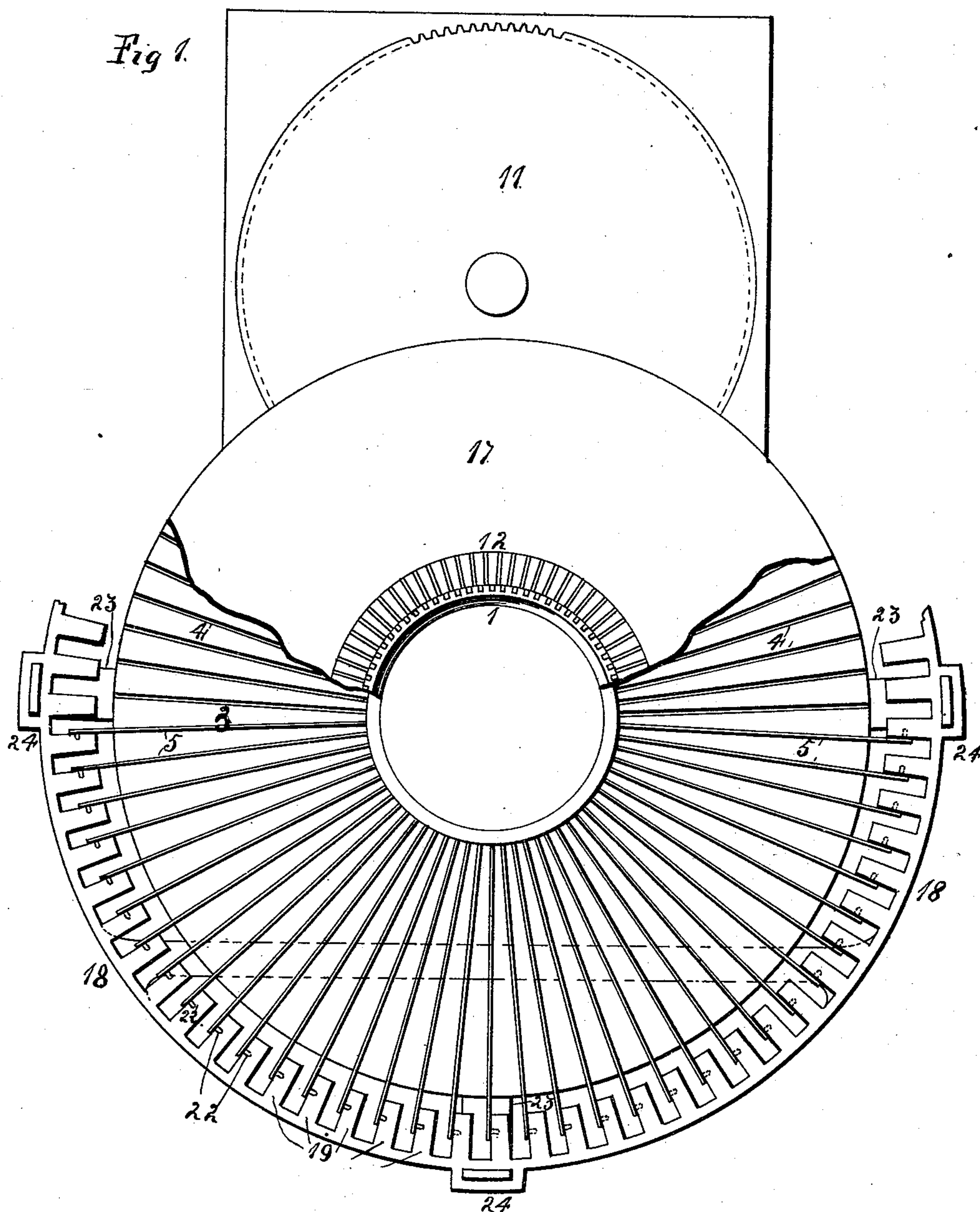
(No Model.)

3 Sheets—Sheet 1.

N. J. WINLUND.  
KNITTING MACHINE.

No. 478,673.

Patented July 12, 1892.



Witnesses:  
E. Behel.  
L. L. Miller.

Inventor:  
Nicholas J. Winlund.  
By A. O. Behel.  
Atty.

(No Model.)

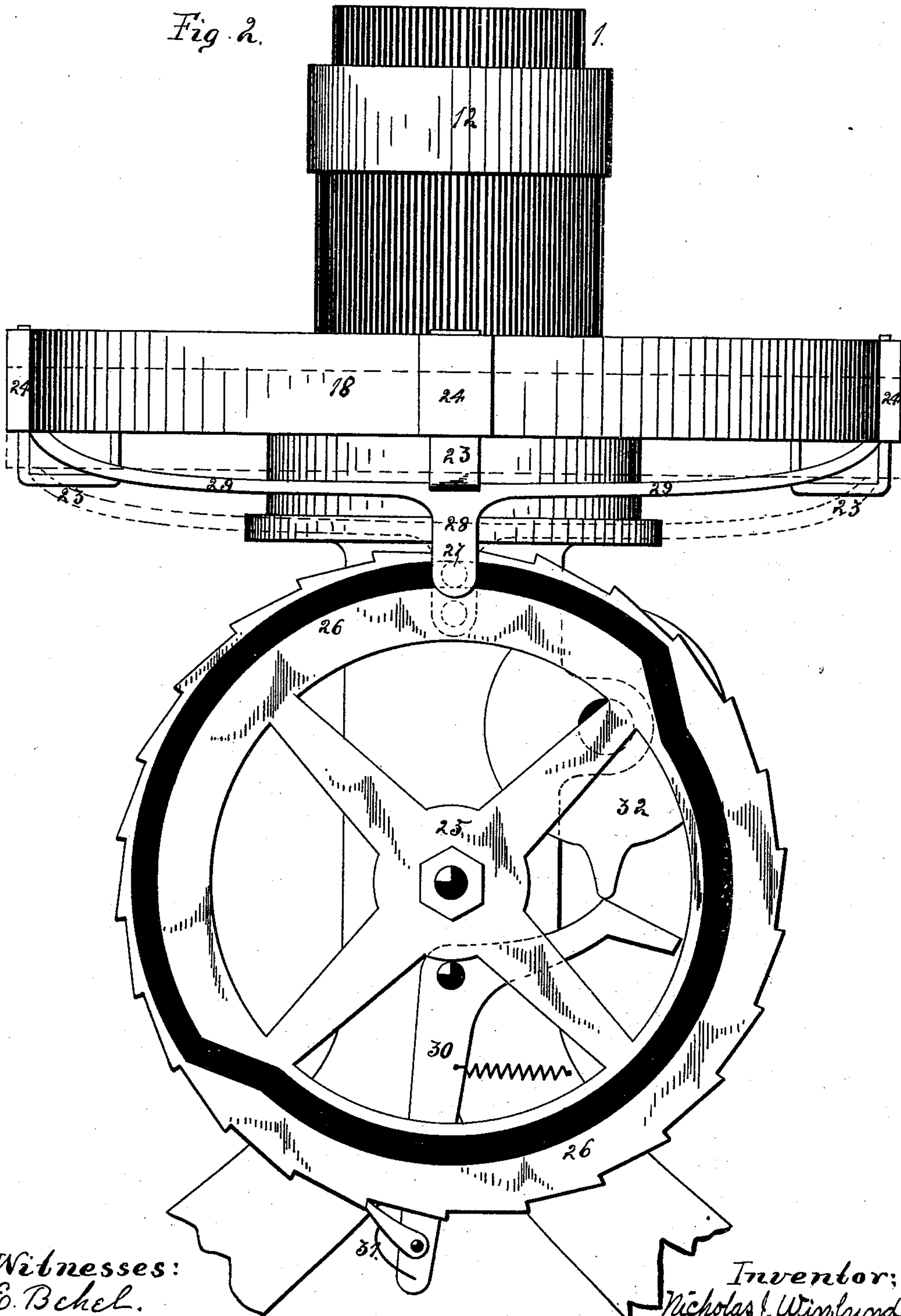
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*Fig. 2.*



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Fig. 5.

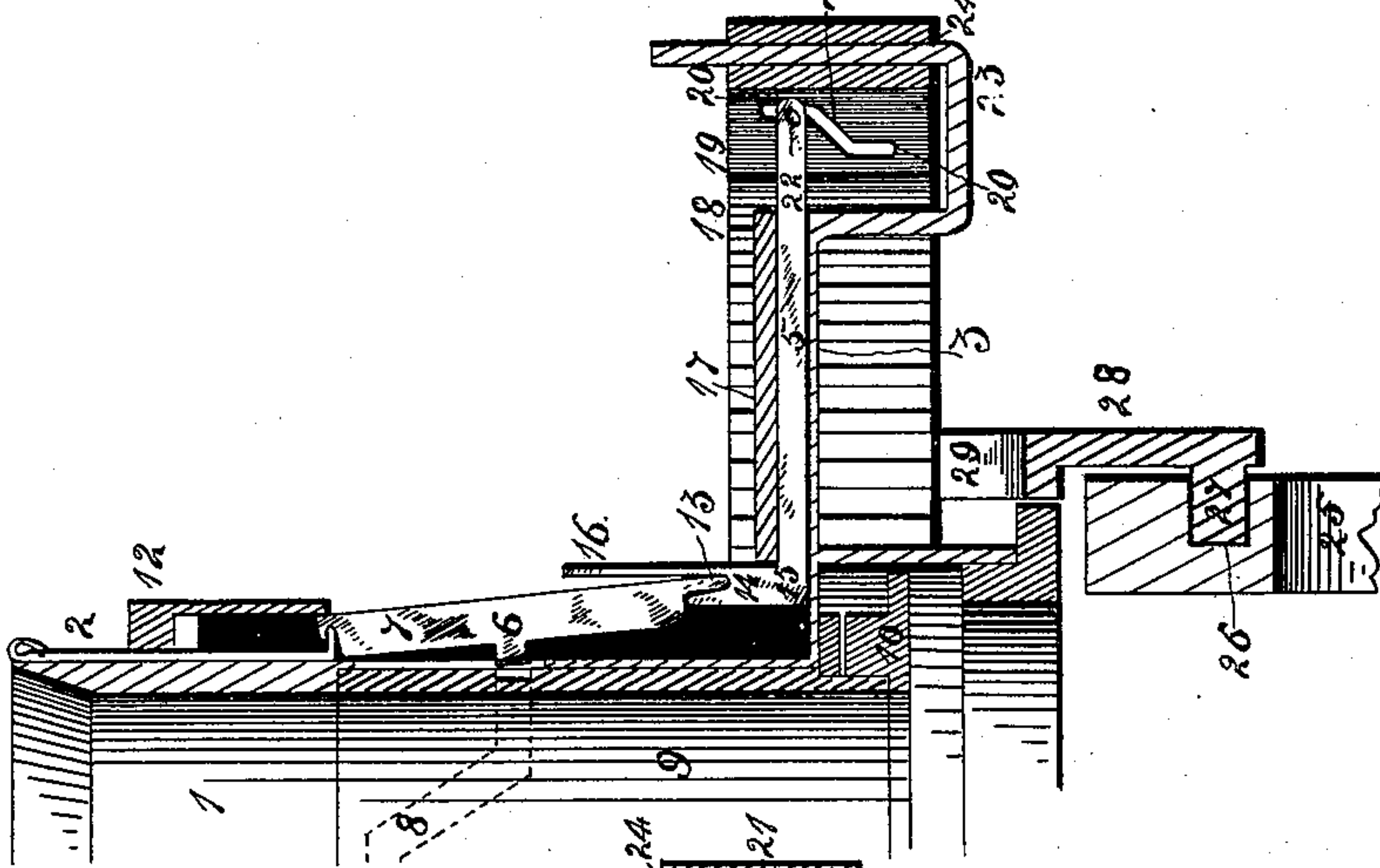


Fig. 4.

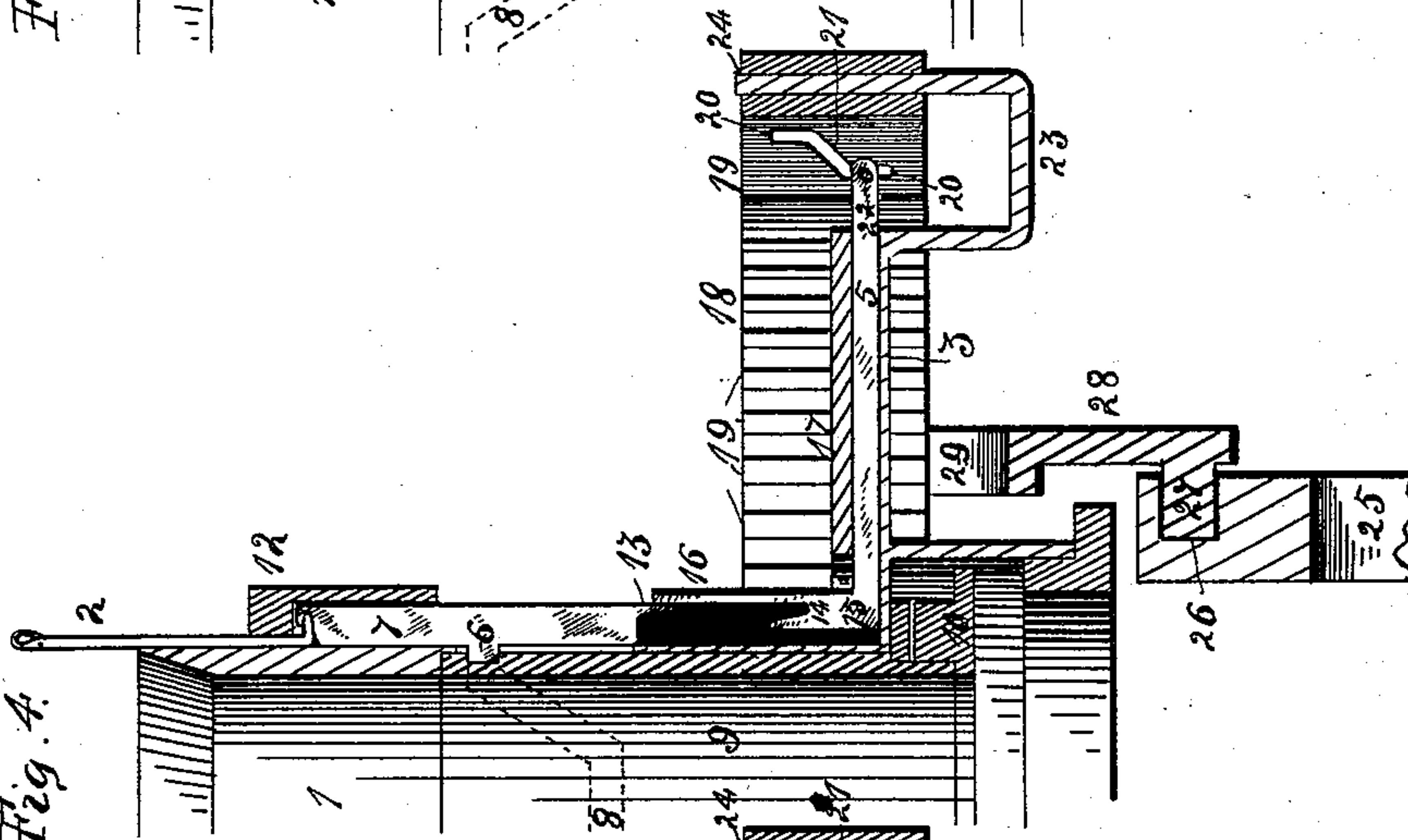
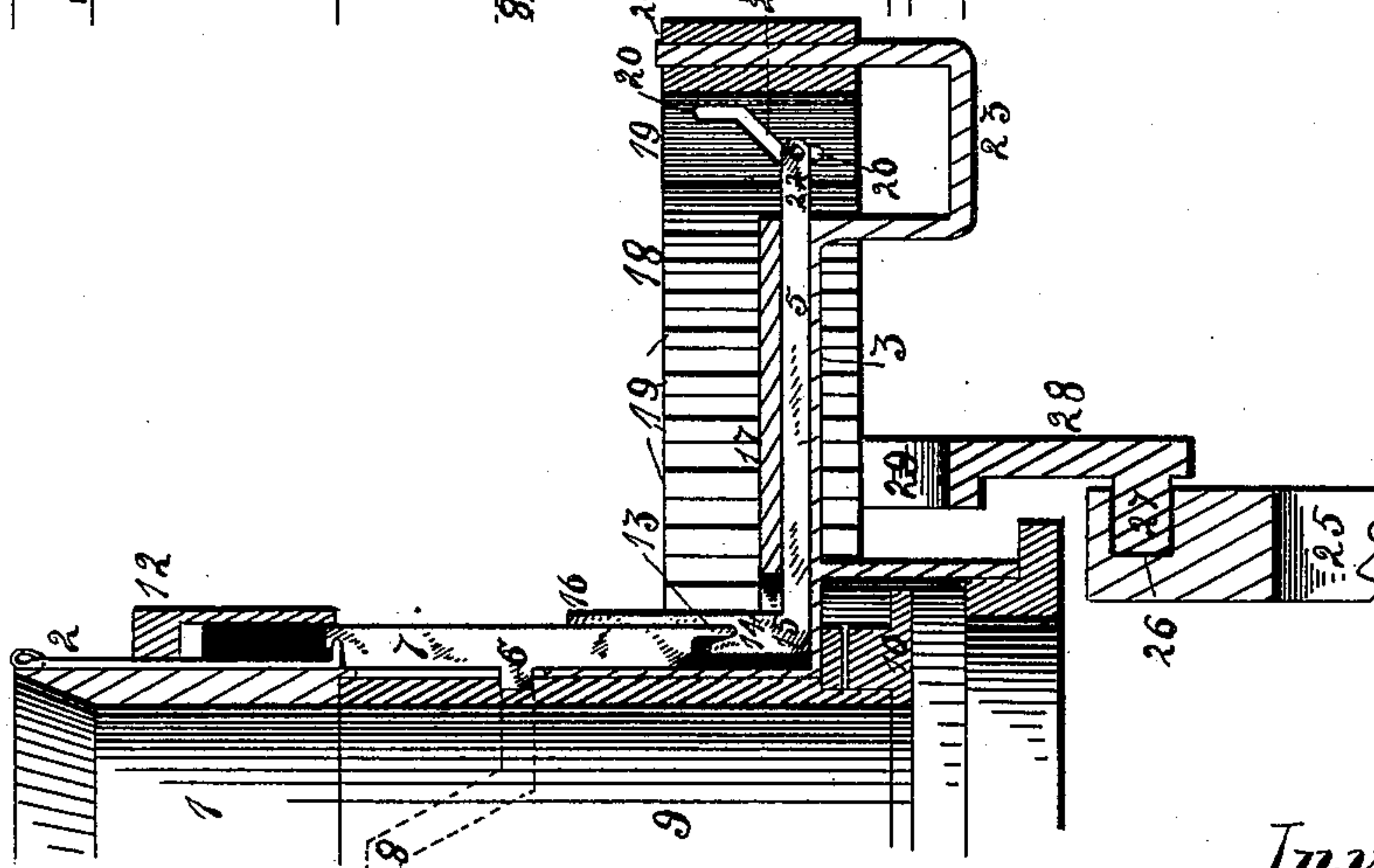


Fig. 3.



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# UNITED STATES PATENT OFFICE.

NICHOLAS J. WINLUND, OF ROCKFORD, ILLINOIS, ASSIGNOR OF TWO-THIRDS  
TO EDWARD McSHERRY AND HENRY W. PRICE, OF SAME PLACE.

## KNITTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 478,673, dated July 12, 1892.

Application filed May 18, 1891. Serial No. 393,224. (No model.)

*To all whom it may concern:*

Be it known that I, NICHOLAS J. WINLUND, a citizen of the United States, residing at Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Knitting-Machines, of which the following is a specification.

The object of this invention is to construct a knitting-machine provided with a needle-cylinder, knitting-needles, operating-cam, subjacks, and a pattern-wheel, located outside of the needle-cylinder, capable of a vertical movement and operating upon the subjacks to hold the needles in or out of engagement with the cam.

The further object of this invention is to provide the subjacks with an extension which serves as a guide for the needle in its vertical movement during the process of knitting.

In the accompanying drawings, Figure 1 is a plan view of a knitting-machine embodying the features of my invention. Fig. 2 is an elevation showing the connection between the pattern-wheel and its controlling mechanism. Figs. 3, 4, and 5 are vertical sections of a portion of the needle-cylinder, cam-cylinder, pattern-wheel, and the controlling device for the pattern-wheel, showing the various positions which the needle, jack, and subjack occupy during the process of knitting.

This invention relates to a class of knitting-machines known as the "automatic knitting-machines," in which the needles are thrown into and out of action by a pattern-wheel during the process of knitting. The needle-cylinder 1 in this instance is of the usual construction, having its interior surface provided with vertical grooves, within which the needles 2 move. From the lower end of the cylinder extends an annular base 3, having its upper surface provided with radial grooves 4 for the reception of subjacks 5. The needle-cylinder is vertically slotted a portion of its length, and through these slots extend a projection 6, from a jack 7, which enters the groove 8 of a cam-cylinder 9, located within the central opening of the needle-cylinder. To the lower end of the needle-operating cam-cylinder is secured a gear-wheel 10, the teeth of which mesh with the teeth of a gear-wheel

11, to which a rotary or oscillatory movement is imparted from a prime mover.

Surrounding the needle-cylinder near its upper end is located a needle holding and releasing ring 12, which is provided with slots, so that when the ring is oscillated the slots will coincide with the needle-grooves of the cylinder and permit the removal of a needle, and when oscillated the proper distance the grooves will coincide with the spaces between the grooves of the needle-cylinder, thereby holding the needles in their working position. This needle holding and releasing ring and the cam-cylinder form the subject-matter of Letters Patent granted to me April 28, 1891, Nos. 451,285 and 451,286, and are therefore not claimed in this specification.

The jacks 7 are located in the needle-grooves of the needle-cylinder and have a hook connection with the lower end of the needle, by reason of which the needle is moved vertically as the cam-cylinder 9 rotates or oscillates by reason of the projection 6 of the jack entering the cam-groove. The lower end of the jack is provided with an extension 13, which, when the jack is in the position shown at Figs. 3 and 5, enters a notch 14, formed in the upturned end 15 of the subjack 5. The subjacks are located in the radial grooves 4 of the annular base 3 and moved toward and from the center of the needle-cylinder. When the subjack is in its innermost position, it will occupy the position shown at Figs. 1, 3, and 4, and the upward extension 16 of the subjack holds the jack in its engagement with the operating-cam groove of the cam-cylinder during the process of knitting. When the subjack is withdrawn, the jack will be in its lowest position and its extension 13 will enter the notch 14 of the subjack, and by reason of this engagement the lower end of the jack will be moved outward and the projection 6 of the jack will be disengaged from the cam-groove of the cam-cylinder 9, thereby holding the jack, and consequently the needle, out of working position. A disk 17 is located over the annular base and holds the subjacks in their grooves, but in such a manner as to permit of their radial sliding movement. A pattern-wheel 18, in this instance of segmental form, is located outside



of the annular base extending from the needle-cylinder. This pattern-wheel is provided with a series of ribs 19, which radiate from the center of the needle-cylinder. In one face 5 of each of these ribs is formed two vertical grooves 20, joined together by a diagonal groove 21, which forms an irregular pathway. This pattern-wheel is so located that the outer end of the subjacks will lie in line with that 10 face of the rib which is provided with the irregular groove, and a pin or stud 22, projecting from the end of each subjack, enters the groove of one of the ribs. This pattern-wheel is supported in such a manner as to be capable of a vertical bodily movement, and is 15 held thus supported in this instance by three brackets 23, having a connection with the annular base and having their free ends upturned, which pass through vertical guide-ways 24 in the outer circumference of the 20 pattern-wheel. It will be seen that as this pattern-wheel is moved vertically the pin of the subjack will travel the irregular groove formed in the face of the ribs of the pattern-wheel, and this irregular groove is of such 25 form as to force the subjacks radially inward when the pattern-wheel is moved upward, and when the pattern-wheel is moved downward the subjacks will be moved outward. This movement of the subjacks will, by reason 30 of their engagement with the jacks, cause the jacks to become inoperative or to be held in engagement with their operating-cam. In this instance I have provided each of the ribs with the same form of groove, which will move all of the subjacks having a connection therewith 35 simultaneously inward or outward, thereby throwing into or withdrawing from action all of the jacks having a connection with the subjacks, which are operated by the pattern-wheel, and in this instance all needles except the fashioning-needles. It is necessary that 40 this vertical movement of the pattern-wheel should be accomplished automatically, and for that purpose I have located a wheel 25 below the pattern-wheel to move in a vertical plane. The face of this wheel 25 is provided with an irregular groove or pathway 26, which receives a horizontal stud 27, projecting from 45 a vertical arm 28, which has connection by means of a brace 29 with the pattern-wheel. The periphery of the wheel 25 is in notched or ratcheted form, and a dog 30, having a pivotal connection with the main supporting-

frame, carries a spring-actuated pawl 31, which 55 engages the teeth of the wheel 25. This dog is operated by the movement of a rotating cam-wheel 32. As this cam-wheel is rotated it moves the dog on its pivot, which causes the pawl to engage the teeth of the wheel 25, 60 imparting thereto an intermitting rotary movement, which is repeated at each revolution of the cam-wheel. When this wheel 25 is rotated a sufficient distance, the stud 27 will descend from the pathway having the 65 greatest diameter to the pathway having the least diameter, which will cause a vertical movement to be imparted to the pattern-wheel, and this vertical movement is repeated when the stud changes from one path to the other. 70 It will be seen that by this construction of the knitting-machine all of the needles are under positive control either while they are in engagement with their cam-cylinders or disengaged therefrom. 75

I claim as my invention—

1. In a knitting-machine, the combination of a needle-cylinder, knitting-needles, jacks, subjacks, and an operating-cam, the subjacks being provided with an extension which forms 80 a guide for the jacks and holds them in engagement with the cam during the process of knitting.
2. In a knitting-machine, the combination of a needle-cylinder, knitting-needles, an operating-cam, subjacks, and a pattern-wheel 85 located outside of the needle-cylinder and capable of a vertical movement and operating upon the subjacks to hold the needles in or out of engagement with the cam. 90
3. In a knitting-machine, the combination of a needle-cylinder, a series of knitting-needles, a series of subjacks, and a pattern-wheel located outside of the needle-cylinder and capable of a vertical movement, and means for 95 moving the pattern-wheel, each of the subjacks having an independent connection with the pattern-wheel.
4. In a knitting-machine, the combination of a needle-cylinder, needles located therein, 100 an annular base extending from the cylinder, said base being provided with radial grooves, subjacks located in said grooves, and a top plate holding the subjacks in position.

NICHOLAS J. WINLUND.

Witnesses:

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