May 9, 1933. E. E. MILNER 1,908,528

LEER

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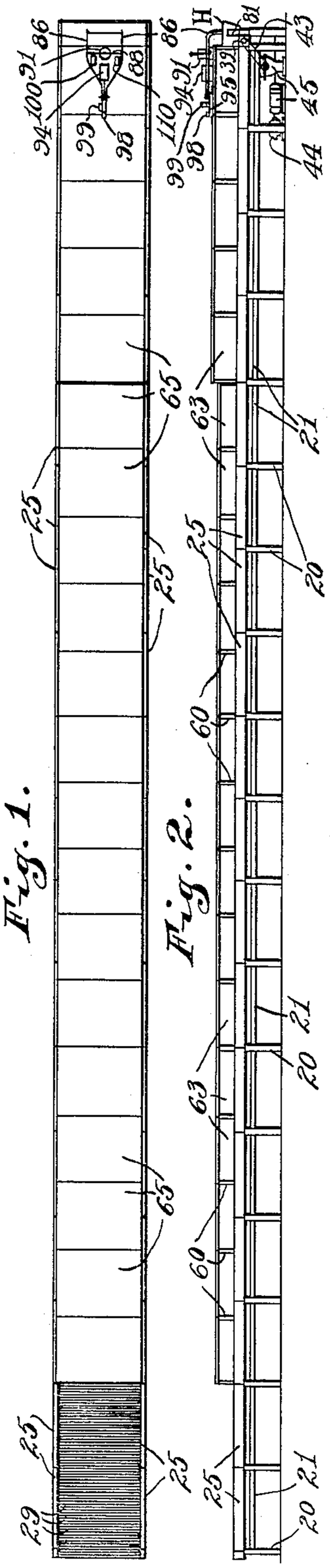

Fig. 1.

Fig. 2.

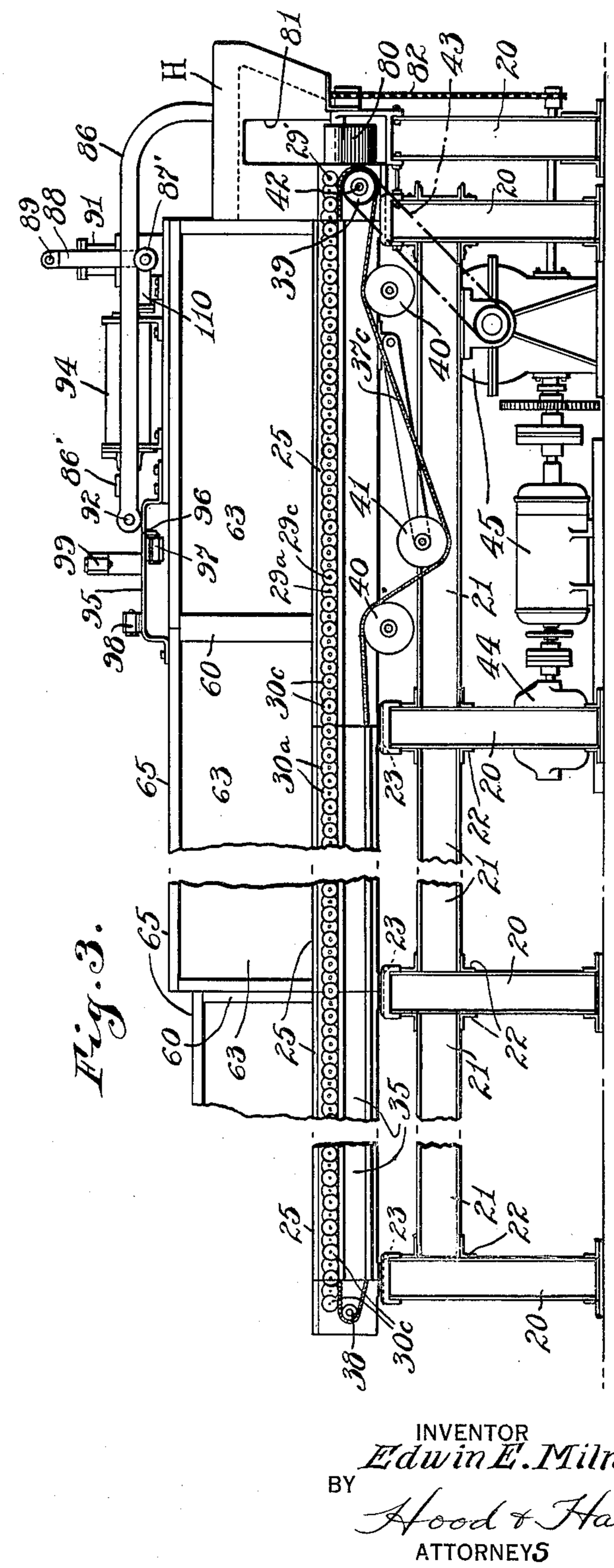

Fig. 3.

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Fig. 4.

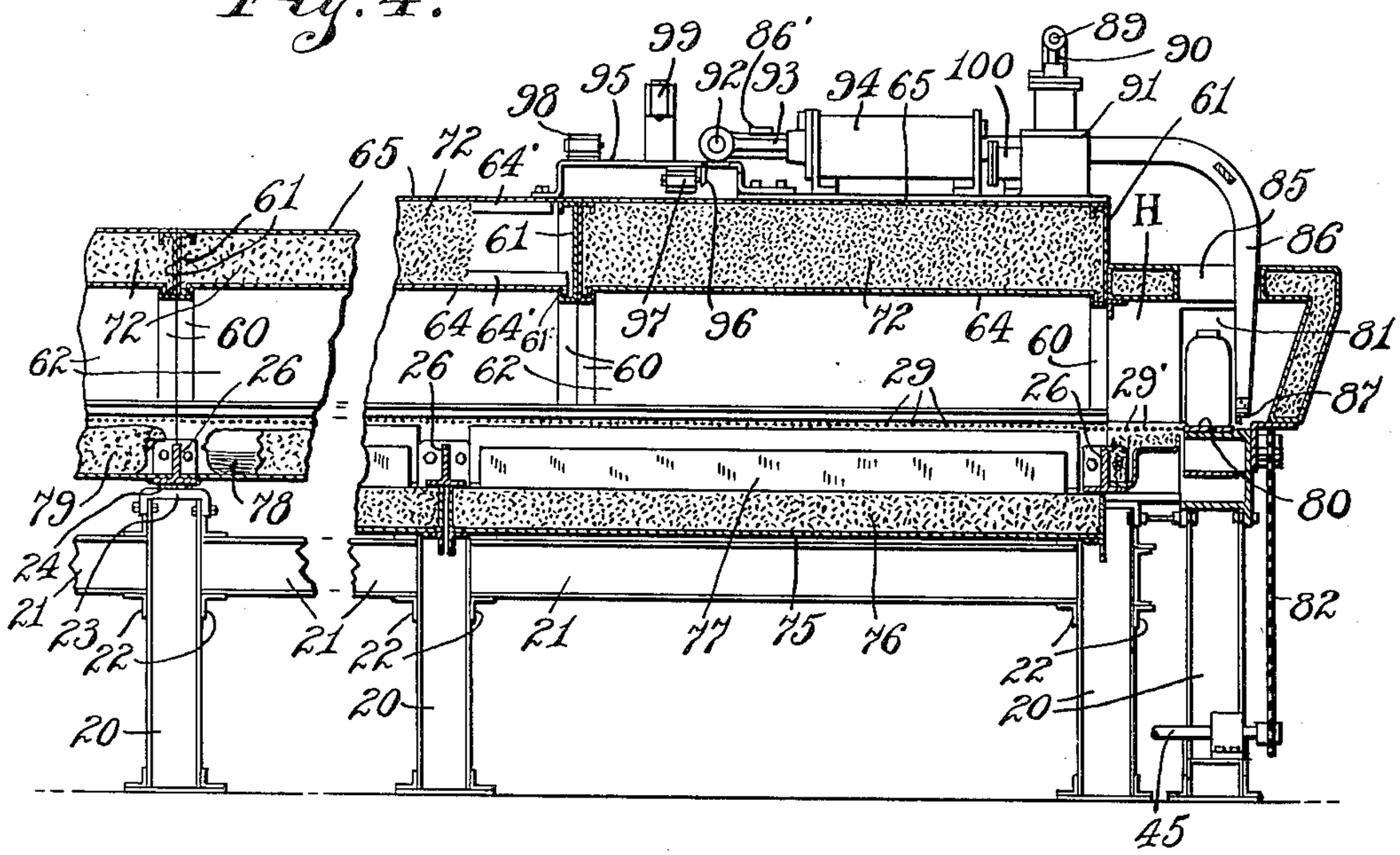

Fig. 5.

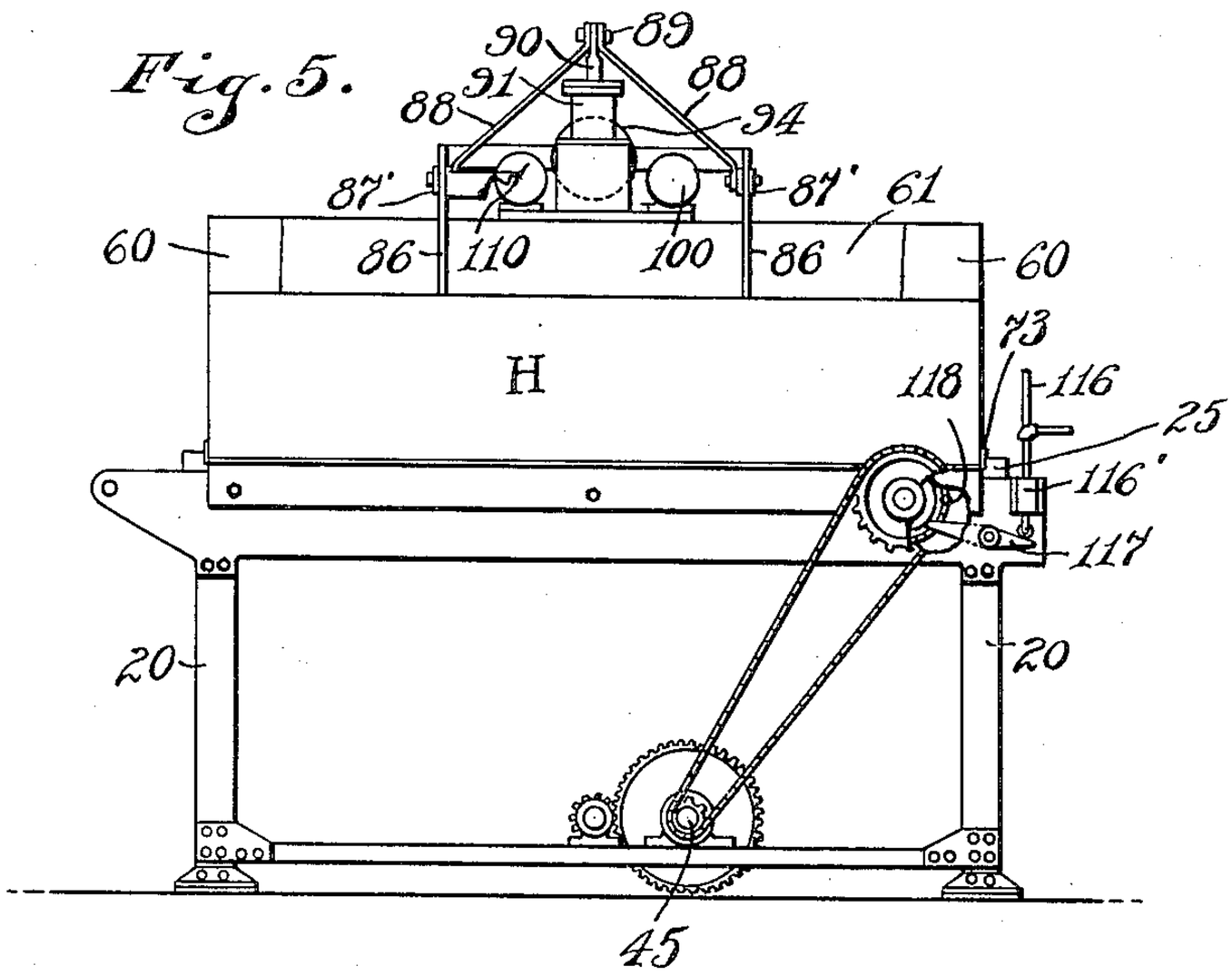

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Fig. 6.

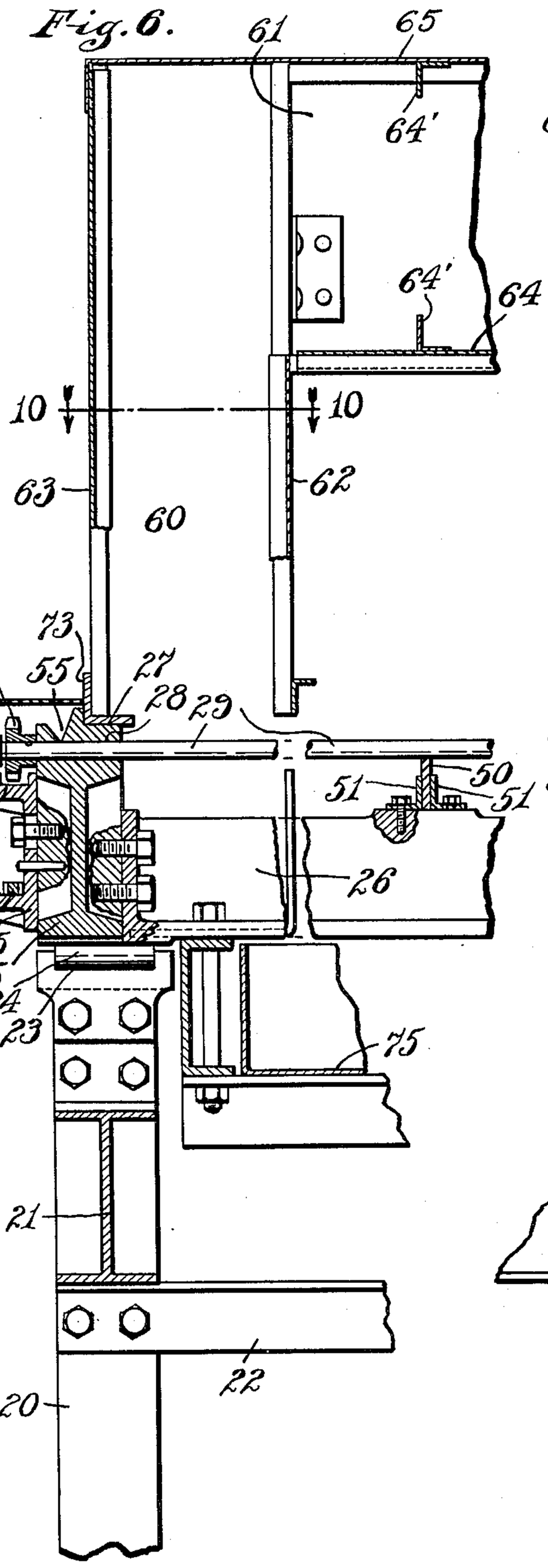

Fig. 7.

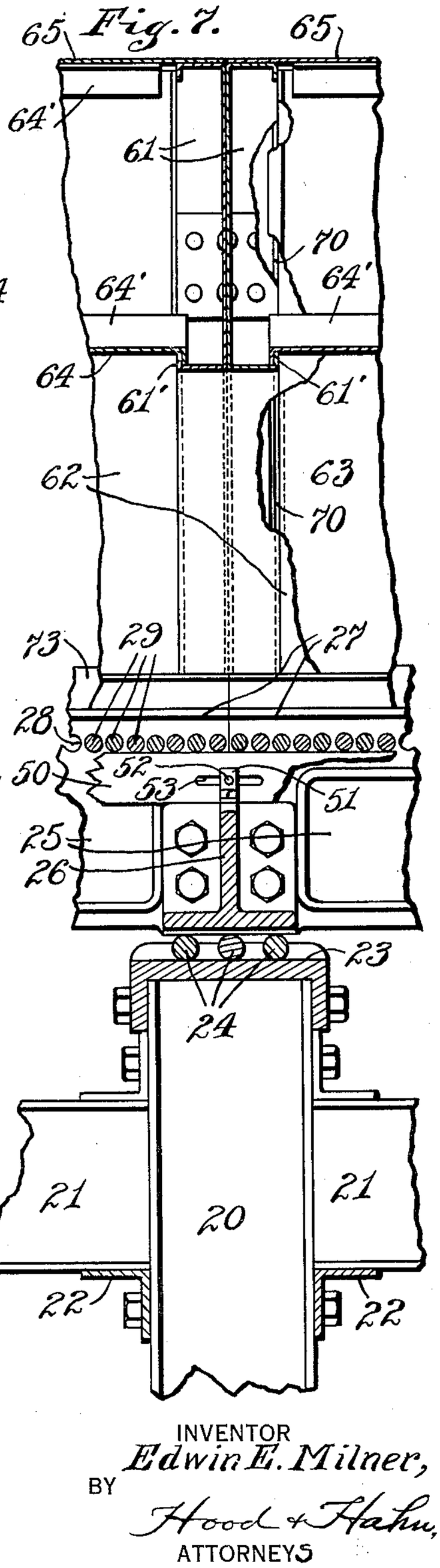

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Fig. 8.

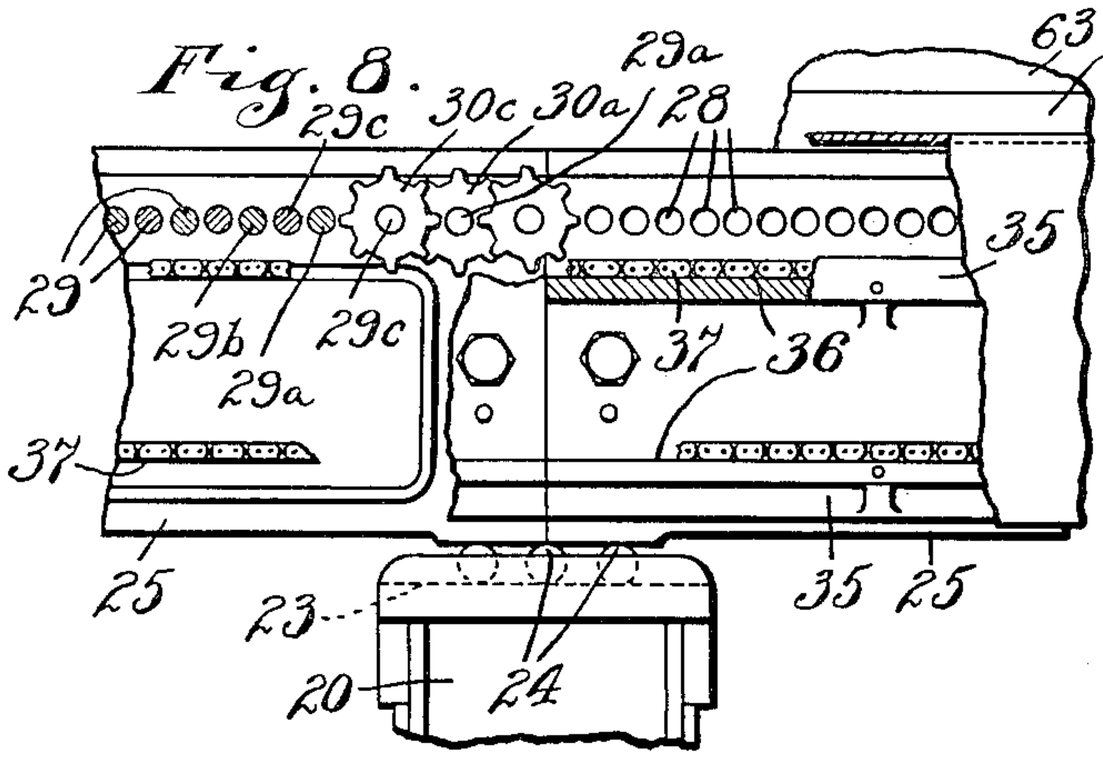

Fig. 10.

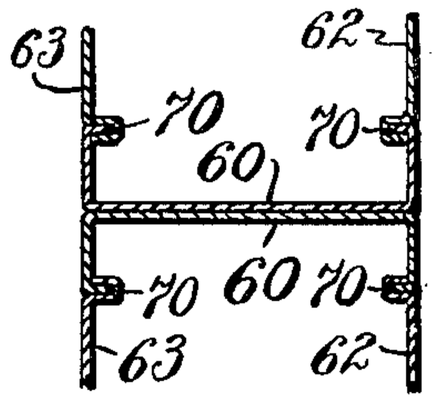

Fig. 9.

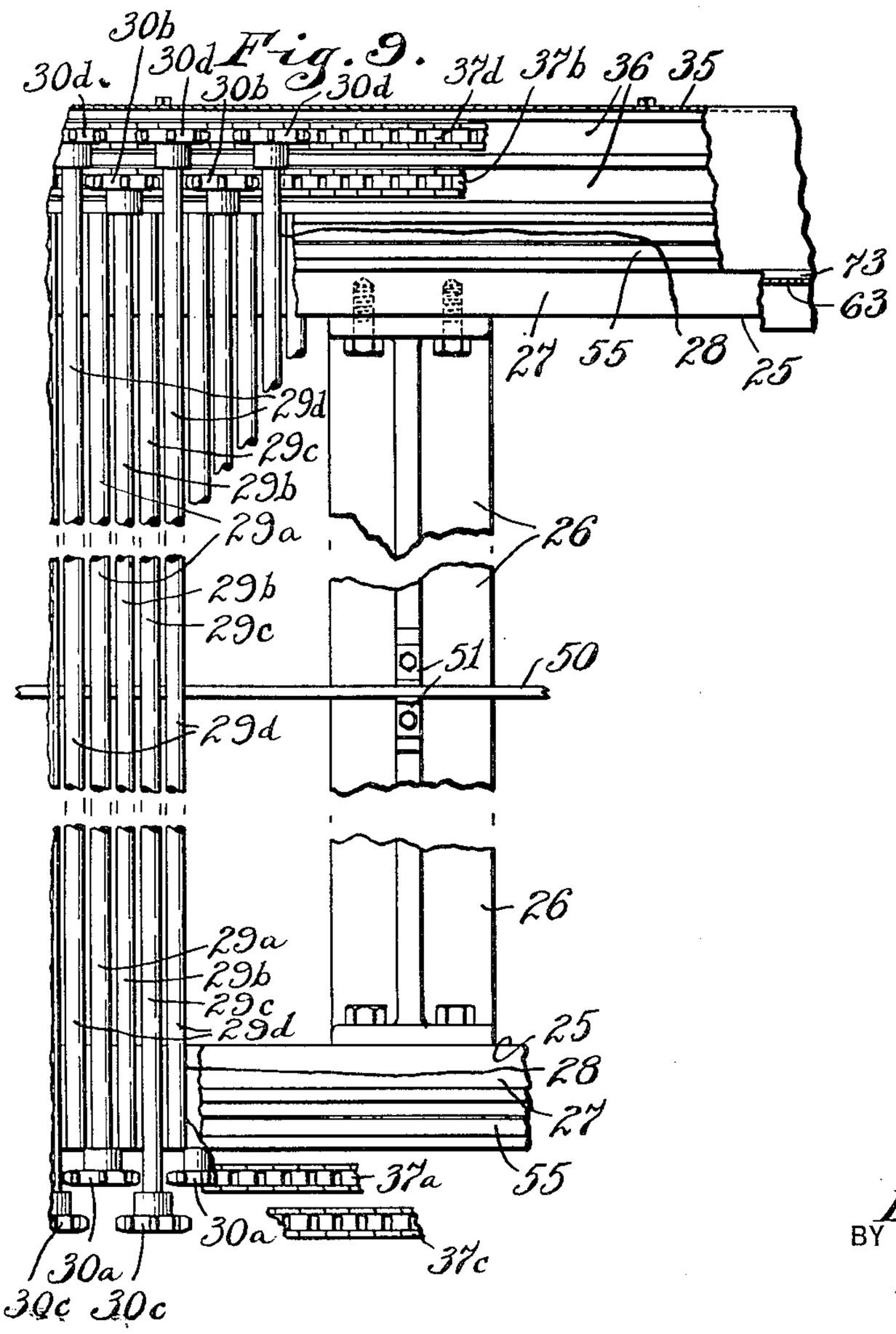

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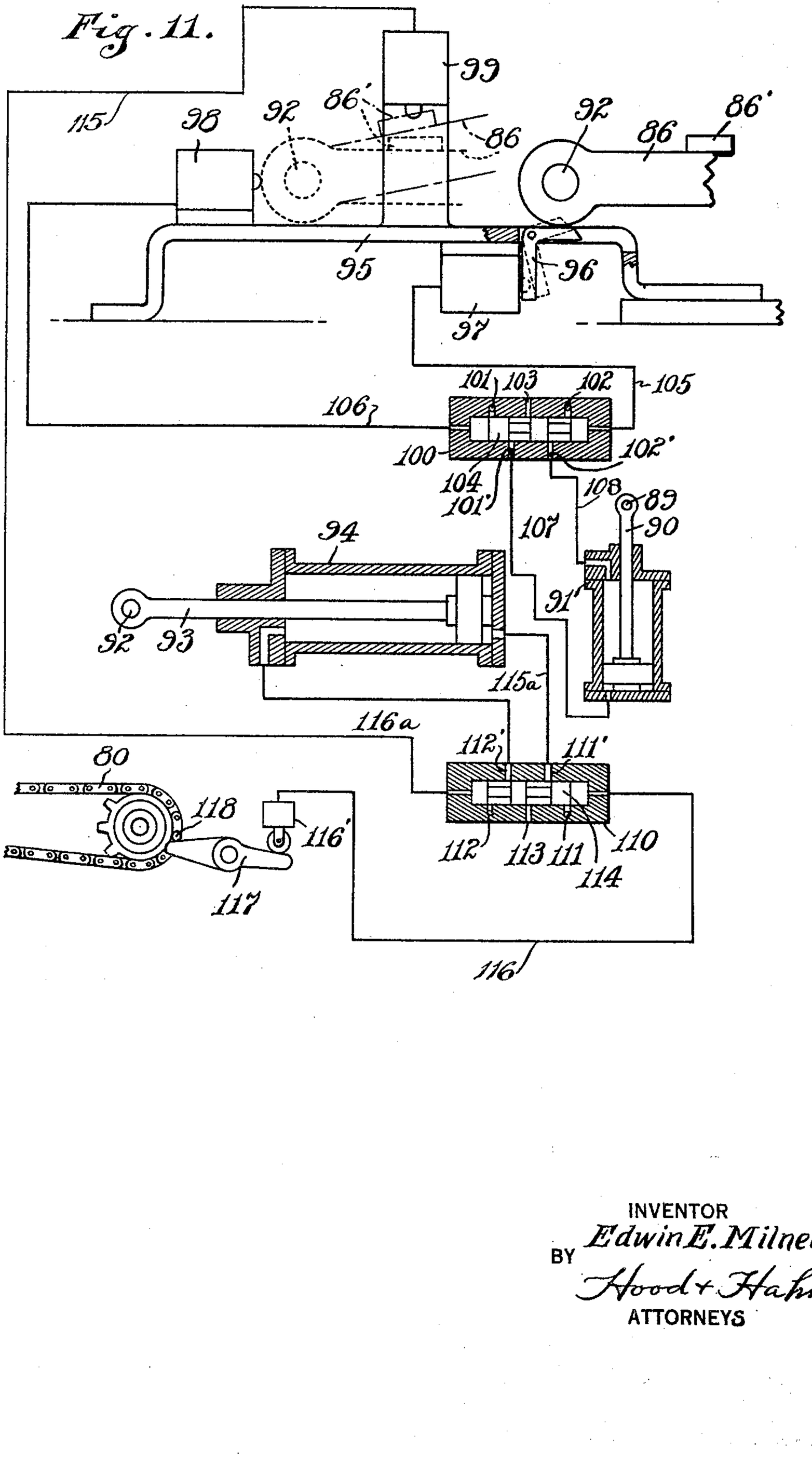
Fig. 11.



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Patented May 9, 1933

1,908,528

UNITED STATES PATENT OFFICE

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LEER

Application filed August 10, 1929. Serial No. 384,948.

The object of my invention is to produce an efficient leer for receiving freshly formed glass articles and annealing the same.

The invention comprises various improvements in details of construction of the leer body, the means for feeding articles continuously through the main body, and the means for receiving and projecting articles to the feeding means.

The accompanying drawings illustrate my invention:

Fig. 1 is a plan, on a very small scale, of the complete leer:

Fig. 2 is a side elevation on the scale of Fig. 1:

Fig. 3 is a side elevation, on a larger scale, with the middle length omitted:

Fig. 4 is a longitudinal section of the receiving end:

Fig. 5 is an elevation of the receiving end:

Fig. 6 is a transverse sectional detail, on a larger scale, of the main body:

Fig. 7 is a longitudinal sectional detail, on the scale of Fig. 6, of adjacent ends of two body sections:

Fig. 8 is a longitudinal section and fragmentary elevation of adjacent ends of two body sections:

Fig. 9 is a fragmentary plan of parts shown in Fig 8:

Fig. 10 is a section on line 10—10 of Fig. 6, and

Fig. 11 is a schematic illustration of portions of the automatic article-injecting means.

The main frame is composed of a series of posts 20 connected by longitudinal beams 21 and cross beams 22. The upper end of each post 20, except the two at the receiving end of the structure, carries a track 23 which supports a series of rollers 24.

Supported on rollers 24 is the base frame of the main body, or tunnel structure, of the leer, said frame comprising two longitudinal series of side bars 25, 25 and connecting cross beams 26. Each bar 25 is rabbeted at its upper inner edge, as indicated at 27 and is transversely perforated by a multiplicity of parallel closely spaced perforations 28 all in the same horizontal plane and the perforations of the two sets of side bars arranged in alignment. Journalled in the perforations are small shafts 29 which extend across the frame and are arranged in groups of four, as clearly shown in Fig. 9, and each shaft is provided with a sprocket wheel 30 by which it may be driven.

For convenience of description these shafts are designated in Fig. 9 as 29*a*, 29*b*, 29*c*, 29*d*, and the corresponding sprocket wheels as 30*a*, 30*b*, 30*c*, 30*d*. Shaft 29*a* has a length which at one end (the top of Fig. 9) preferably does not project beyond that side of the base frame, and at the other end projects just far enough to receive its sprocket wheel 30*a*. Shaft 29*b* is of the same length as shaft 29*a* but carries its sprocket wheel 30*b* at the opposite end. Shaft 29*c* is projected beyond the vertical plane of sprocket wheel 30*a* far enough to receive a sprocket wheel 30*c*. Shaft 29*d* is the same length as shaft 29*c* but has its sprocket wheel 30*d* at the opposite side of the frame in a vertical plane beyond that of wheels 30*c*. By this grouping of shafts and sprocket wheels, the shafts may be very small and closely grouped, yet the sprocket wheels, may be of such diameter as to overlap the two adjacent shafts and thus be of adequate size and strength to permit the use of driving chains extending the entire length of the leer.

Secured to the outer faces of each series of side bars 25 is a series of channel bars 35 having chain-supporting guiding grooves 36 therein, said grooves being so arranged and proportioned as to hold the driving chains 37*a*, 37*c*, 37*b* and 37*d* in mesh with the lower parts of the adjacent sprocket wheel series 30*a*, 30*c*, 30*b* and 30*d*, respectively. The top run of each chain 37 passes over an idler 38 at the delivery end of the structure, and over a drive sprocket 39 at the receiving end of the structure and the bottom run passes over guide rollers 40, 40 and under an intermediate take-up roller 41. Driving sprockets 39 are carried by a shaft 42 driven by a chain or other connection 43 from a suitable motor 44 through suitable speed reduction gearing 45.

In order to prevent shafts 29 from sagging under a load of ware, I arrange longitudinal

wear strips 50 along one or more intermediate lines, said strips being supported in such manner as to permit freedom of expansion and contraction. In Figs. 6 and 7 I show, for this purpose angle brackets 51, 51 supported by cross beams 26 on each side of strips 50 and having cross pins 52 passing through longitudinal slots 53 in strips 50. The upper edges of strips 50 are arranged slightly below the shafts so that there is no engagement unless the shafts are heavily loaded.

In order to lubricate shafts 29 I form a V-shaped channel in each side bar 25, as indicated at 55 (Fig. 6), the point of the V slightly piercing the perforations 28. These channels being easily accessible and away from the heat of the leer, proper lubrication may be very easily maintained.

The heat insulating tunnel is formed of a series of inverted U-shaped hollow sections which may be readily filled with mineral wool or other satisfactory heat-insulating material. Each section comprises vertical channel leg sections 60, connecting top sections 61, connecting inner and outer side plates 62, 63, an under top plate 64 and a cover plate 65. Sections 60 are conveniently formed, as shown in Fig. 10, of sheet metal to provide inturned flanges 70 for interlocking engagement with the ends of the side plates which are folded, as shown in Fig. 10, to have a vertically sliding longitudinally interlocking engagement therewith. Similarly the upturned edges 61′ (Fig. 4) of the top section 61 receive and interlock with the downturned ends of the under top plate 64. The hollow tunnel sections thus formed may be easily stuffed with loose insulation 72. The top cover plate 65 is laid upon and extends between the two top sections 61 and covers the insulation 72 in the tunnel sections. The top and bottom plates may be made of comparatively thin sheet stiffened by angles 64′ (Fig. 6) attached to their inner faces. The lower ends of the legs 60 are supported, at their outer corners in channels 73 seated in the rabbets 27.

The first one or two tunnel sections at the receiving end of the leer are preferably more heavily insulated across their tops, as indicated in Fig. 4. Beneath the first few tunnel sections I suspend pans 75 (Figs. 4 and 6) for reception of heat insulation material 76 and I also arrange several electric heating units 77, 78, 79, etc. as may be desired.

At the receiving end I arrange a heat insulated hood section H equipped with a few feed shafts 29′, as indicated in Fig. 4, to bridge the space between the first roller of the first tunnel section and the top run of a cross-feed belt 80 upon which the ware is delivered to the leer through an opening. 81 in one side of the hood H. Belt 80 is driven at appropriate speed by a belt 82 from the reducing train 45.

The top of hood H is slotted at 85 and through these slots are projected two depending fingers 86, the lower ends of which are connected by a pusher bar 87 adapted to laterally traverse the top run of belt 80. The horizontally extending portions of fingers 86 are supported on rollers 87′ carried by depending arms 88 pivoted at 89 upon the end of the piston rod 90 of an air cylinder 91, and at their forward ends the fingers 86 are pivoted, at 92 to the piston rod 93 of an air cylinder 94.

The forward end of one of the fingers 86 traverses a track 95 (Fig. 11). At the rear end of track 95 is a trigger 96 arranged to be engaged by finger 86 at the rear end of its stroke, and this trigger is arranged to open an air supply valve 97 when depressed by finger 86 as shown in full lines in Fig. 11.

At the forward end of track 95 is an air valve 98 arranged to be opened by finger 86 when at the forward end of its stroke, as indicated in dotted lines in Fig. 11.

At an intermediate point in the length of track 95 is an air valve 99 arranged to be opened by finger 86 at the beginning of its return or rearward stroke.

100 is a pneumatic valve casing having vent ports 101 and 102, to atmosphere; delivering ports 101′ and 102′ for supply of air to the opposite ends of cylinder 91; and inlet port 103 for air supply; and a piston valve 104 for controlling said ports. Air lines 105 and 106 connect the opposite ends of casing 100 with valves 97 and 98. Air lines 107 and 108 connect the opposite ends of cylinder 91 with ports 101′ and 102′.

110 is a pneumatic valve casing having vent ports 111 and 112; air delivery ports 111′ and 112′; air supply port 113; and a piston valve 114 controlling said ports. Air lines 115*a* and 116*a* connect the opposite ends of cylinder 94 with ports 111′ and 112′. An air line 115 connects valve 99 with one end of casing 110 and an air line 116 connects the other end of said casing 110 with a valve 116′ adapted to be opened by a lever 117 intermittently actuated by pins 118 carried by, or moving in synchronism with, belt 80. The valves 97, 98, 99 and 116′ are of a form well known in glass house practice, are connected to a supply of compressed air and are spring pressed to air-cut-off position and in that position vent their delivery lines to atmosphere.

The operation is as follows: Belt 80 is continuously driven, receives ware from any suitable supply and carries said ware into the leer in front of the pusher bar 87. Upon a predetermined movement of belt 80 a pin 118 actuates lever 117 which, in turn, actuates valve 116′ to admit air to casing 110 driving valve 114 to the left-hand position shown in Fig. 11 to admit air to the right hand end of cylinder 94, and to vent the left hand end

thereof. Rod 93 moves to the left in Figs. 4 and 11, bar 87 sweeping the ware onto shafts 29′ and these shafts, and shafts 29, being in rotation, the ware is thereafter advanced through the tunnel of the leer.

As finger 86 moves to the left it passes under valve 99 without actuating it and at the end of its movement in this direction, opens valve 98 to admit fluid under pressure to casing 100 to drive valve 104 to the right-hand position shown in Fig. 11, thus admitting air to the lower end of cylinder 91. This lifts hangers 88 and thus raises the pusher bar 87 above the level of the tops of ware which is arriving on belt 80. When rod 90 reaches the upper end of its stroke a pad 86′ on finger 86 opens valve 99 and thus admits air to the left-hand end of casing 110 to drive valve 114 to the right, thus venting the right-hand end of cylinder 94 and admitting air to its left-hand end, whereupon the pusher bar 87 is carried back over the tops of the arriving ware. When finger 86 arrives at the rear or right-hand end of its stroke it engages trigger 96 to open valve 97 to admit fluid under pressure to casing 100 to drive valve 104 to the left, thus venting the lower end of cylinder 91 and admitting air to the upper end of said cylinder, thereby lowering bar 87 to the starting point.

The electric heating elements may be controlled in any desired and well-known manner. In actual practice the leer tunnel is so well heat-insulated that, in many instances, the heat of the arriving ware is sufficient to keep the interior at a proper temperature gradient.

It will be noticed that the means for forwarding the ware through the tunnel does not travel longitudinally through the tunnel nor does any portion of this mechanism pass from a region of high temperature to one of lower temperature. On the contrary, each ware-forwarding shaft soon attains, and remains at, the temperature of the immediately adjacent tunnel region.

I claim as my invention:

1. In a leer, a pair of side bars, a plurality of relatively small shafts journalled therein and extending transversely therebetween, said shafts projecting in alternate pairs beyond each side bar, sprocket wheels of larger diameter than twice the distance between shaft centers attached to said shafts in two overlapping series at the outer face of each side bar, four driving chains connecting said sprocket wheels in four longitudinal series, and a supporting strip arranged longitudinally between the side bars beneath the shafts to prevent undue sagging of said shafts.

2. In a leer, a pair of side bars, a plurality of relatively small shafts journalled therein and extending transversely therebetween, means for simultaneously rotating said shafts in the same direction, and a supporting strip arranged longitudinally between the side bars beneath the shafts to prevent undue sagging of said shafts.

In witness whereof, I have hereunto set my hand at Muncie, Indiana, this 6th day of August, A. D. one thousand nine hundred and twenty-nine.

EDWIN E. MILNER.