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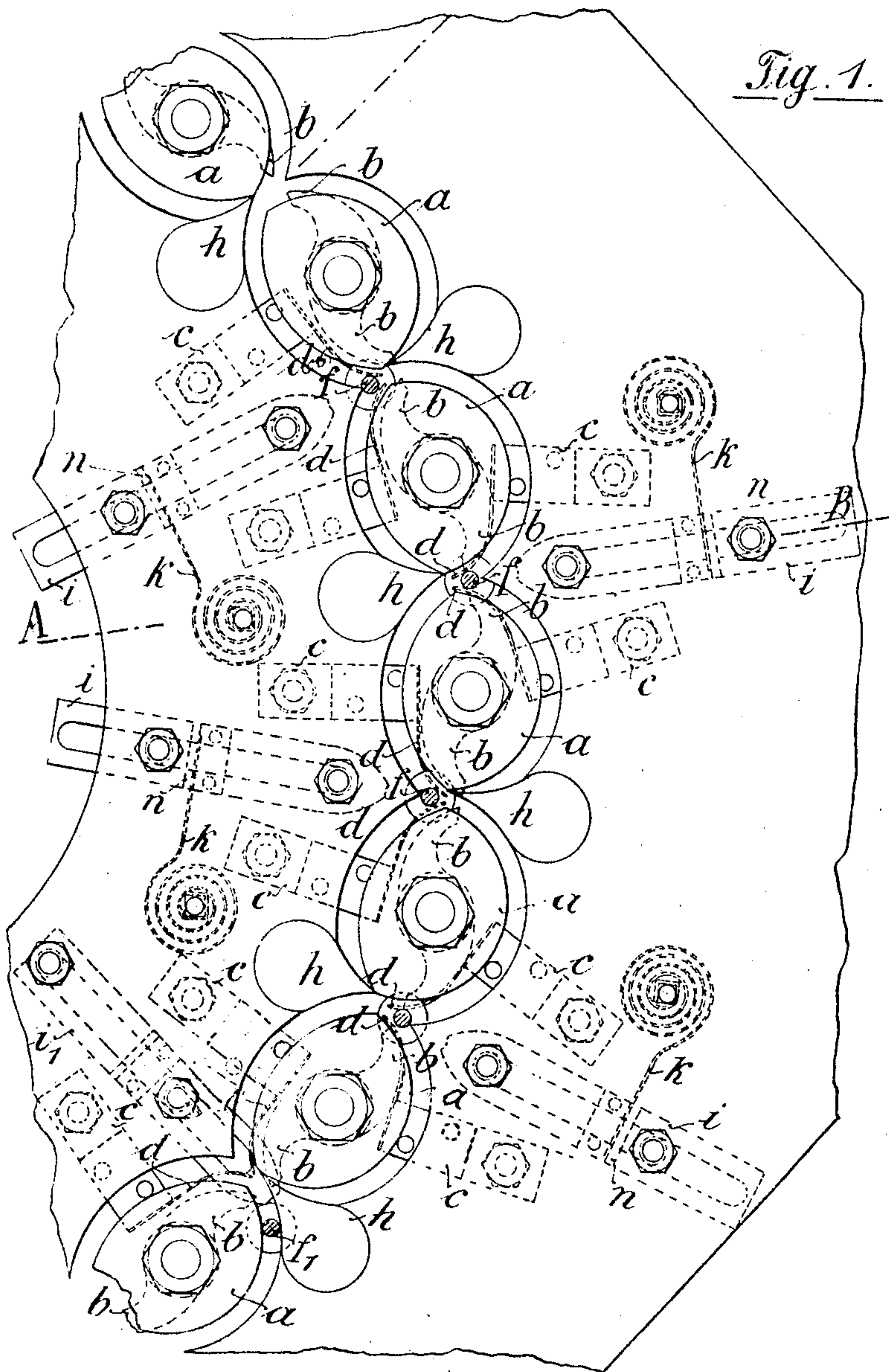
PATENTED MAR. 17, 1908.

F. MEYER.
BRAIDING AND LACE MAKING MACHINE.

APPLICATION FILED JUNE 7, 1907.

7 SHEETS—SHEET 1.

Fig. 1.



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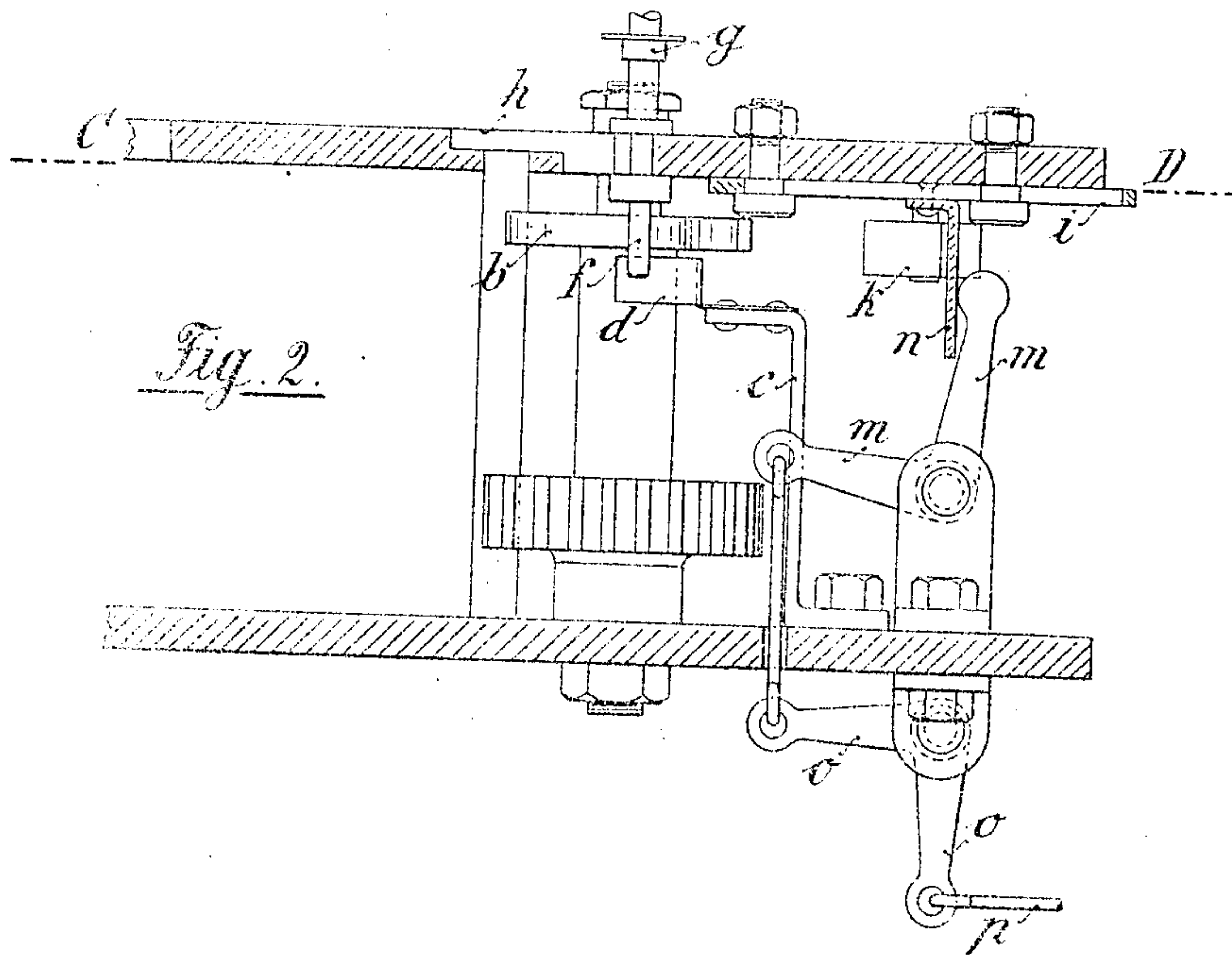
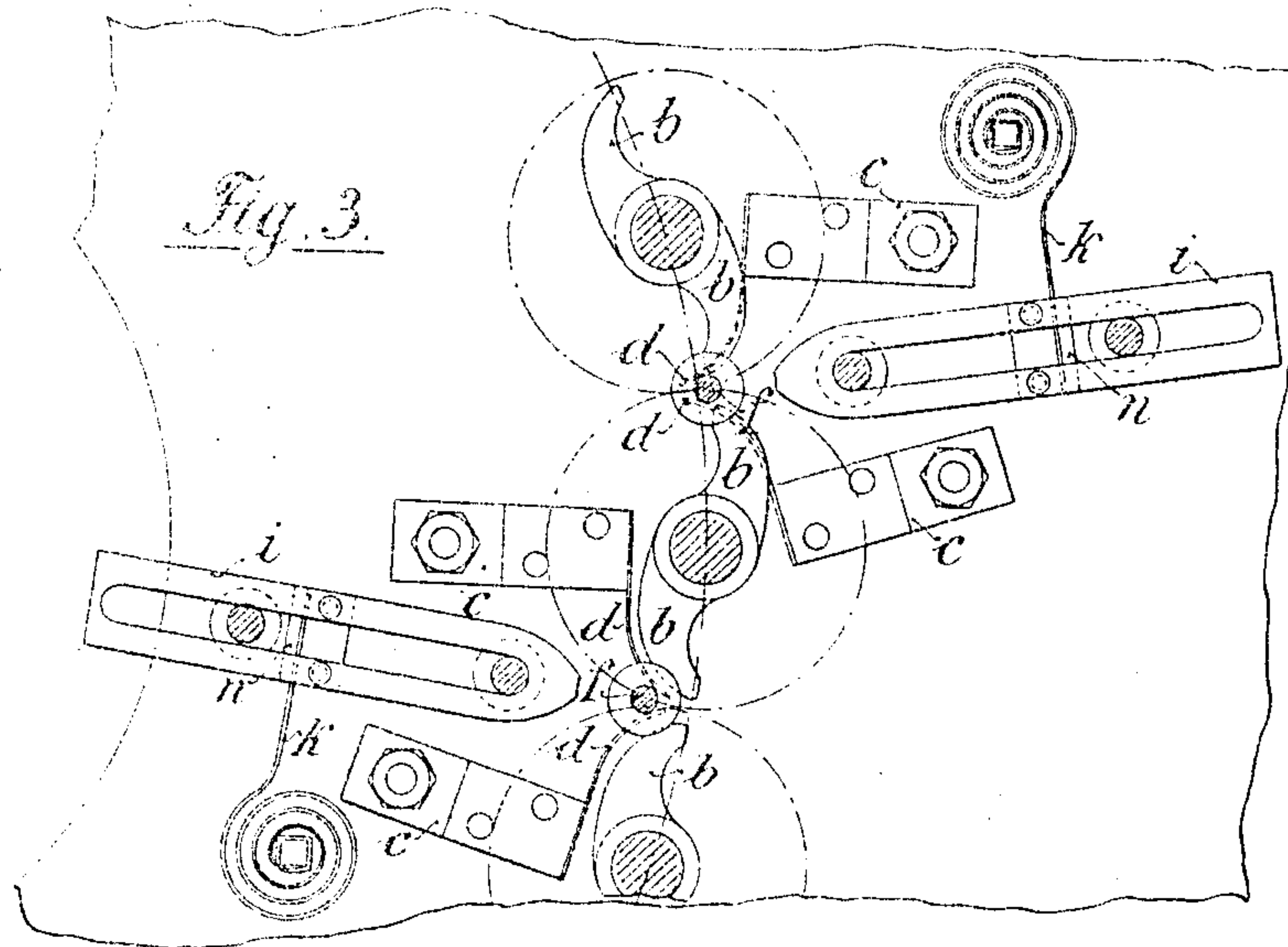
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7 SHEETS—SHEET 2.



Witnesses:

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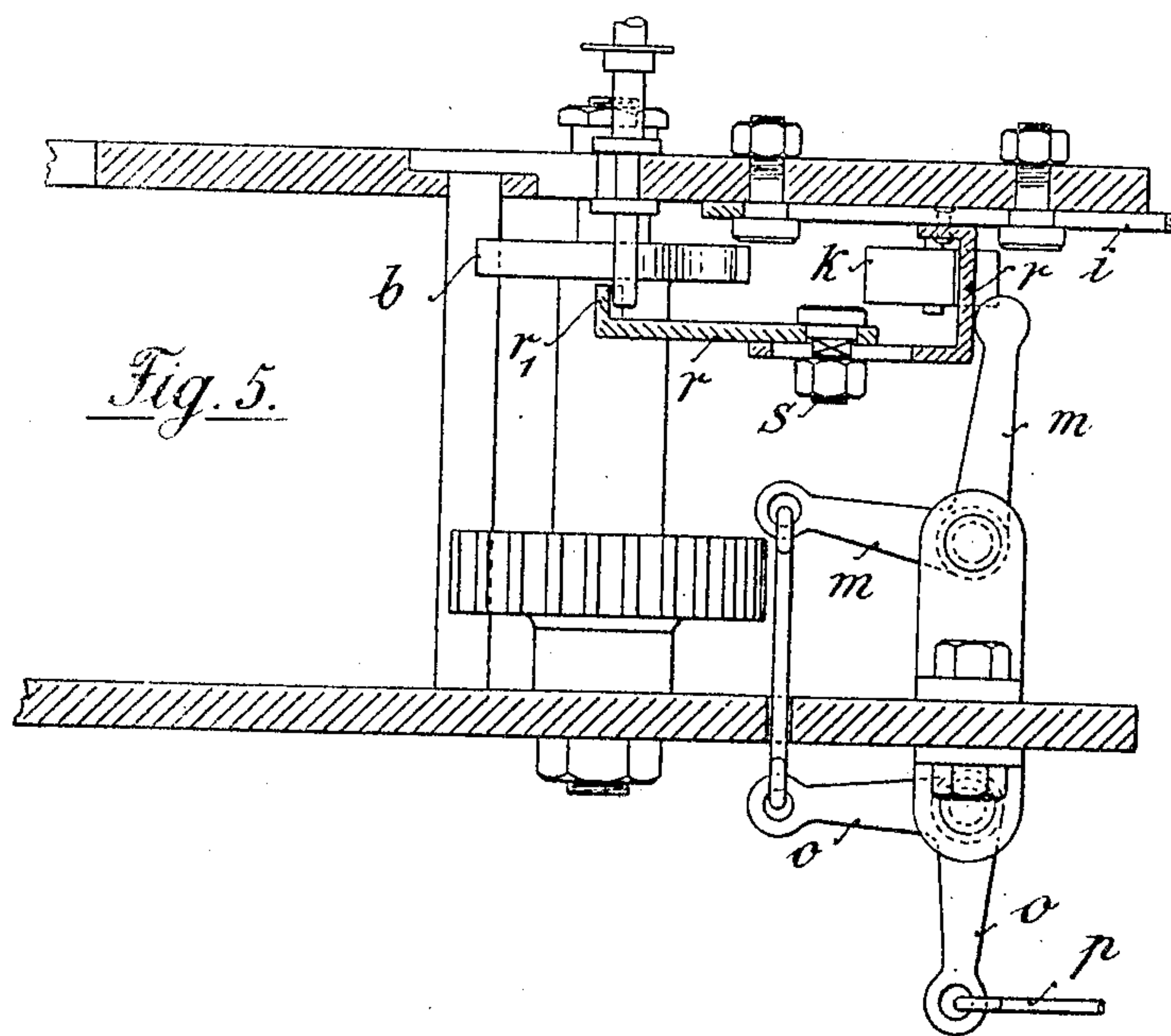
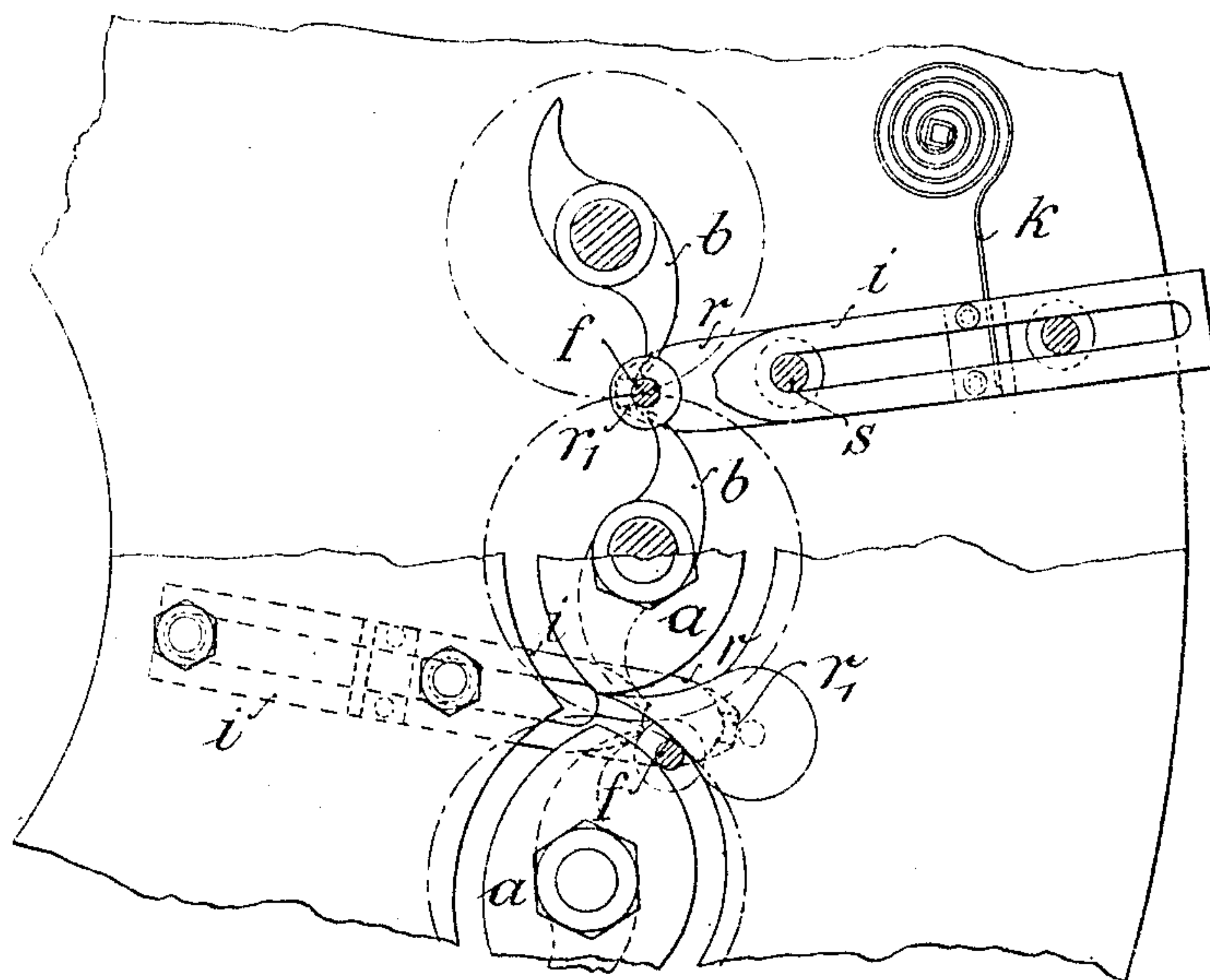
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7 SHEETS—SHEET 3.

Fig. 4.



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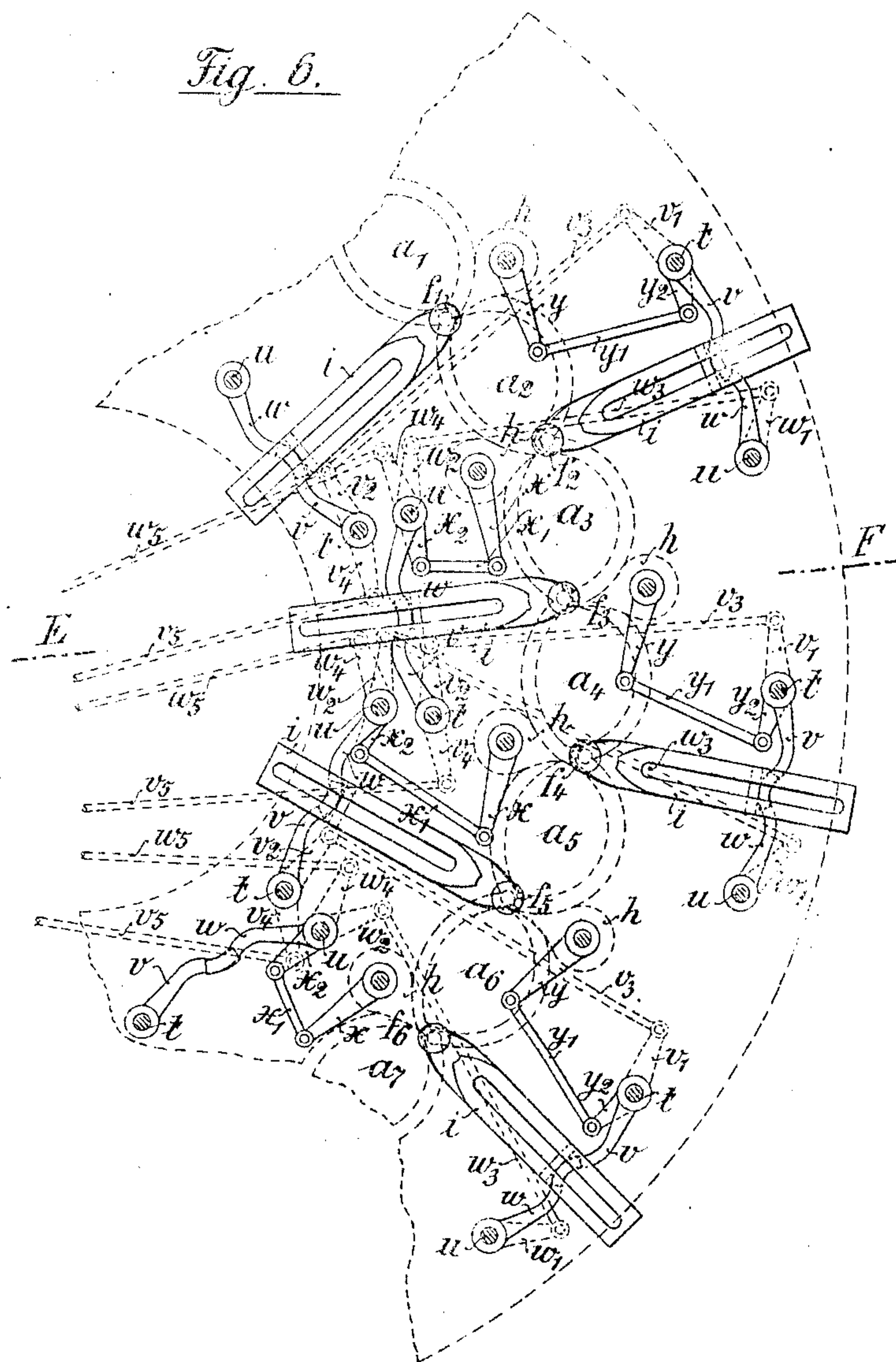
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7 SHEETS—SHEET 4.

Fig. 6.



Witnesses:

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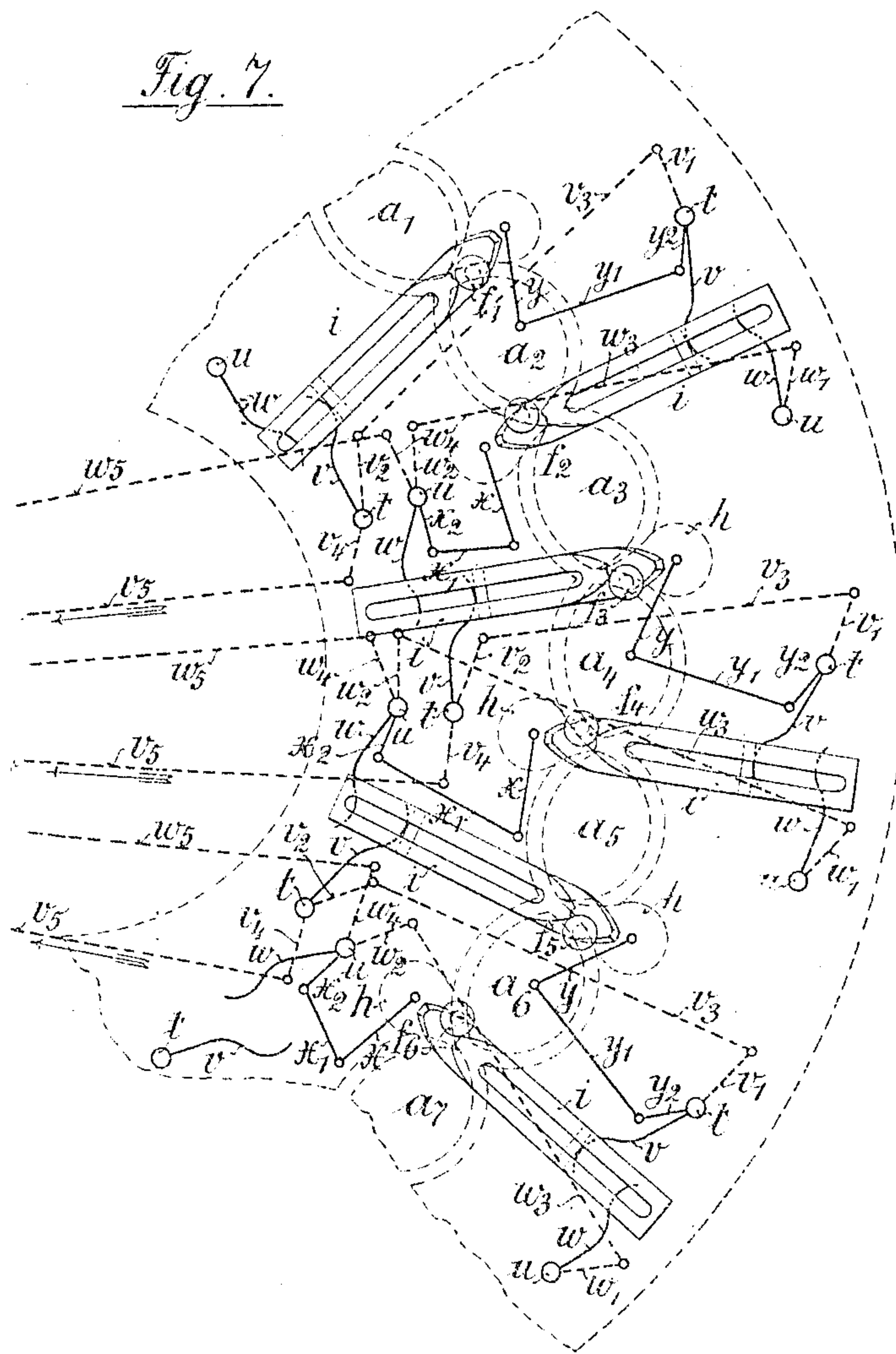
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7 SHEETS—SHEET 5.

Fig. 7.



Witnesses:

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PATENTED MAR. 17, 1908.

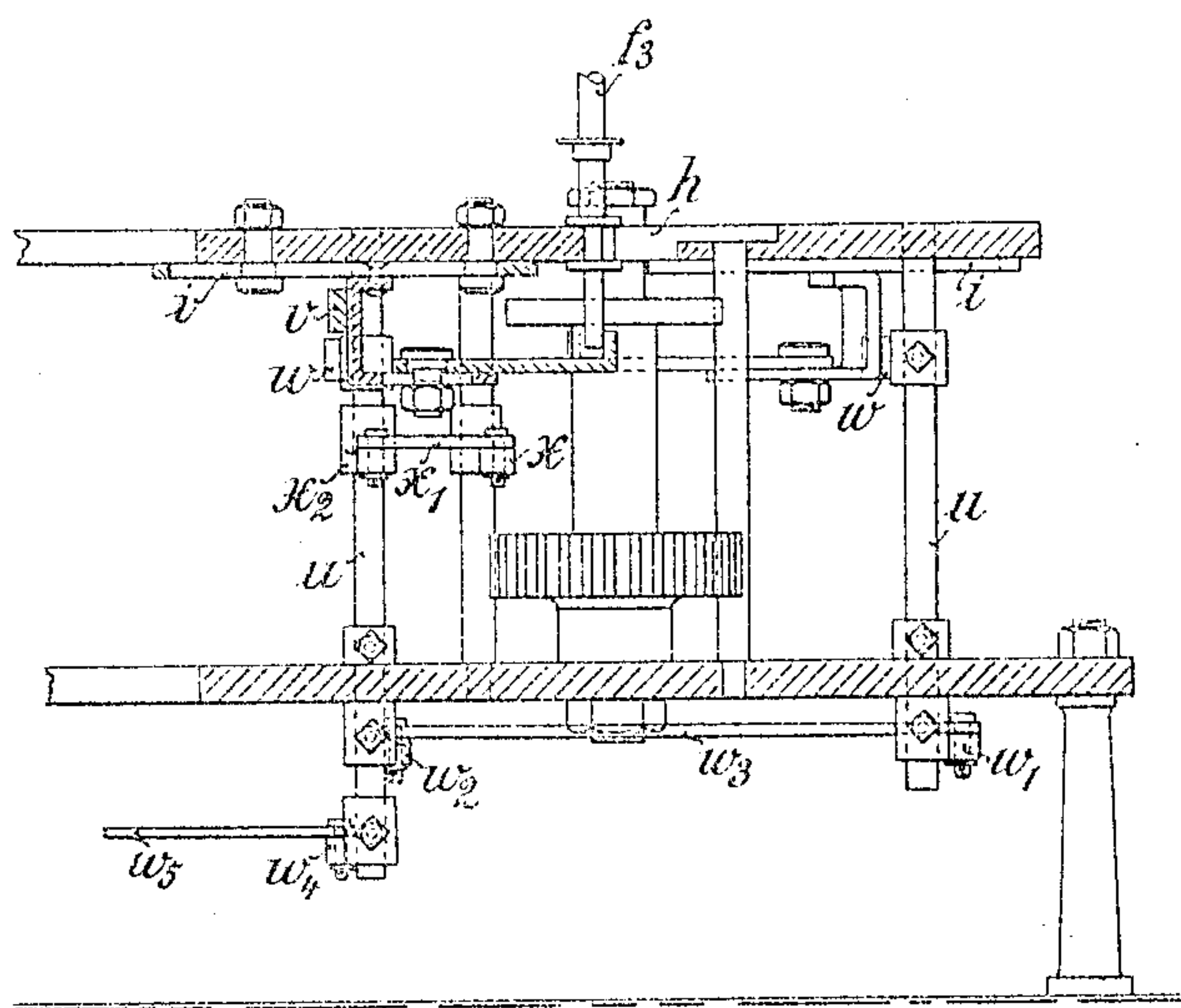
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7 SHEETS—SHEET 7

Fig. 9.



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UNITED STATES PATENT OFFICE.

FERDINAND MEYER, OF BARMEN, GERMANY, ASSIGNOR TO BARTELS, DIERICH'S & CO.
GESELLSCHAFT MIT BESCHRÄNKTER HAFTUNG, OF BARMEN, GERMANY.

BRAIDING AND LACE-MAKING MACHINE.

No. 882,332.

Specification of Letters Patent.

Patented March 17, 1908.

Application filed June 7, 1907. Serial No. 377,833.

To all whom it may concern:

Be it known that I, FERDINAND MEYER, a subject of the Emperor of Germany, residing at Barmen, Emilstrasse 21, in Rhenish Prussia, Germany, have invented new and useful Improvements in or Relating to Braiding and Lace-Making Machines, of which the following is a specification.

Regulation of the bobbin travel in braiding and lace-making machines by temporary stopping of the bobbins in their tracks or at the points of intersection or crossing of the same is well known.

In order to cause the arrested bobbin to again pass into the track in front of the drivers, slides are used which cause the bobbin to move from the position of rest until it is placed at such a point in the track that it is within range of the bobbin drivers.

This invention relates to a device for effecting the stopping at the points of intersection in a simple and reliable manner. To that end the plates or trays are oval, that is to say longer in the direction of the wheel circle, than in their direction of width, and the drivers of the bobbins are of such length that they leave the driver pin of the bobbin when the latter has arrived at the center in front of the point of intersection or crossing of the tracks so that the bobbin stops here in front of two spring stopping devices or "holders" reaching into the point of intersection, while it is again rendered operative by a slide driven by the pattern gear which forces the bobbin between the two spring "holders" into the track to such an extent that it arrives again in front of the driver. As widened portions or recesses in the tracks or at the points of intersection are avoided, the bobbin has everywhere a positive guidance and is always stopped again at the same point at the place of stopping. As further, the pattern gear has no connection with the bobbin stopping devices, but only affects the advance of the bobbin slides, the machine, in addition to being made to work in a reliable manner, can be considerably simplified and cheapened.

In the drawings, Figure 1 shows in plan a portion of the track upper plate of the machine, Fig. 2 is a cross-section on line A—B of Fig. 1, and Fig. 3 is a plan in section on line C—D of Fig. 2. Figs. 4 and 5 are respectively plan and cross-section of a modified construction of the bobbin stopping device.

Fig. 6 shows a bobbin slide- and switch-motion in plan, on a portion of the machine, the upper plate being shown dotted, and the parts arranged under the bottom plate of the machine, being also shown dotted. Figs. 7 and 8 are also plans with the driving devices in different positions. Fig. 9 is a cross-section on line E—F of Fig. 6.

The trays *a* are larger in the direction of the wheel-circle than in width, and the bobbin drivers *b* are of such length that they carry with them the bobbin into the tracks having the shape corresponding to that of the trays, only up to the center in front of the crossing, and then pass the bobbin pin. Between the drivers of two adjoining wheels there is, therefore, a distance which is approximately equal to the thickness of the bobbin driving pin. Under the drivers are mounted on suitable supports *c* spring "holders" *d* which face each other with their free ends and form an inlet angle for the driving pin *f* of the bobbin *g*. The drivers *b* bring the bobbins up to the angle formed by the "holder" springs and then pass the bobbin pin. In that position the bobbin can, therefore, be stopped for any desired length of time. At each point of intersection or crossing, are mounted, opposite the switches *h* arranged and moved in well known manner, that is to say alternately on the inner and outer side of the wheel-circle, slides *i* which are advanced by the pattern gear, and push the bobbin which stopped in front of the holders *d*, with its front end into the track in front of the drivers. This position of slides and bobbins is shown in Fig. 1 at *i*, and *f*. According to the position of the switch, the advanced bobbin is brought to the right or to the left into the track and thus caused to work. The slide *i* is controlled by a spring *k* which brings it back again after each advance by the pattern gear. The connection of the slide to the pattern gear can be effected in different ways. In the construction illustrated in Fig. 2, a bell crank lever *m* engages behind a projection *n* of the slide *i*, against which also presses the spring *k*. The other arm of the lever *m* is connected to a second bell crank lever *o* arranged under the machine and driven by means of the connecting rod *p* by the pattern gear.

As the springs *d* have often to be repaired owing to the wearing out, and are easily broken they can be replaced by a bobbin

holder which is connected to the advance slide and the free end of which, engaging behind the bobbin pin, is moved, during the advance of the slide to such an extent beyond the crossing of the tracks that the advanced bobbin can pass the end of the "holder" or stop.

To the slide i driven by the pattern gear, is secured the bobbin holder or stopping device r , Figs. 4 and 5 the free end r' of which is bent slightly upwards this end, when the slide is pushed back being situated beneath the bobbin driver b and immediately below that point at which the tracks cross or approximately at such point. In order to enable the end r_1 to be suitably adjusted, the "holder" is composed of two parts secured together by means of a screw s passing through a slot in both parts. Behind the portion of the holder secured to the slide i , can engage the bell crank lever m which receives its partial rotation from the lever o connected to the pattern gear by the rod p . The return of the slide i is effected, like in the preceding construction, by a spring k .

At the upper part of Fig. 4, the slides i and holders r are shown in that position in which the bobbin, left by the drivers b but still advancing owing to its momentum, is held up and stopped by the holder r_1 . The bottom part of Fig. 4 shows, on the contrary, the slide i , with the holder r , in advanced position, and it will be seen that in this case the holder has passed so far beyond the crossing of the tracks that the bobbin pin f can freely pass.

In order to guide the bobbin g which has been advanced and carried along by the drivers, either back to the plate from whence it comes or further on to the adjoining plate, the switches h are moved to and fro between the plates in well known manner. For this continuous uniform oscillation of the switches, there are several well known, more or less complicated, driving devices for which a comparatively large consumption of power is required. The parts are also liable to great wear, so that it is frequently necessary to repair the machine or to replace the parts. These drawbacks are greatly reduced by the arrangement shown in Figs. 6 and 9. These arrangements are characterized—1 by the simultaneous movement of the slides which advance the bobbins and the switches by means of a system of levers actuated by the pattern or jacquard gear: 2 by the fact that two levers are provided for moving each slide, each of said levers being separately connected with the jacquard gear. Each slide is advanced simultaneously with one of the slides next thereto but on the opposite side of the track, owing to the pull of the jacquard gear. Owing to this combined switch- and slide-motion, only those switches are moved in which a change of position is re-

quired in accordance with the lace pattern to be produced, all other switches remaining in the position of rest. The amount of power consumed is therefore smaller, and the wear of the machine is reduced.

Each of the slides i bringing the bobbins f into operation, is controlled by two pressure levers v and w secured respectively to the spindles t and u . The pressure levers v of an outer and of an inner slide adjoining on the left, connected to the levers v_1 v_2 which are coupled together by levers v_3 and by levers v_4 and rods v_5 to the pattern gear. In the same way the pressure lever w of an outer slide is connected to the lever w of the inner slide adjoining the right, by means of levers and rods w_1 w_2 w_3 , and the two levers w are moved together by the jacquard gear by means of levers w_4 and rods w_5 . This method of coupling and connection to the pattern gear results in each slide being advanced either together with the opposite adjoining slide to the left, or with the adjoining slide to the right, according as the pressure levers v or w are partly turned by the pattern gear.

The switches h are controlled by springs in such manner that they all press against the same side of the trays a , so that, as shown in Fig. 6, the corresponding track is quite open in one direction of travel of the bobbins, and of the switches of two adjoining trays one is connected by means of the lever y secured to its spindle, by a rod y_1 and a lever y_2 to the spindle t of the pressure lever v , while the other switch is connected to the spindle of the pressure lever w by means of levers x x_2 and the rod x_1 .

When the bobbins f as shown in Fig. 6, are in the position of rest at the corners of the tracks, if it is desired to make them operative, they must either rotate in pairs on a tray, for instance the bobbins f_1 f_2 on the tray a_2 , the bobbins f_3 f_4 on the tray a_4 , the bobbins f_5 f_6 on the tray a_6 , the bobbins being then always pushed by the pressure levers v by the slides from the position of rest into the position in front of the drivers, that is to say, into the position shown in Fig. 7, or the bobbins f_2 and f_3 must be able to pass on the tray a_3 , the bobbins f_4 f_5 to the tray a_5 , the bobbin f_1 on the tray a_1 and the bobbin f_6 on the tray a_7 , which, according to Fig. 8, is effected by the advance of the slides by means of the pressure levers w . When the bobbins travel as shown in Fig. 7, in which case the threads of the bobbins rotating in pairs on the trays continuously produce a braiding strand, it is merely necessary to move the outer switches h , since the track for the bobbins f_2 , f_4 f_6 is open. These outer switches are moved by means of the pressure levers v by the connection y y_1 y_2 . The inner switches which are moved by means of the pressure levers w by the connection x x_1 x_2 ,

remain, however, with the said levers in the position of rest. When the bobbins travel as shown in Fig. 8, the bobbins $f_1 f_3 f_5$ can utilize the open track and the movement of the inner switches takes place owing to the advance of the slides by the pressure levers w . The outer switches and the pressure lever v as well as all the levers and the rods, remain therefore in the position of rest.

Owing to the last mentioned mutual passage of the bobbins, their threads form in well known manner the connections between the single strands, and a meshwork peculiar to the hand bobbin lace is produced. It will be seen that in this arrangement always only a portion of the switches is moved, so that the economy of power is the greater, the greater the number of trays of the machine. It will be also seen that owing to the temporary stopping of the switches and of the parts moving them, the wear is reduced.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A braiding and lace making machine comprising crossing tracks and bobbin drivers, bobbins with pins, trays of greater dimension in the direction of the wheel circle than in that of the width, spring holders for the bobbin pins constituting an inlet guide and arranged at each crossing to act as a bobbin stopping device, slides independent of one another for moving the bobbins free

from the holders into reach of the drivers, and pattern gears for controlling the slides.

2. A braiding and lace making machine comprising crossing tracks and bobbin drivers, bobbins with pins, trays of greater dimension in the direction of the wheel circle than in that of the width, spring holders for the bobbin pins constituting an inlet guide and arranged at each crossing to act as a bobbin stopping device, slides independent of one another for moving the bobbins, pattern gears controlling the slides and bobbin stopping devices secured to the slides.

3. A braiding and lace making machine comprising crossing tracks and bobbin drivers, bobbins with pins, trays of greater dimension in the direction of the wheel circle than in that of the width, spring holders for the bobbin pins constituting an inlet guide and arranged at each crossing to act as a bobbin stopping device, slides independent of one another for moving the bobbins, switches at the crossings, and pattern gears connected to the slides and to the switches for controlling the movements of such slides and switches.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

FERDINAND MEYER. [L. s.]

Witnesses:

OTTO KÖNIG,
CARL BOEDDINGHAUS, Jr.