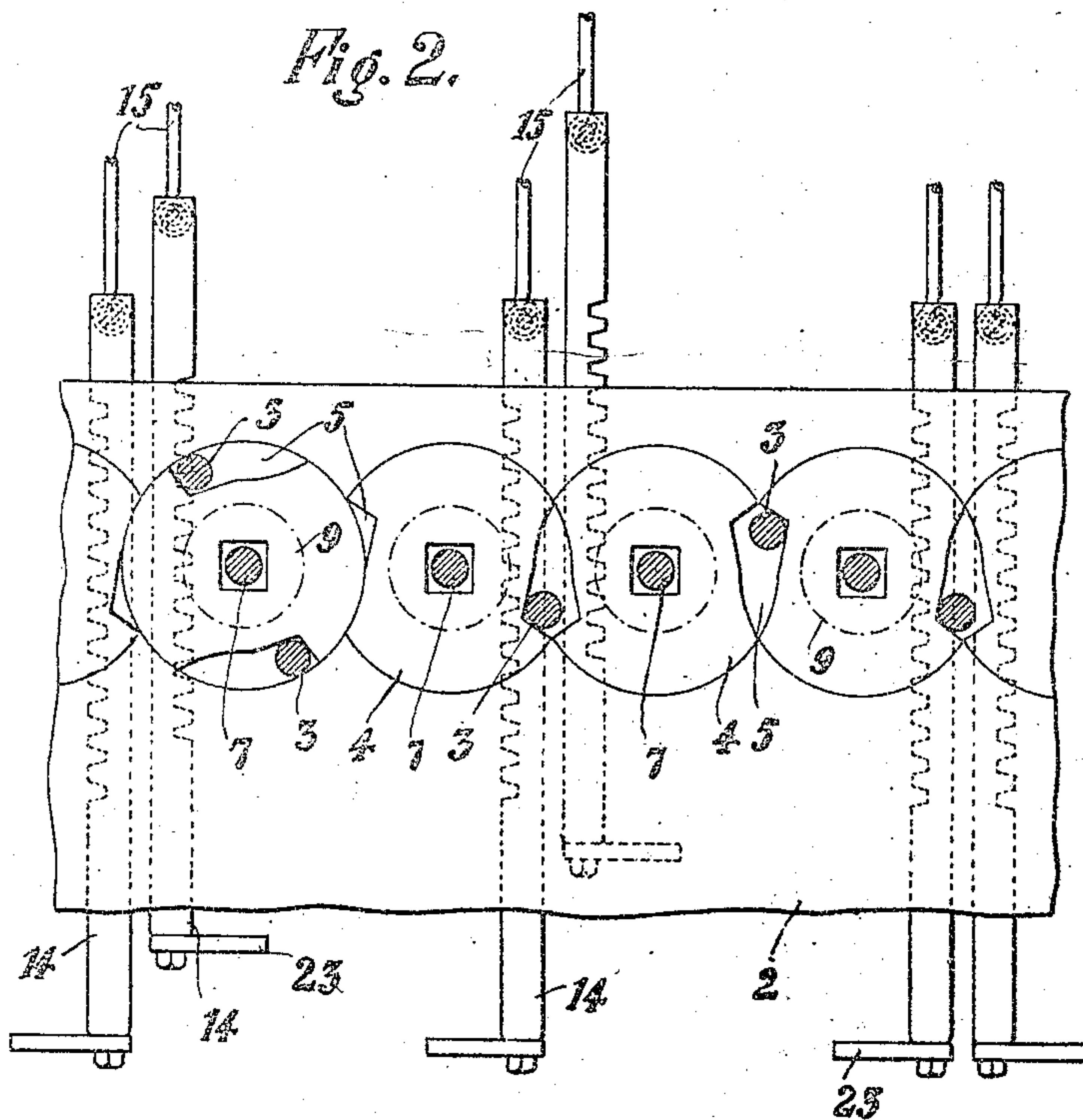
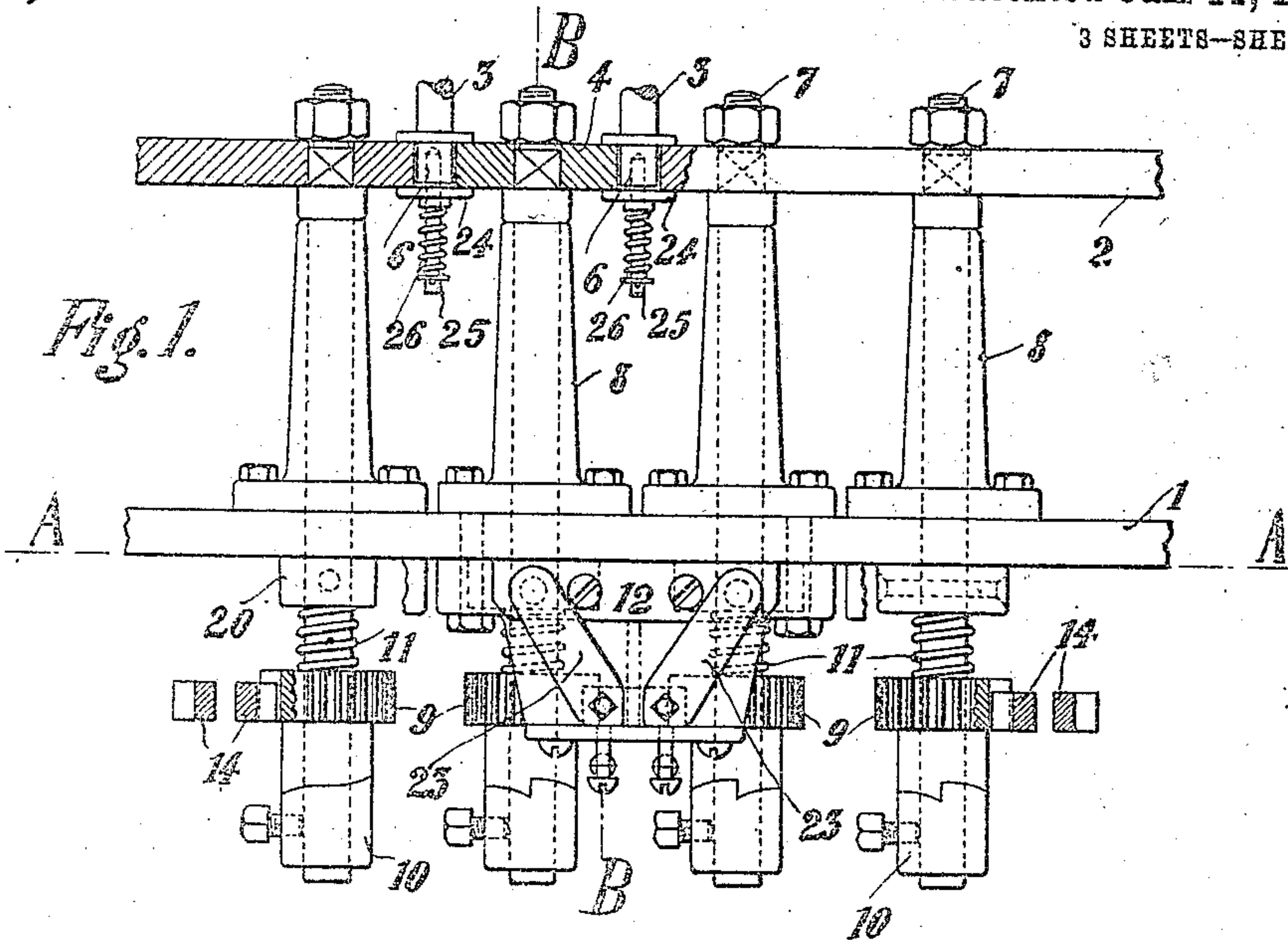


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SINGLE THREAD LACE BOBBIN MACHINE.
APPLICATION FILED JUNE 16, 1909.

946,445.

Patented Jan. 11, 1910

3 SHEETS—SHEET 1.



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Fig. 3.

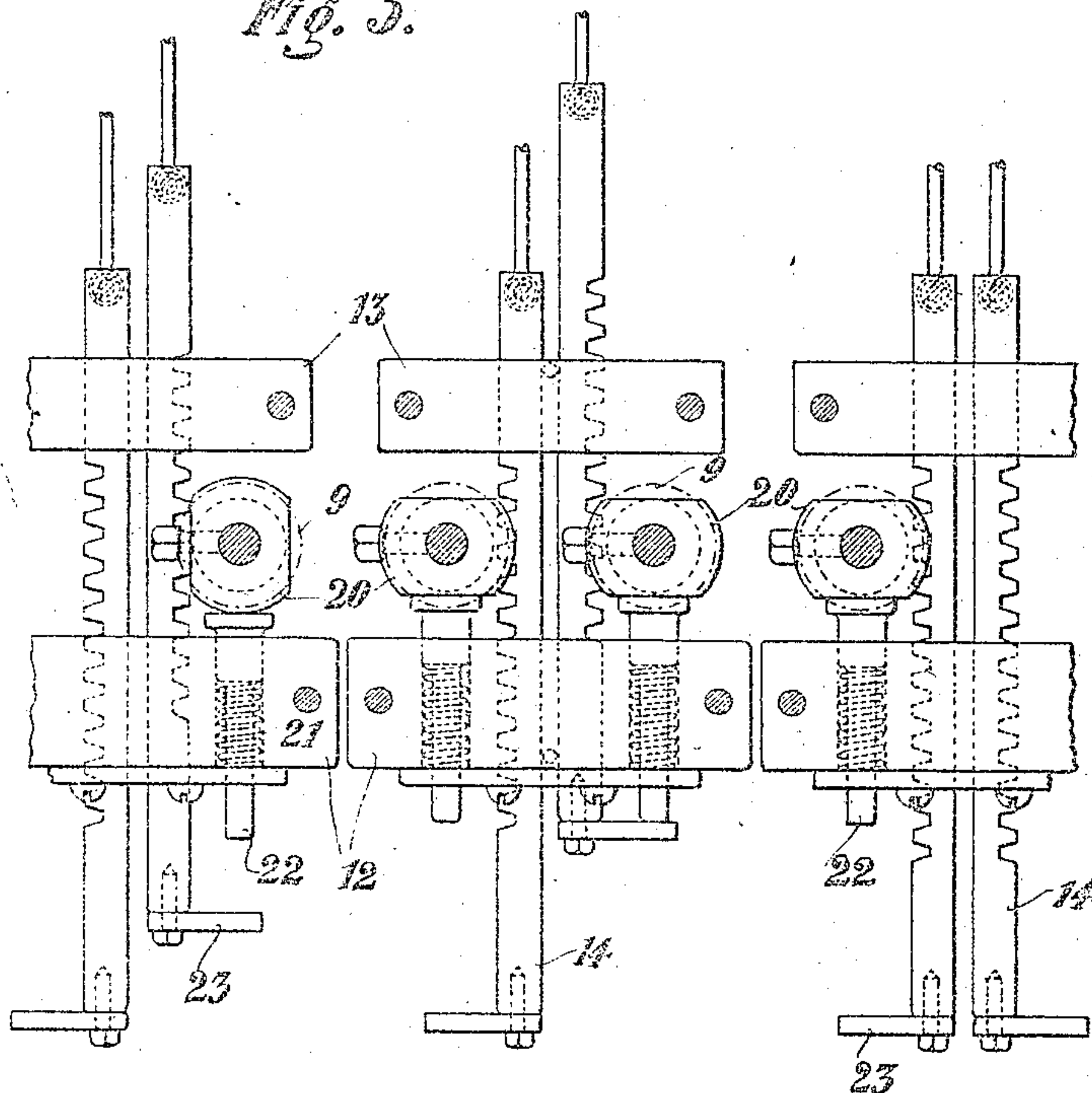
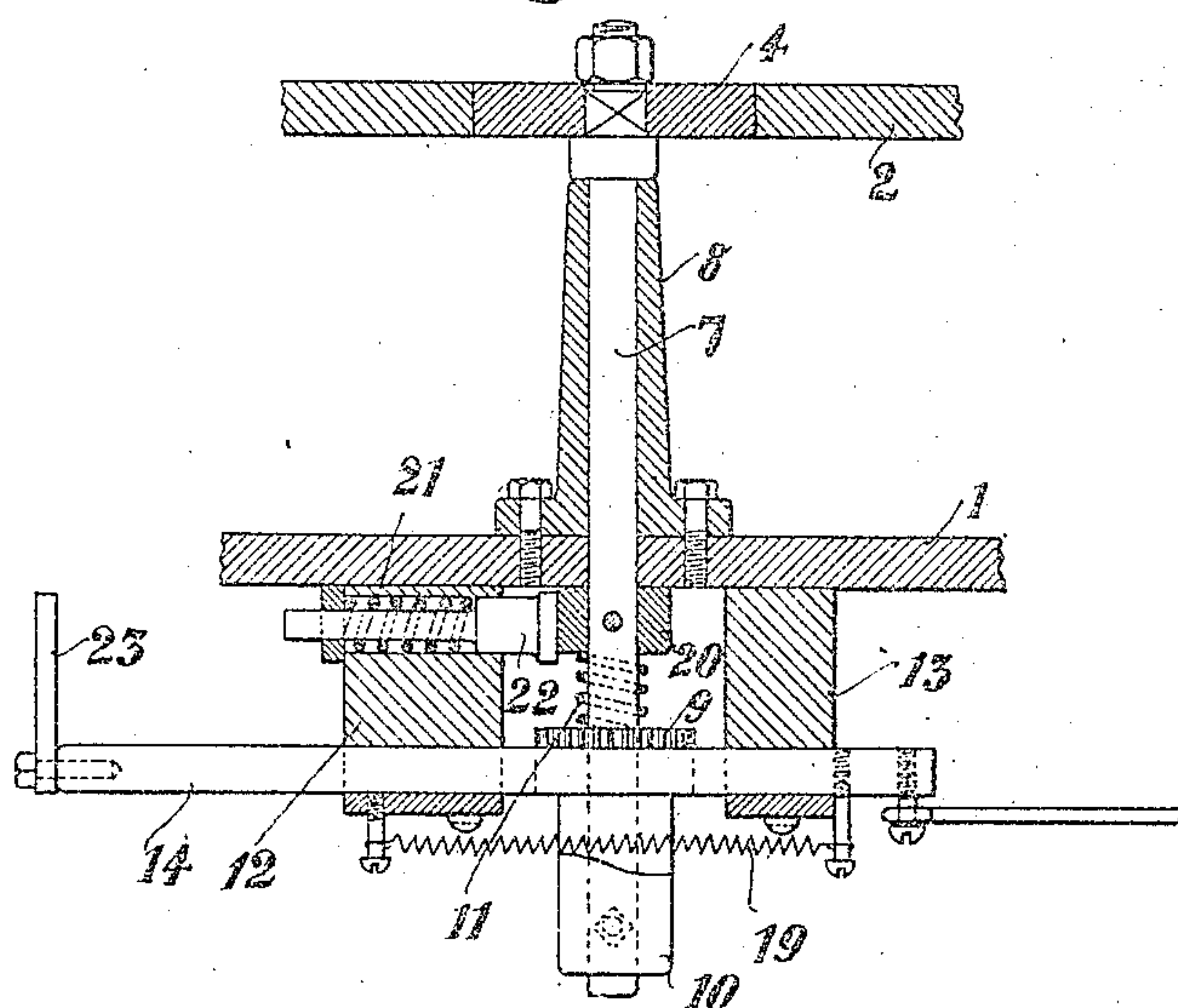


Fig. 4.



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Fig. 5.

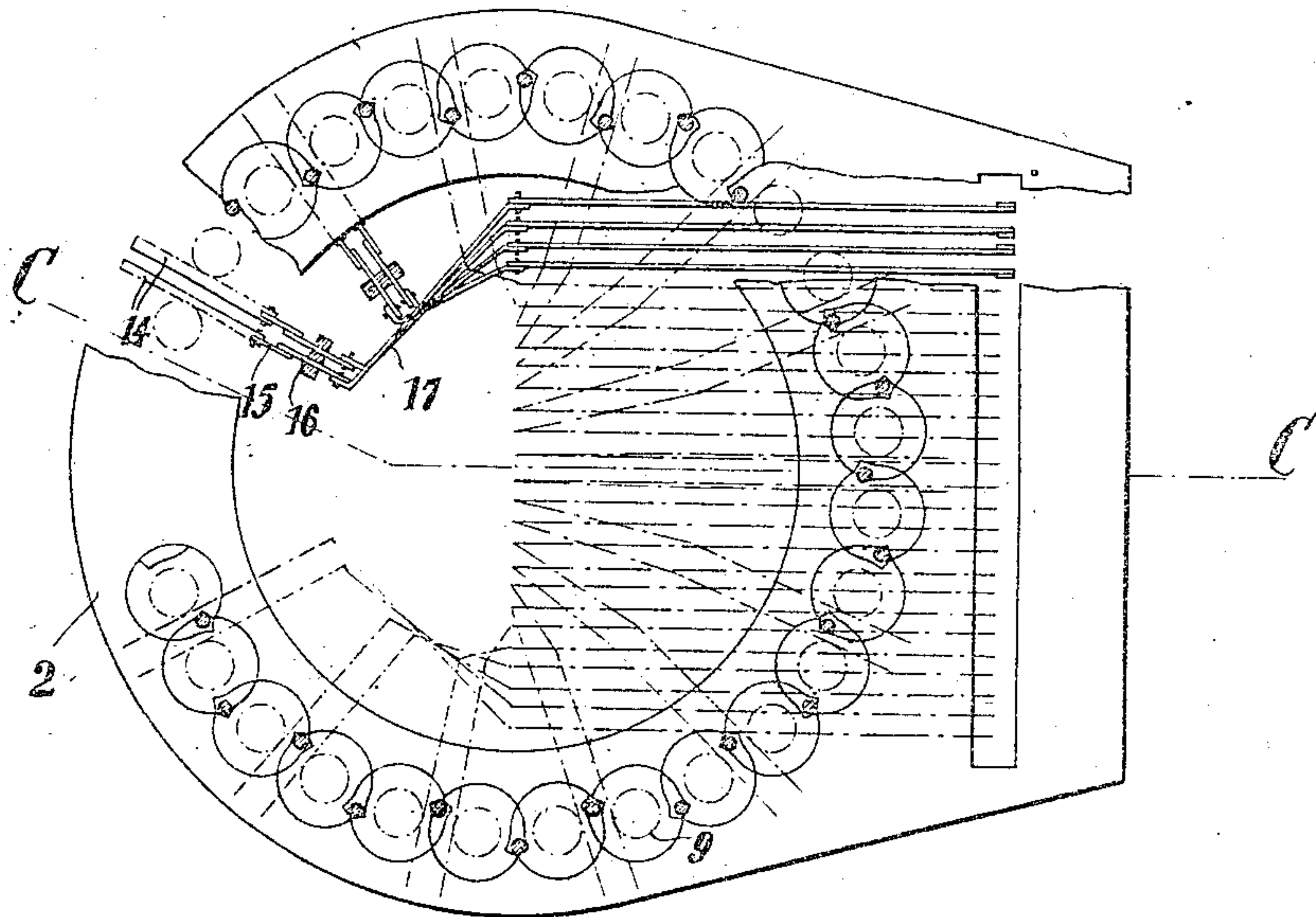


Fig. 6.

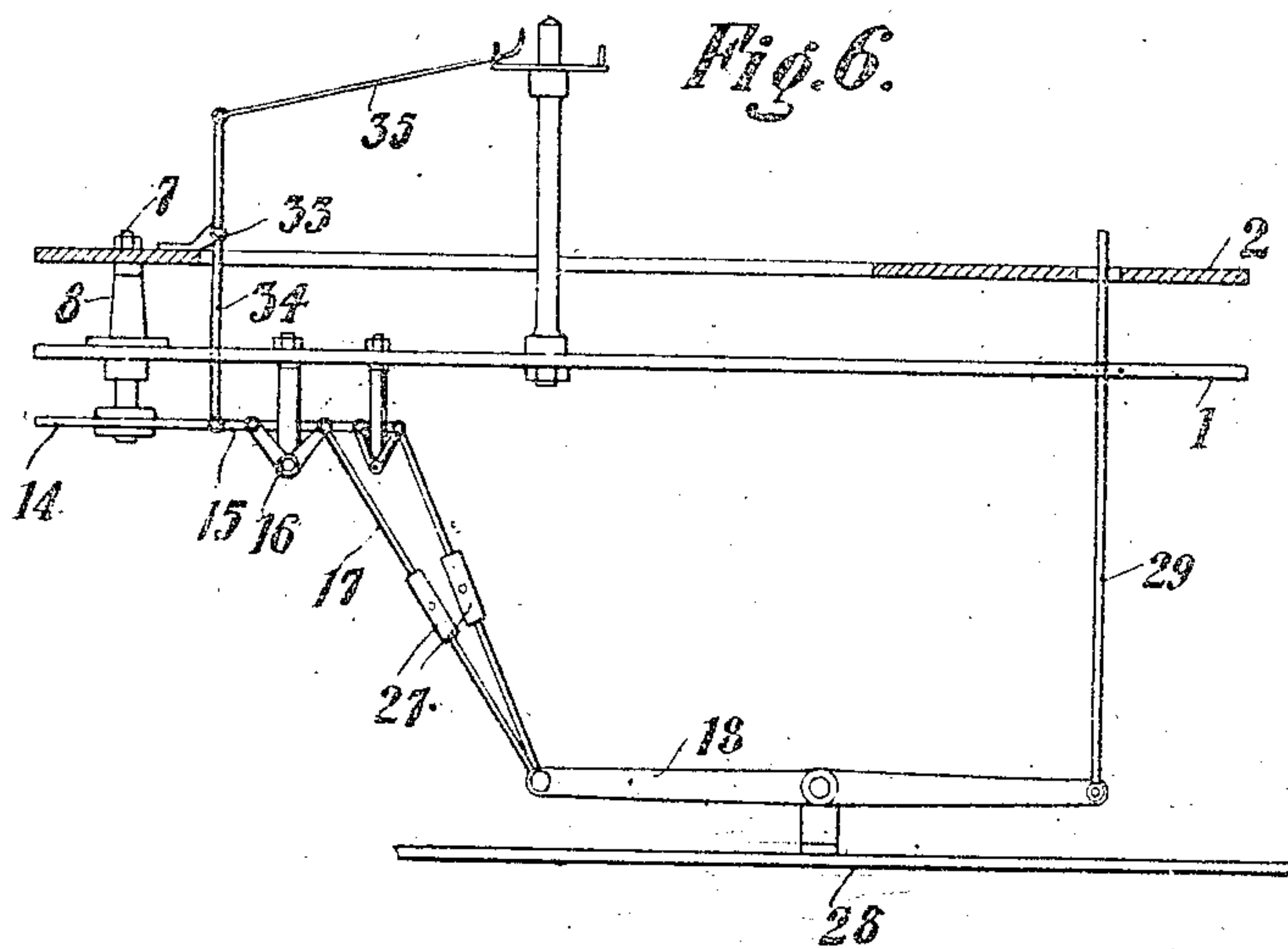
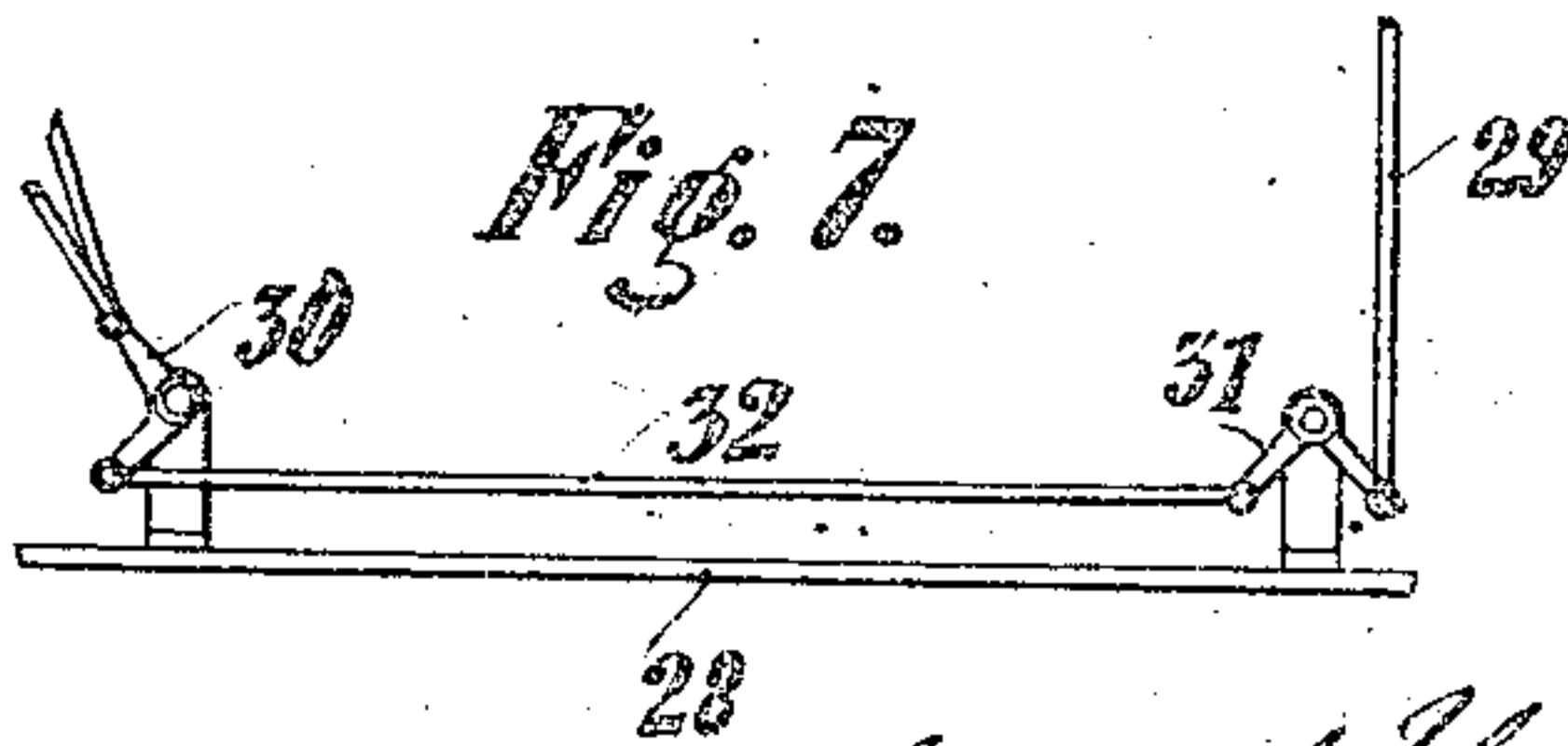


Fig. 7.



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EMIL KRENZLER, OF BARMEN, GERMANY.

SINGLE-THREAD LACE-BOBBIN MACHINE.

946,445.

Specification of Letters Patent.

Patented Jan. 11, 1910.

Application filed June 16, 1909. Serial No. 502,529.

To all whom it may concern:

Be it known that I, EMIL KRENZLER, a citizen of the German Empire, residing at Barmen, in the Province of Rhenish Prussia and Kingdom of Prussia, Germany, have invented certain new and useful Improvements in Single-Threaded Lace-Bobbin Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to single-threaded lace-bobbin machines.

In the case of the so-called single-threaded lace-movements hitherto known, that is, in the case of the movements in which a bobbin corresponds to each plate, the bobbins although they always work with only a few plates and never on two neighboring plates are driven by continuously rotating drivers engaging with their driving wheels. Consequently in the case of these machines special contrivances are necessary for the purpose of temporarily stopping the bobbins and said contrivances not only make the whole construction of the machines very complicated but frequently they do not work reliably.

In contradistinction to these well-known machines the essence of the new bobbin-machines made according to the present invention consists in the bobbin-drivers being moved through suitable intermediate members by the jacquard machine and never being set in action unless the bobbins, which are situated on the corresponding plate, are to work, that is, are to revolve on said plate or to be transferred to the neighboring plate. In the case of this new arrangement of the machines, the stopping devices for the bobbins are consequently no longer necessary and the continuously rotating toothed wheels which drive the drivers and which have hitherto existed in the case of all bobbin-machines are dispensed with. Consequently the whole construction of the machine is very much simpler than that of the old machines, and moreover the new machine runs more quickly and with greater certainty and almost noiselessly. Finally, in the case of the new machine it is possible to construct the plates themselves as bobbin-drivers so that a special track and the arrangement of tongue-switches is no longer requisite, the plates being arranged

revolvably with a tight fit in the track-plate and regulating the motion of the bobbins. In the case of the new machine in consequence of the avoidance of the open track, the penetration of dirt into the interior of the machine is likewise avoided.

In the accompanying drawings one embodiment of the invention is illustrated by way of example.

In said drawings:—Figure 1 is a part sectional elevation of a part of the machine, Fig. 2 a plan of the same, Fig. 3 a section on the line A—A Fig. 1, and Fig. 4 a section on the line B—B of Fig. 1 in which for the sake of simplicity the plates are drawn as though situated in a straight line. Fig. 5 is a diagrammatic plan of the machine, some parts being removed, Fig. 6 a section on the line C—C Fig. 5, and Fig. 7 an elevation of a detail.

Referring to the drawings, 1 is the lower plate and 2 the upper plate on which the bobbins 3 move and in which the drivers 4 are arranged. These drivers 4 are of course arranged as usual in a circle and as shown diagrammatically in Fig. 5. In Figs. 1—4 however, they are drawn as though they were situated in a straight line, this being for the sake of simplicity. These drivers 4 are circular and each possesses two driving recesses 5 situated 180° apart, in which the bobbins 3 are held with their circular core 6. The drivers 4 are secured on spindles 7 which are revolvably guided in bushes 8 fastened on the lower plate 1, so that with the aid of these spindles 7 the drivers 4 can be rotated in the upper plate 2 in which they are accurately fitted. In their position of rest the drivers 4 occupy the position indicated at the right of Fig. 2; that is, in such a position that the recesses 5 of two neighboring drivers correspond with one another and consequently form a common opening in which a bobbin 3 is situated. Each driver so moves into the path of the neighboring plate that each of two adjacent drivers can carry along with it the bobbin situated between them, and thus a bobbin can, as desired, be left on the same driver or be transferred on to the next one according as the one or the other plate is rotated. The driving recesses are consequently so designed that each plate can be rotated without hindrance while the two neighboring drivers are at a standstill, which is sufficient since as mentioned above in the

case of these machines bobbins never work on two neighboring drivers.

The rotation of the drivers is effected according to the present invention by means of the jacquard machine and this is performed in such a manner that during one stroke of the jacquard machine the driver set in action at the time is always turned through 180° , so that the driving recesses 5 in a driver and the bobbin therein change places as is necessary in single-threaded lace-movements. In order to actuate the drivers 4 a pinion 9 is loosely and revolubly arranged underneath the lower plate 1 of the machine on each of the spindles 7 carrying the drivers 4, which spindles rest by means of their collars on the bushes 8. The lower end of the nave of each pinion is extended and is formed as the one half of a clutch-coupling, which half engages in the other half 10 which is rigidly connected with the spindle 7, a spring 11 being provided which tends to hold the halves of the coupling in engagement with one another. On the under side of the lower plate 1, bearing blocks 12, 13 are fixed in which the racks 14 which engage with the pinions 9 are displaceably mounted. The latter are each connected through a rod 15, angle-lever 16 and a rod 17 with the lever 18 adapted to be actuated by the jacquard machine and thus are moved in the one direction by the latter. The return motion of the racks is effected by the springs 19 (Fig. 4). The stroke of the racks is such that when the racks are moved in the one direction the pinions 9 perform half a revolution, so that the bobbin-drivers turn through 180° . The left-hand part of Fig. 2 shows a bobbin-driver rotated through about 90° . During the return motion of the rack the bobbin-driver remains stationary in its new position, the pinion rotates loosely around the spindle 7, its toothed nave sliding over the teeth on the coupling-half 10 and it itself rising in opposition to the action of the spring 11.

If one and the same driver is moved several times consecutively, the two bobbins on it are driven around and their threads are twisted together. If on the contrary, first the one driver and then the neighboring driver is turned, the bobbins on the first driver are transferred to the neighboring plate so that they can then work together on the latter with other bobbins, as is necessary in the case of single-threaded lace-movements.

In order to secure the bobbin-drivers in the various positions there is connected with each of the spindles 7 a ring 20 flattened at opposite sides against which a presser 22 subjected to the action of a spring 21 presses laterally. As soon as during the rotation of the bobbin-driver the presser 22 comes

against one of the lateral flattened portions of the ring 20, which takes place when the rack has reached the end of its stroke, the bobbin-driver is held fast. In order to prevent any possibility of the bobbin-driver rotating farther and therefore the bobbin moving farther in consequence of centrifugal force, in some cases a stop 23 is connected to the one end of the rack, which stop in the end position of the rack comes against the presser 22 and so prevents it from receding in opposition to the spring. On the return of the rack the presser is freed again and can yield resiliently on the bobbin-driver rotating the next time.

In order to prevent the bobbin 3 from traveling too far on the completion of the rotation of the driver, the lower guide plate 24 of the bobbin is not connected rigidly with the core 6, but is held movably on a pin 25 and is subjected to the action of a spring 26 arranged on said pin, so that the plate 24 is pressed gently against the upper plate 2 or the driver 4. By these means it is effected that the bobbins come to rest with the driver and run quietly even after they have become partially worn.

All the racks 14 are radial with regard to the center of the machine, as are also the rods 15 which are pivoted to them. The angle-levers 16 are arranged in a circle while the rods 17 which are connected with said angle-levers and which are suitably provided with an adjusting-device 27 are arranged with their lower ends in a straight line in which they are connected with the ends of the levers 18 which are all of the same length and which are mounted in a straight line side by side under the table. To the other ends of the levers 18 are connected the rods 29 operated by the jacquard. This arrangement of the jacquard rods offers the advantage that the various parts of the arrangement with the exception of the rods 17 may have the same shape and dimensions, which materially reduces the cost of manufacture and considerably facilitates the putting together of the machine.

Instead of the levers 18, pairs of angle-levers 30, 31 may, as shown in Fig. 7, be mounted on the plate 28, said angle-levers being connected together in pairs by means of rods 32 and being operated through rods 29 by the jacquard. The jacquard machine since it is well known *per se* is not shown in the drawings.

The manner in which the new machine is constructed renders it possible to utilize the reciprocating motion of the rack for the actuation of the crown-beater needle apparatus to the crossing place in question. For this purpose a two-armed lever 34 mounted at 33 on the upper plate 2 is connected at one end with the rack, the other end of which lever pivotally engages di-

rectly with the beater-needle 35. As soon as the rack is displaced by the jacquard machine the bobbin-driver is rotated, and the beater-needle moves away from the place of interlacing, whereas as soon as the rack has returned under the action of the spring 19 into its starting position said striker-needle flies forward again and strikes against the crossing of the threads which has just been produced.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In combination with a series of drivers and their spindles, the bobbins carried by said drivers, pinions turning with the spindles of said drivers, racks engaging said pinions, means for reciprocating said racks and means for removing the pinions from engagement with the racks during the return reciprocation of the same, for the purpose set forth.

2. In combination with a series of rotary drivers, the bobbins carried by them, the spindles of said drivers, pinions turning with the spindles of said drivers, reciprocating racks adapted to engage said pinions, rings carried by said spindles and having laterally flattened parts, and devices spring pressed against said rings to prevent by engagement with the flattened parts the bobbin drivers from turning by their centrifugal momentum.

3. In combination with a series of rotary drivers, the bobbins carried by them, spindles for said drivers, pinions, flattened rings carried by their respective spindles, pressers spring held against said rings, reciprocating

racks engaging said pinions and stops attached to said racks and arranged to cooperate with said springs in holding said pressers to their work at the end of the longitudinal movement of each rack in one direction substantially as set forth.

4. In combination with a bobbin driver and means for rotating the same, a bobbin carried by said driver, its pin, a fixed part of the machine, a guide plate on said bobbin pin and a spring forcing said guide plate against said fixed part to act as a brake substantially as set forth.

5. In combination with a bobbin driver and a pinion turning therewith, a rack engaging said pinion, means reciprocating said rack to rotate said driver, a beater needle and means interposed between said rack and said needle whereby the former operates the latter as its action is needed in interlacing substantially as set forth.

6. In combination with levers arranged to be actuated by jacquard mechanism, angle levers and connecting rods actuated by the levers first mentioned, racks reciprocated by said angle levers, driver spindles provided with pinions which are fast thereon and engage said racks, drivers rotated thereby and pairs of bobbins carried by said drivers as set forth.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

EMIL KRENZLER. [L. s.]

Witnesses:

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CHAS. J. WRIGHT.