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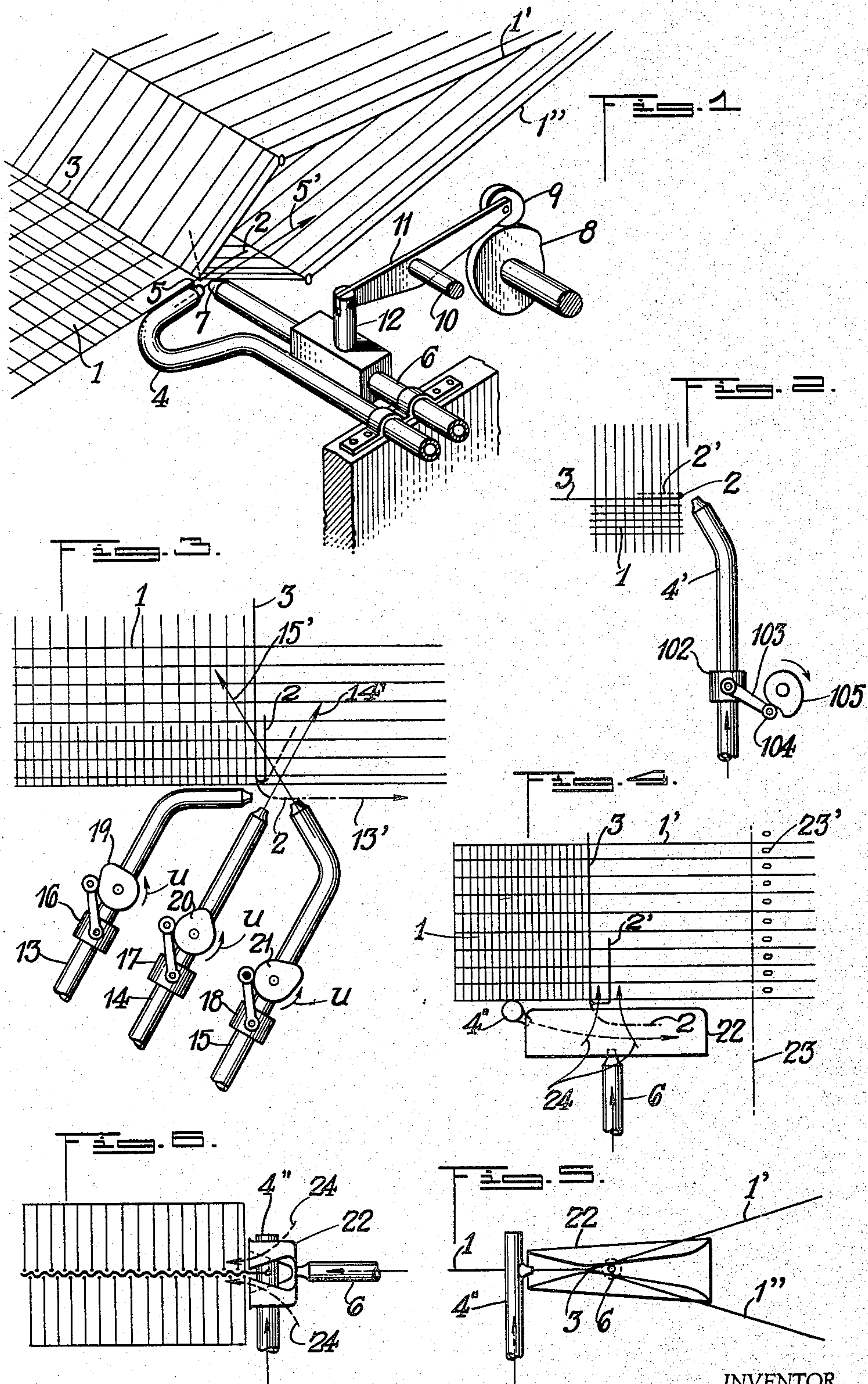
A. MOESSINGER

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SELVAGE FORMING DEVICE FOR LOOMS

Filed Aug. 8, 1940

3 Sheets-Sheet 1



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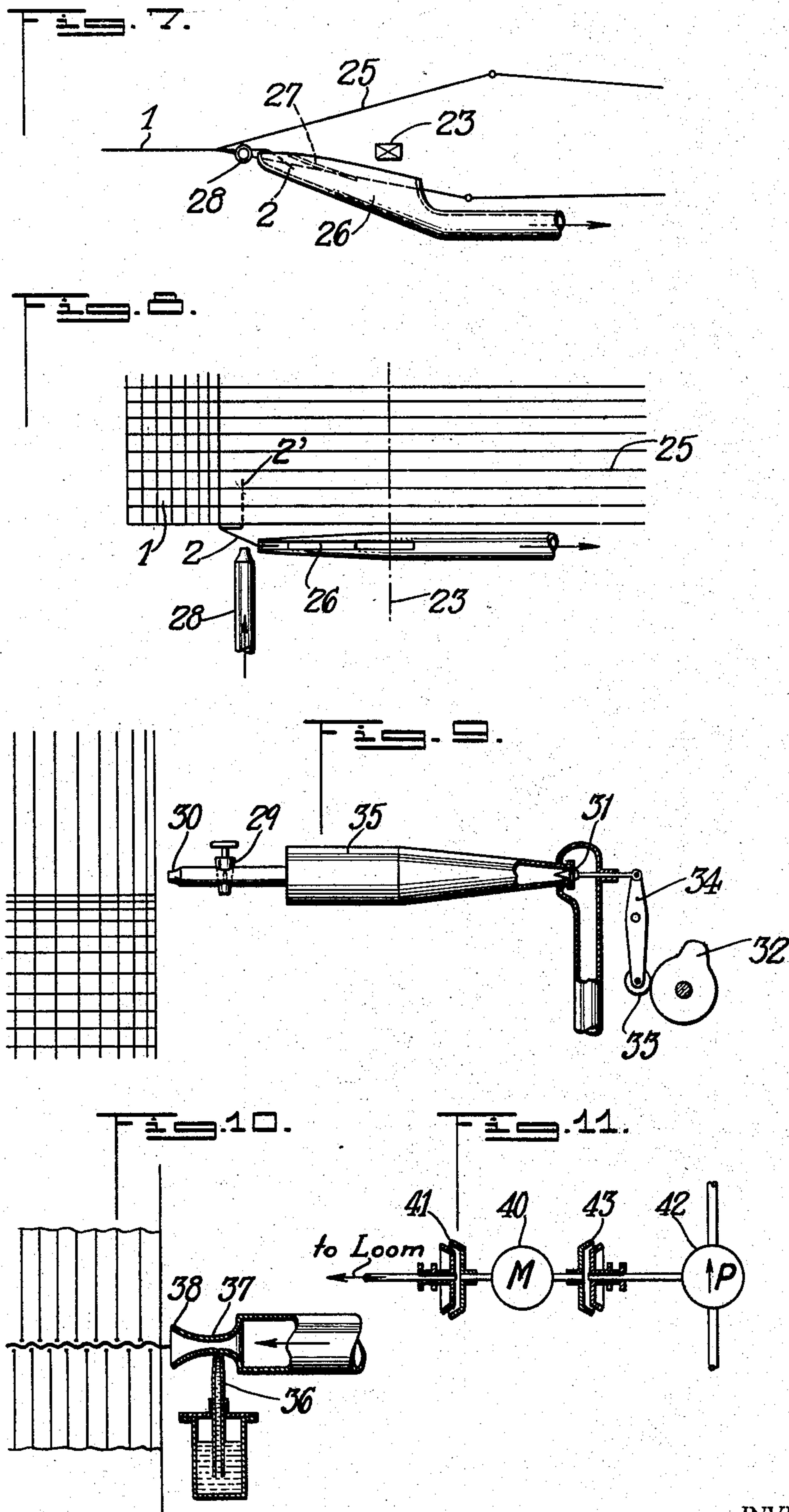
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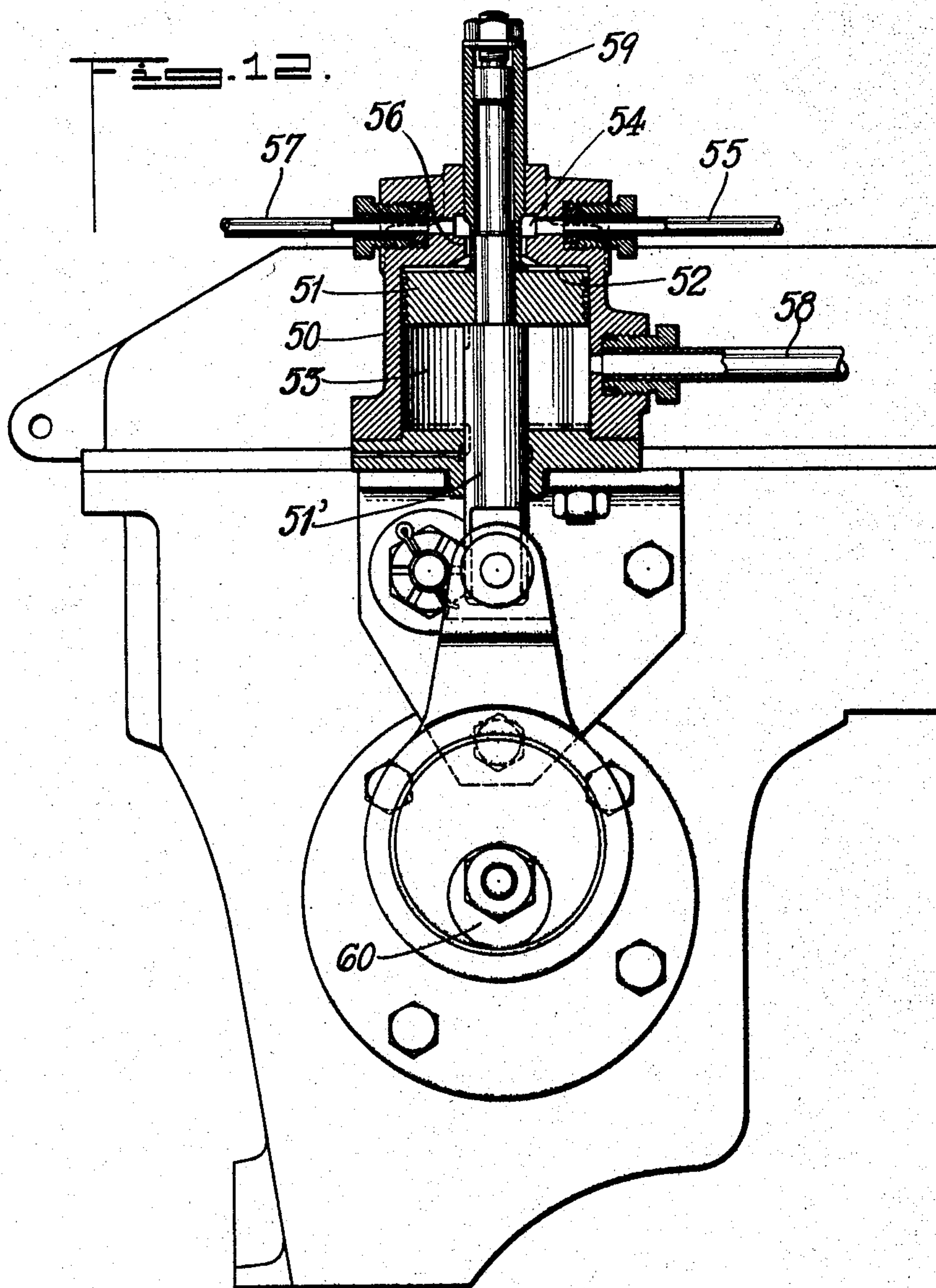
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SELVAGE FORMING DEVICE FOR LOOMS

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3 Sheets-Sheet 3



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SELVAGE FORMING DEVICE FOR LOOMS

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In Switzerland August 26, 1939

6 Claims. (Cl. 139—127)

The present invention relates to a method and means for forming a selvage on woven fabric, more particularly for turning the thread ends projecting from the edge of the fabric into the shed.

It is an object of the present invention to provide a method and means for producing the effect stated in the paragraph next above whereby the turning over of the thread ends is accomplished by means of suitably directed currents or jets of an operating fluid. The equipment for carrying out the new process comprises accordingly devices with the help of which the bending over of the thread ends is effected through forces which are generated by currents or jets issuing from pipes disposed near the edge of the cloth.

The bending over of the thread ends may be effected, for instance, by a current of air, a current of gas or a current of steam. If the bending over of the thread ends is effected by compressed air, by air suction or by suction and compressed air combined, the direction of at least one of the jets of air may be adjustable. The thread ends may also be bent over by several streams of air acting in different directions, at least one of which is controlled.

For instance, one air current may bend the thread end over in the weaving plane approximately in the direction of the warp threads and another stream, acting intermittently, may bend the thread over into the shed that is formed. After the end of the thread has been turned into the shed, a further stream, acting intermittently in the direction of the apex of the shed, presses the thread end closely against the cloth. The thread end may, however, also be held in the plane of the cloth approximately in the direction of the warp threads by means of a suction nozzle.

The nozzles used for producing the air currents may be supported, at least partly, on a stationary part of the machine. An air container may be arranged between the blow-in nozzle and a control valve. A liquid may be sprayed together with the air current on the projecting thread end or on the outermost warp threads whereby the liquid is carried by the air current. A regulating valve or an orifice-diaphragm may be arranged in the compressed air conduit.

The air, gas or steam required for producing the current or jets may be supplied by a piston which is driven by the loom. The air flow may be controlled by means of a valve or valves which are operatively connected with the piston or with

the piston rod. The means used for producing the currents or jets may be supplied by a pump, which is connected to the drive of the loom by means of a coupling independent of the loom coupling.

Further and other objects of the present invention will be hereinafter set forth in the accompanying specification and claims and shown in the drawings which, by way of illustration, show what I now consider to be preferred embodiments of my invention.

In the drawings:

Fig. 1 is an axonometric representation of a mechanism according to the invention having two compressed-air nozzles.

Fig. 2 is a top view of a modified arrangement according to the invention having only one nozzle.

Fig. 3 is a diagrammatic top view of another modification of the invention in which three nozzles blow jets of air in different directions.

Fig. 4 diagrammatically illustrates a means according to the invention for guiding the thread.

Fig. 5 is a front view of the means shown in Fig. 4.

Fig. 6 is a side view of the means shown in Fig. 4.

Fig. 7 diagrammatically shows a device in which the freely projecting thread end is held in the direction of the warp threads by means of a suction nozzle.

Fig. 8 diagrammatically illustrates a modification of an arrangement according to the present invention in which the thread is held in the direction of the warp threads by means of a suction nozzle.

Fig. 9 shows an arrangement according to the invention having a container between the control valve and the nozzle.

Fig. 10 illustrates an injection device according to the invention for moistening the thread ends with liquid.

Fig. 11 illustrates an arrangement for driving the pump for producing the air currents or jets.

Fig. 12 illustrates a modified pump drive according to the invention.

Like parts are designated by like numerals in all figures of the drawings.

Referring more particularly to Figure 1 of the drawings numeral 2 designates the end of the last inserted weft thread 3. End 2 projects at the side from the finished material 1. The purpose of the edge-former according to the invention is to bend thread end 2 over into the next formed shed. From pipe 4 provided at its end

with a nozzle 5, an air jet 5' is blown for this purpose in the plane of the cloth 1 in a direction opposite to the direction of movement of the warp threads. By means of this jet of air the thread end 2 is moved in the direction of the projection of the warp threads. Before the shed is closed, a stream of air, which moves approximately parallel to the weft threads, emerges from pipe 6 through a nozzle 7, whereby the air stream is regulated by means of a valve 12 controlled by the agency of a cam 8 operating on a roller 9 at the end of lever 11; lever 11 is pivoted at 10 and has an arm operatively connected with the valve 12. The air stream emerging from nozzle 7 bends the thread end over and into the shed. One of the nozzles 5 or 7 may be made movable, so that the direction of the jet emerging therefrom can be adjusted. Both nozzles are preferably mounted to a stationary part of the loom.

Fig. 2 shows an embodiment of the invention in which only one nozzle 4' is provided. According to the nature of the edge of the fabric 1 the thread end 2 can thereby be blown in a certain direction, for instance, either into a cutting-off device or, as shown in Fig. 2, to be bent over and into the next formed shed. After the pick of the weft thread 3 the warp threads 1' (Fig. 1) form a new shed. During this time the control valve 102 (Fig. 2) is opened by means of a lever 103 provided with a roller 104 cooperating with a cam 105. The air that flows out of pipe 4' lays the thread 2' into the newly formed shed. Even when the freely projecting thread end 2' is not exactly in the direction of the nozzle outlet, it will be brought into the direction of the air jet emerging therefrom by means of the suction action of the air stream and will be carried along with the stream.

Fig. 3 illustrates a device in which three compressed air pipes 13, 14, 15 are provided; these pipes terminate into nozzles arranged in three different directions in the plane of the fabric. These pipes are fitted with controlled valves 16, 17, 18 which are adjusted by means of diagrammatically shown cams 19, 20, 21 rotating in the direction of the arrows *u*. At first the compressed air pipe 13 blows a jet 13' in the direction of the projection of the warp threads and in the plane of the fabric for bending the thread over, then the compressed-air pipe 14 blows a jet 14' approximately in the direction of the weft threads and pipe 15 blows a jet 15' in the direction of/or in back of the weft threads. By these streams of air the thread end 2 is bent over into the shed, i. e. tucked in to form a hem. A hem may, of course, be formed on the fabric either on one side only or on both sides.

With the edge-forming device according to Fig. 3 it is possible to press the bent-over thread end quite close to the apex of the shed. It is advisable, especially in the case of very elastic yarn, as for instance wool, certain silks or rayon, not to close at least one of the valves, for instance the valve 18, until the shed is closed, so that the thread end 2 cannot spring back out of the shed.

A further modification of the edge-forming apparatus including a thread guide is represented in Figs. 4, 5 and 6. In the thread guide 22 a pipe 4'' is provided which causes a stream of air to flow at right angles to the weft thread 3, so that the thread end 2 runs at first parallel to the warp threads 1'. A pipe 6 then introduces a stream of air into the thread guide in the di-

rection of the weft thread 3, thus turning the thread end 2' completely over, i. e., bending it into the shed. The guide 22 may also be of such a form as to create an ejector action, so that if the thread end is outside of the guide it will still be bent over into the shed because of the secondary air streams 24 which are caused by the main stream emerging from the nozzle 6.

Primarily a current is produced through pipe 4'', into which, for instance, air is blown; after that, air emerges from pipe 6, whereby the thread end bent by the current emerging from pipe 4'' is bent over still further and into the shed.

In Figs. 7 and 8 an edge-forming apparatus is illustrated in which the thread end 2 is held in the direction of the warp threads 25 by means of a suction stream. After the thread end 2 is let loose, i. e. after the pick is completed, the thread end 2 is drawn into the slotted suction nozzle 26 during its movement from the picking position 23 to the cloth 1. In order to obtain sufficient suction action at the end of the suction nozzle, a guide plate 27 is provided therein. Finally, by means of the compressed air emerging from pipe 28, the thread end 2 is bent over into the position 2', i. e. into the shed.

Fig. 9 illustrates a special construction of a compressed air pipe. Between the nozzle 30 and the control valve 31 which is operated by means of a cam 32 cooperating with a roller 33 provided on the valve operating lever 34, a chamber 35 is provided which may be of such capacity that a desired amount of air flows through the nozzle 30 after closing of valve 31. A further adjustable throttle means 29 may be provided between the pressure chamber 35 and nozzle 30 for further adjustment of the secondary air flow.

Fig. 10 shows an atomising device, in which a liquid injecting pipe 36 is connected to the narrowest part 37 of the nozzle 38. With this atomising device, the weft thread may be sprinkled, for instance, by means of water. Some kind of solvent, gum, etc., may be introduced into the atomising device.

The pump required for producing the stream of air may be connected with the loom drive either directly or by means of a clutch coupling. Fig. 11 shows a driving motor 40 having a shaft one end of which is connected with the loom coupling 41 and the other end of which is connected with a compressor 42 by means of a coupling 43. The air pump thus may continue to be driven when the loom has been stopped.

Instead of air, steam may be used for producing the necessary currents, and the steam may then be obtained from a central plant or from a small electric steam generator built into each loom. Exhaust gas from a heating plant or some other kind of plant may also be used for this purpose.

Fig. 12 shows an air pump which works synchronously with the loom. In the cylinder 50 is arranged a piston 51 having a piston rod 51' the latter being operatively connected with and driven by shaft 60 of the loom. The piston divides the cylinder into two chambers 52 and 53, chamber 52 producing compressed air, whilst chamber 53 produces a suction effect. The compressed air produced in chamber 52 is ejected through passage 54 into pipe 55, leading for instance to a delivery nozzle. Further air may be supplied by the piston 51 through the passage 56 into the pipe 57 for supplying air to further nozzles. Passages 54 and 56 are controlled by a sleeve member 59 adapted to move simultaneously with the piston 51. If the plant requires

suction air, as for instance in connection with the devices according to Figs. 7 and 8, chamber 53 is connected by means of pipe 58 with the suction devices.

While I believe the above described embodiments of my invention to be preferred embodiments, I wish it to be understood that I do not desire to be limited to the exact details of design, method and construction shown and described, for obvious modifications will occur to a person skilled in the art.

I claim:

1. A device for bending projecting weft thread ends in looms for weaving into the shed, said device comprising a plurality of individual nozzle means disposed in different directions adjacent to said thread ends and ejecting streams of operating fluid acting in different directions on said thread ends, the combined action of said streams bending said thread ends into the desired position, fluid flow control means individually connected with said nozzle means, and periodically acting operating means operatively connected with and operating said fluid flow control means and being operatively connected with and actuated by the loom.

2. In looms for weaving, a device for bending projecting weft thread ends into the shed, said device comprising a plurality of individual nozzle means disposed in different directions in the center plane of the shed adjacent to said thread ends and ejecting streams of operating fluid in different directions in the center plane of the shed and acting on the thread ends, the combined action of said streams bending the thread ends into the desired position, fluid flow control means individually connected with said nozzle means, and periodically acting operating means operatively connected with and operating said fluid flow control means and being operatively connected with and actuated by the loom.

3. In looms for weaving, a device for bending projecting weft thread ends into the shed, said device comprising a plurality of individual nozzle means disposed in different directions in the center plane of the shed adjacent to said thread ends and ejecting streams of operating fluid in different directions in the center plane of the shed and acting on the thread ends, the combined action of said streams bending the thread ends into the

desired position, fluid flow control means individually connected with said nozzle means, and consecutively acting operating means operatively connected with and consecutively operating said fluid flow control means and being operatively connected with and actuated by the loom.

4. In looms for weaving, a device for bending projecting weft thread ends into the shed, said device comprising a plurality of individual nozzle means disposed in different directions in the center plane of the shed adjacent to said thread ends and ejecting streams of operating fluid in different directions in the center plane of the shed, the direction of one of said nozzles and fluid therefrom being parallel to the projection of the warp threads in the central plane of the shed.

5. In looms for weaving, a device for bending projecting weft thread ends into the shed, said device comprising a plurality of individual nozzle means disposed in different directions in the center plane of the shed adjacent to said thread ends and ejecting streams of operating fluid in different directions in the center plane of the shed, the direction of one of said nozzles and streams being parallel to the projection of the warp threads in the central plane of the shed, fluid control means connected with another of said nozzle means, and periodically acting operating means operatively connected with and operating said fluid flow control means and being operatively connected with and actuated by the loom.

6. In looms for weaving, a device for bending projecting weft thread ends into the shed, said device comprising a plurality of individual nozzle means disposed adjacent to said thread ends and individually ejecting a stream of operating fluid acting on said thread ends, the combined action of said streams bending said thread ends into the desired position, fluid flow control means individually connected with said nozzle means, and periodically acting operating means operatively connected with and operating said fluid flow control means and being operatively connected with and actuated by the loom, and a guide member disposed between the weft threads and said nozzles and guiding the thread ends in the center plane of the shed.

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