Jan. 6, 1953

A. E. WINSLOW

2,624,077

DRAFTING FRAME

Filed Sept. 17, 1949

3 Sheets-Sheet 1

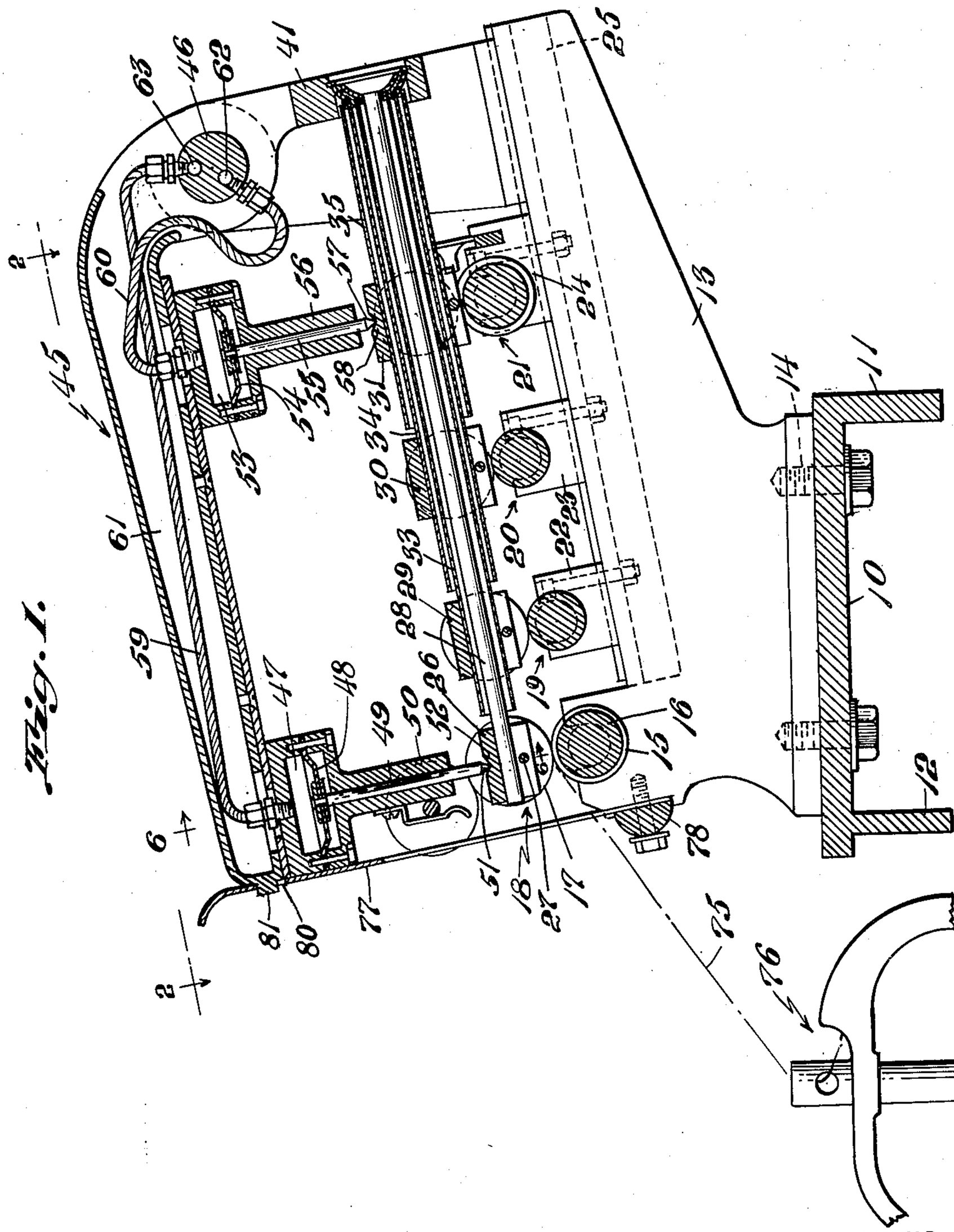

Fig. 1.

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Fig. 2.

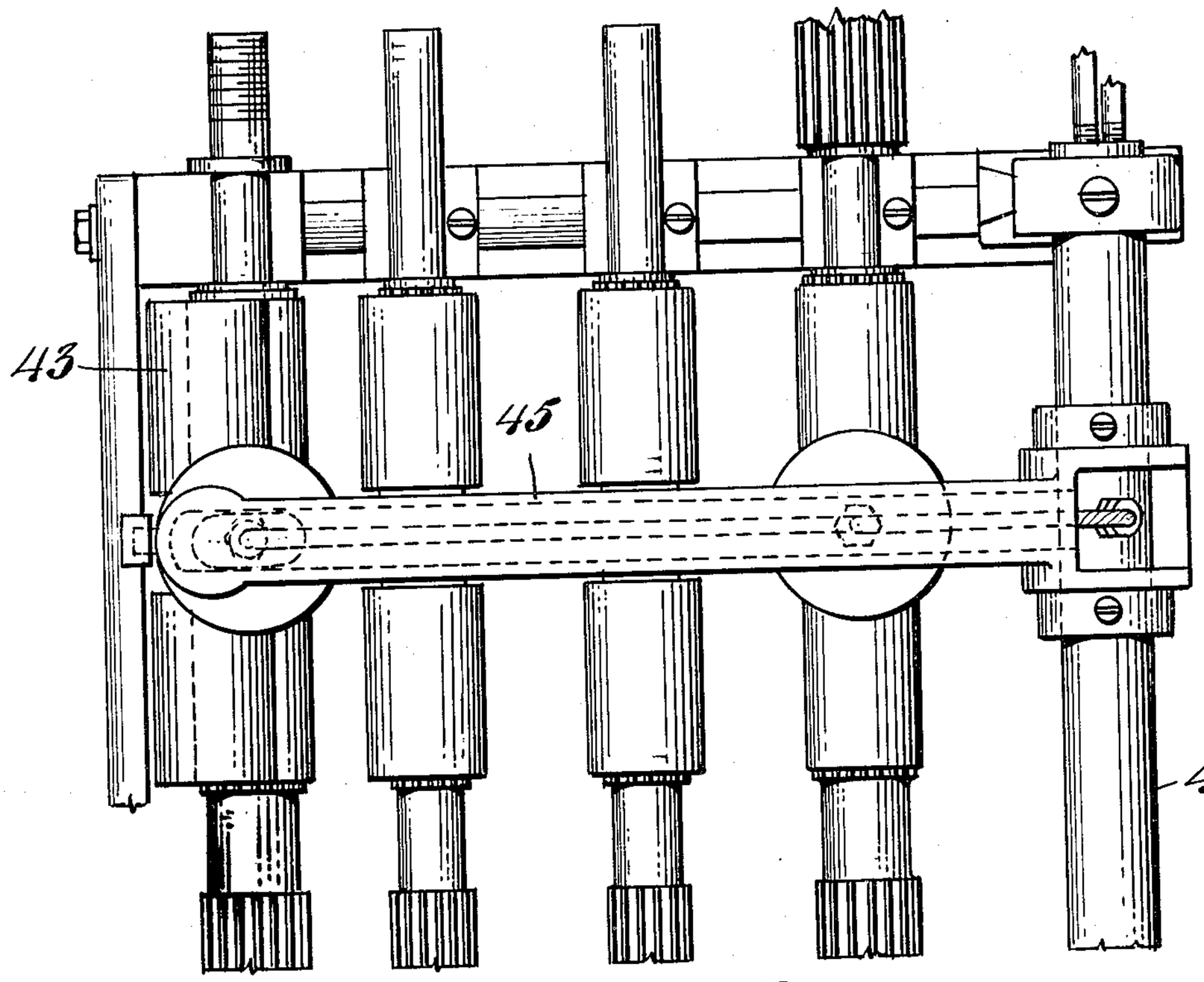

Fig. 3.

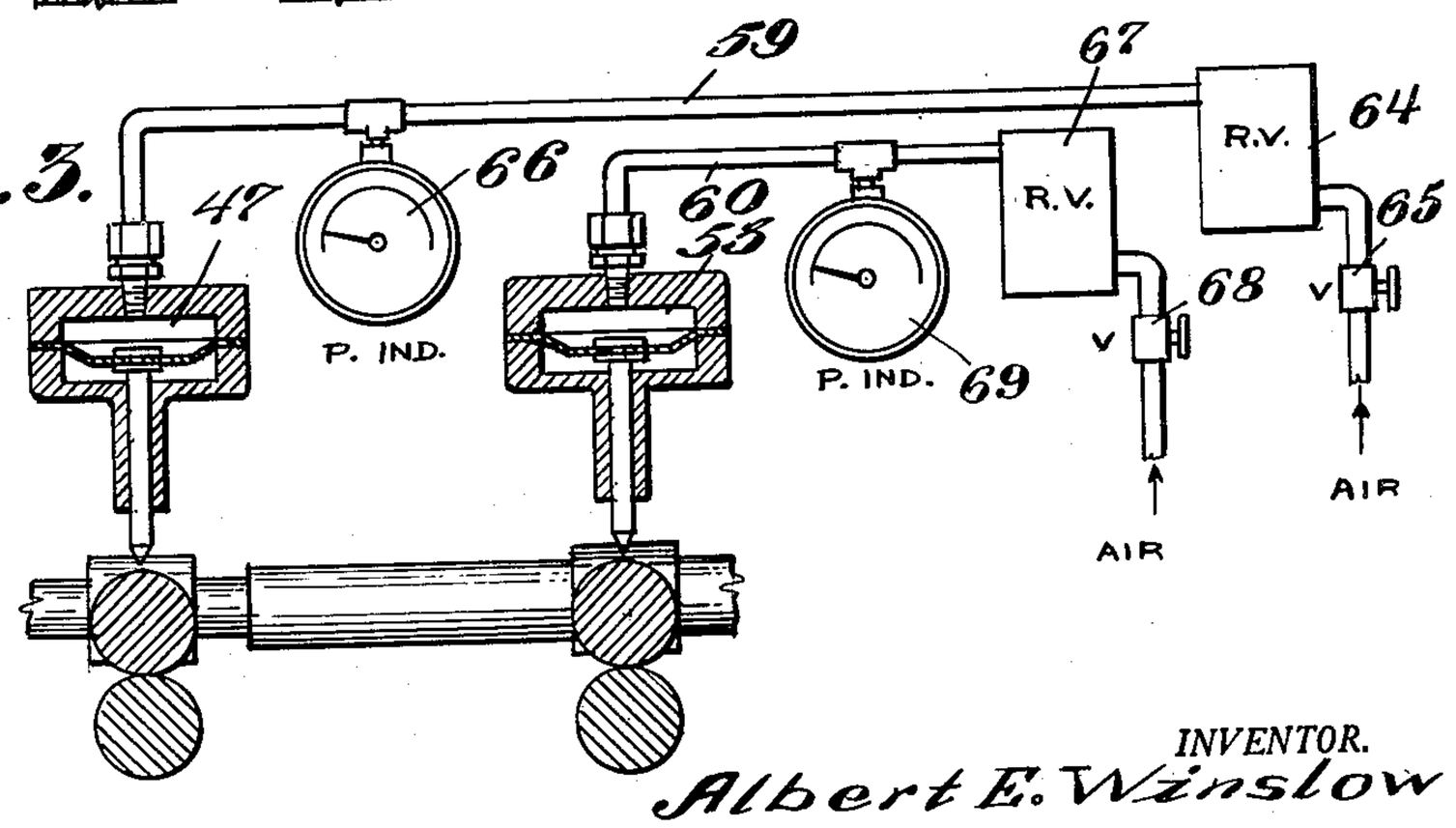

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Fig. 4.

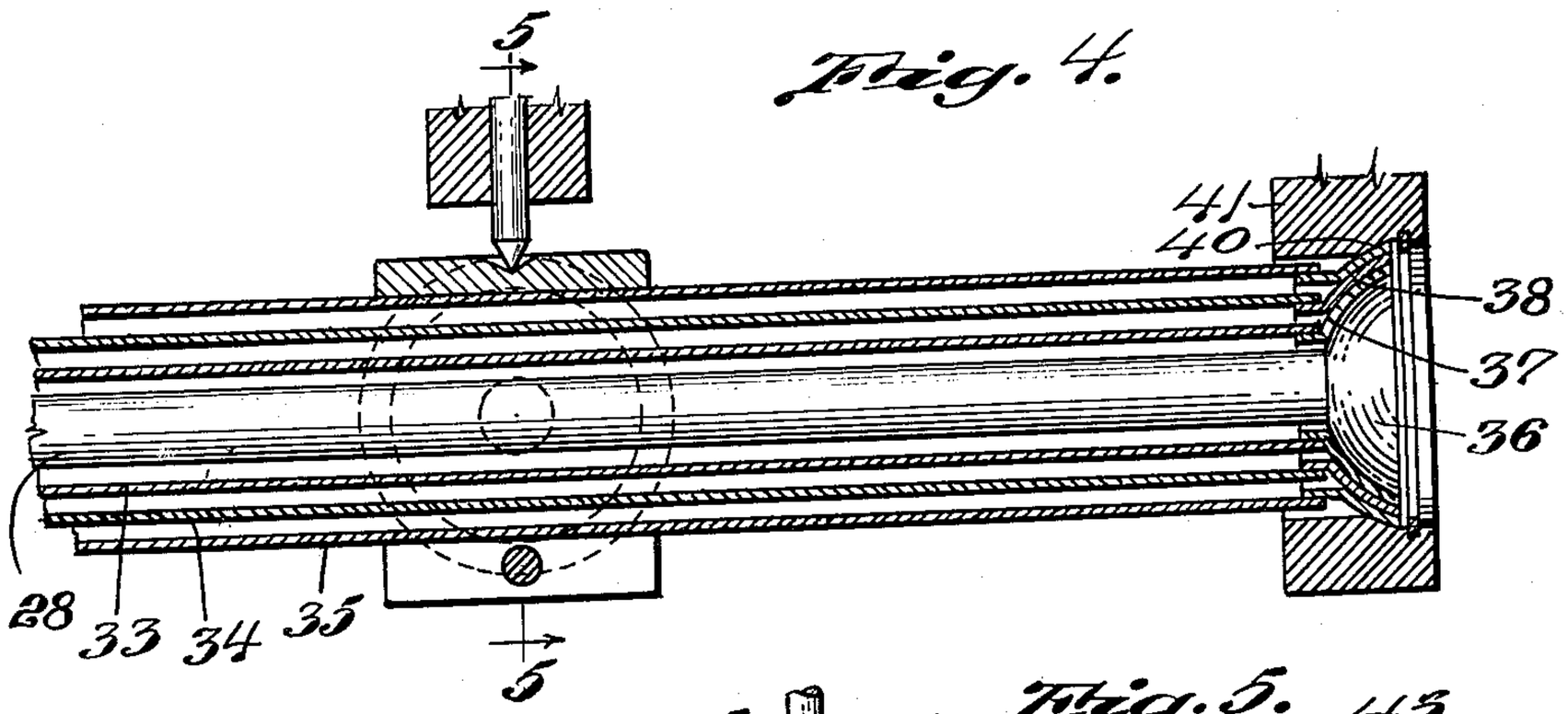


Fig. 5.

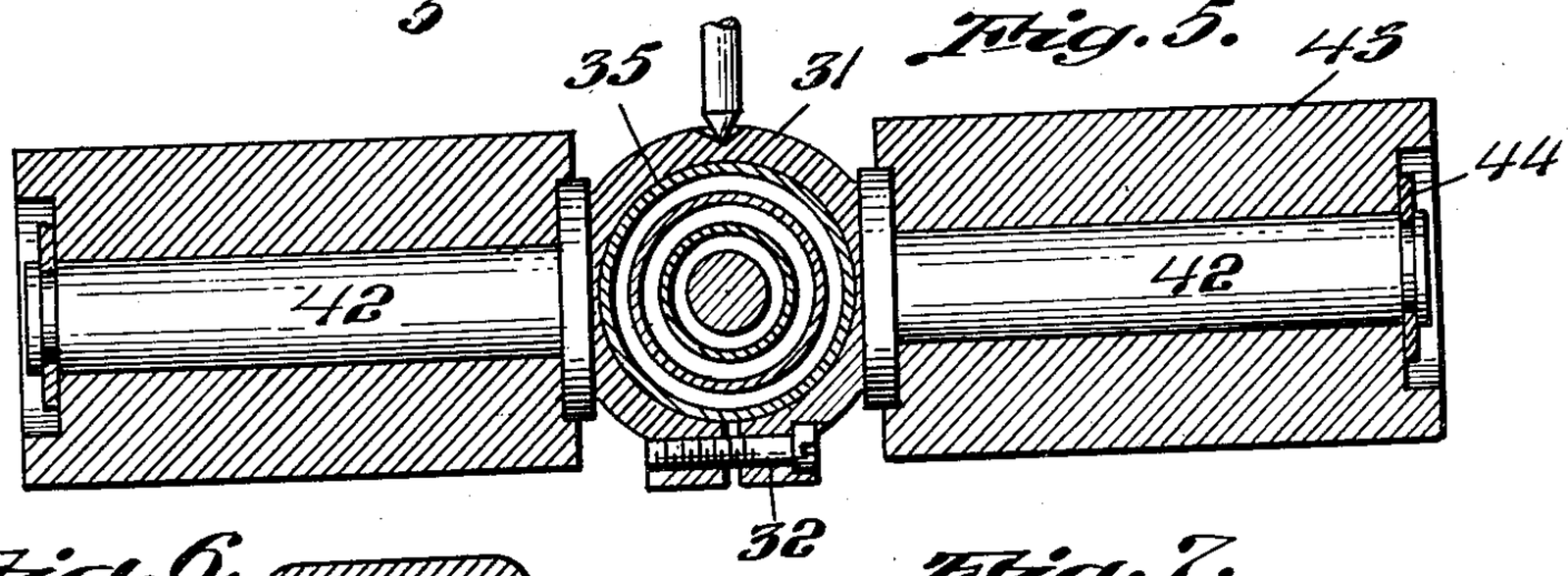


Fig. 6.

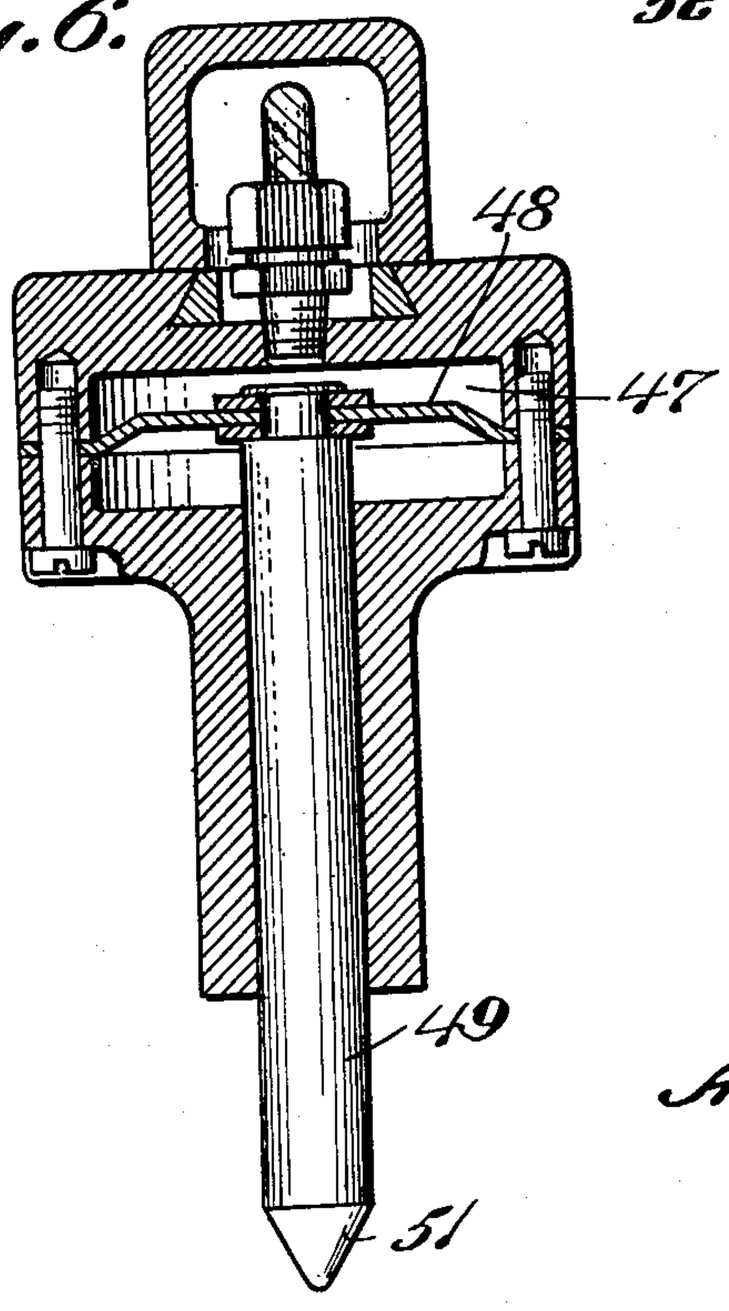
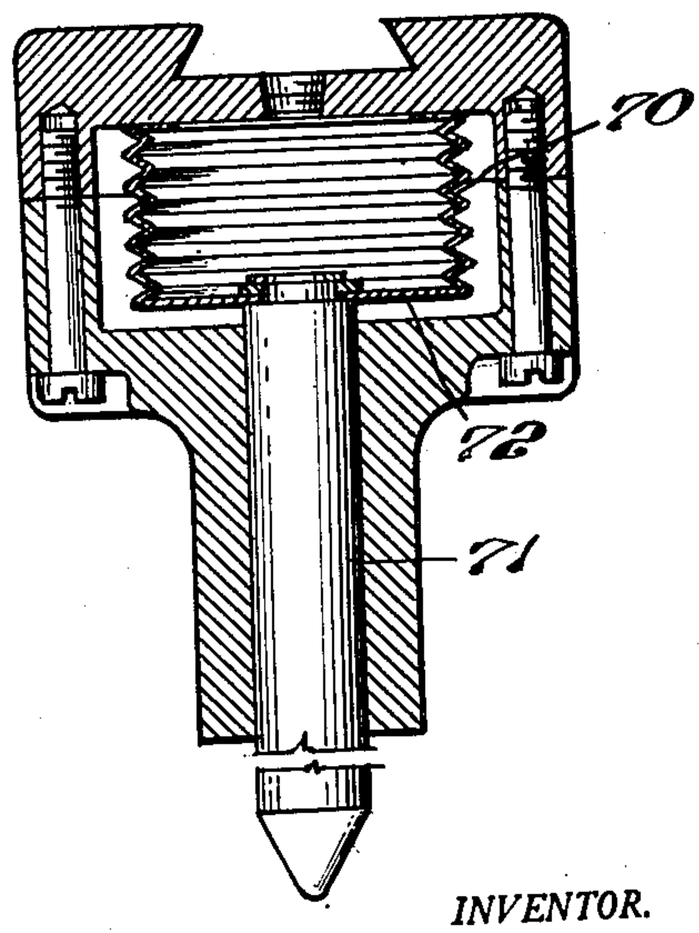


Fig. 7.



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Patented Jan. 6, 1953

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UNITED STATES PATENT OFFICE

2,624,077

DRAFTING FRAME

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Application September 17, 1949, Serial No. 116,263

9 Claims. (Cl. 19—135)

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This invention relates to a drafting frame for textiles.

Heretofore in the use of drafting frames where rolls or belts are employed for attenuating or drawing staple fiber, it has been customary to apply some sort of a weight on the upper roll of a pair of rolls in order to provide a nip for the yarn or sliver which is being worked. This weighting is usually by some mechanical leverage and a gravitational weight, which weighting is difficult to release and when left for any length of time frequently causes flat spots in the rolls. Also, as there is considerable friction in the mechanical action involved, a variation may be caused in the pressure which is applied due to various dirt or lint or atmospheric conditions which may affect the friction. Further, the mechanical weighting is of such a nature that considerable mechanism is exposed which can easily collect lint and dirt and a frame so equipped utilizes many cast parts and is heavy and of clumsy appearance.

An object of this invention is to provide a means for more accurately applying pressure upon rolls as desired.

Another object of this invention is to provide an easy release for the pressure which is applied to the rolls so that when the frame is stopped, pressure may be easily and quickly released on all of the rolls and they will not become flattened in places.

Another object of this invention is to independently weight the different rolls.

Another object of this invention is to support all of the upper rolls of the pairs of rolls on arms pivoted from a point back of the frame for swinging action independently toward the lower of the pairs of rolls.

Another object of this invention is to pivotally mount the arms for supporting the upper of each of the pairs of rolls about a common center so that the rolls will rock and align themselves as pressure is applied.

Another object of this invention is to provide a pressure system which will contain less exposed mechanism and thus one which will not collect dirt or lint as readily.

Another object of this invention is to have the pressure means located above the rolls for application to the upper of each of the pairs of rolls so as to be positioned in a cleaner location than below the lower rolls where lint may settle upon the mechanism.

Another object of this invention is to construct a frame which has a neat appearance and may be readily cleaned and kept clean.

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Another object of this invention is to provide a frame which will require less care and maintenance than frames which have heretofore been utilized.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings:

Figure 1 is a sectional view through the roll supporting portion of a frame constructed in accordance with this invention;

Figure 2 is a top plan view of a fragmental portion of the frame looking in the direction of the arrows on line 2—2 of Figure 1;

Figure 3 is a diagrammatic view illustrating the manner of applying pressure to the individual upper rolls of the pairs of rolls;

Figure 4 is a sectional view through the supporting arms of a set of rolls;

Figure 5 is a section on line 5—5 of Figure 4;

Figure 6 is an enlarged view illustrating the pressure applying means shown in Figure 1 and is on substantially line 6—6 of Figure 1 with the roll omitted; and

Figure 7 is a view similar to Figure 6 but illustrating a bellows through which the fluid acts for expansion rather than a diaphragm chamber.

In proceeding with this invention I mount the upper roll of each of the pairs of rolls which are used on a separate arm, all of which arms are pivoted about a common center on a ball type joint with the arms telescoping one within the other, the smallest arm extending to the front roll and the largest arms extending to the back roll and intermediate arms being between the smallest and largest arms which provide the support for the upper roll of each of the pairs of rolls. Attached to this arm there is provided a means for carrying a pair of rolls so that two ends of a spinning operation may be provided for. This supporting means for each of the rolls has pressure applied to it for the upper of the front and back pairs of rolls through some superimposed supporting mechanism which is hollow and serves to house individual conduits through which fluid pressure may be applied.

With reference to the drawings, 10 designates a horizontal support strengthened by flanges 11 and 12 and upon which separate units or bases 13 are mounted by means of screws 14. Each of these bases comprises a bearing 15 for the lower roll 16 of the front pair of rolls, the upper of which pair of rolls is designated 17. The other pairs of rolls which are supported in the

base are designated generally 19, 20, and 21, the latter of which are the back rolls, the pairs 19 and 20 being intermediate pairs of rolls. Each of these sets of rolls 19, 20, and 21 comprises bearing blocks 22, 23, or 24, which is slidably mounted in a channel 25 for adjustment so as to be variously spaced from the front pair of rolls 18. The upper front roll 17 is supported by means of a split sleeve 26 which is secured by a suitable bolt 27 upon arm 28 at such location that it will support the upper roll 17 above the lower roll 16 of the front pair 18. Similar sleeves 29, 30, and 31, the latter of which is shown in greater detail in Figure 5, are clamped by screws such as 32, as shown in Figure 5, to the tubular arms, the sleeve 29 being clamped to the arm 33, sleeve 30 being clamped to the arm 34, and the sleeve 31 being clamped to the arm 35.

Each of these arms is of a size to telescope into a progressively larger tubular arm. As seen clearly in Figures 1 and 4, the arms are progressively shorter so that the portion of each of the arms upon which the sleeve is mounted extends out beyond the next larger arm. As shown in Figure 4, each of these arms is provided with a back end which is formed along the curvature of a sphere with each forming a bearing for the next adjacent arm so that each of the arms may rock about the same axis, this axis being of a ball type joint so that rocking may occur both vertically and laterally. Thus, the enlarged spherical portion of the arm 28 is designated 36, the portion of the arm 33 designated 37, the portion of the arm 34 being designated 38, and the portion of the arm 35 being designated 40, all being rockably mounted in a member 41 supported above the base 13.

Each of the sleeves such as shown at 31 is provided with trunnions 42 extending from either side thereof upon which the rolls 43 are secured by means of washers 44 for free rotation about the trunnions. These rolls are of the same size and by reason of the ball type mounting for the support of the sleeve 31, these rolls will maintain their alignment so that their axes will be parallel to the axes of the lower rolls of the pair with which they contact.

In order to apply pressure to provide a nip on the front rolls and the back rolls, I have mounted an over arm 45 above each of the telescoping arms pivotally upon a shaft 46 so that this arm may rock in a vertical plane upwardly for removal or servicing of the rolls of each pair. The front end of the arm 45 is detachably held stationary by means of a resilient strap 77 which is secured to cross brace 78 secured to the bases 13. The strap 77 extends upwardly and has an opening 80 in which is received a projection 81 extending from the front end of the said arm 45, thus securing said arm against movement. A chamber 47 is secured to the forward end of the over arm 45 in which there is located a diaphragm 48 which has a pressure pin 49 guided in the stem 50. This pressure pin is provided with a conical end 51 which engages a conical recess 52 in the sleeve 26 so that as the diaphragm 48 is forced downwardly by fluid, pressure will be applied upon the sleeve and arm and rolls carried by the sleeve.

Similarly, a chamber 53 is attached to the back portion of the over arm in which there is located a diaphragm 54 having a pressure pin 55 attached thereto guided in the stem 56 and similarly conical as at 57 to engage the conical recess 58 so that when the diaphragm is flexed downwardly, pressure will be applied upon the arm 35 and back rolls carried thereby.

Fluid pressure is applied individually to each of the chambers 47 and 53 through the individual conduits 59 and 60 which extend through the hollow 61 of the over arm 45, being connected to channels 62 and 63 in the shaft 46 upon which the arm is mounted.

As shown in Figure 3, a reducing valve 64 will be interposed in the conduit 63, 59 and may be controlled by a shut-off valve 65. The pressure is designated as at 66 so that it may be adjusted to the desired amount. Likewise, the conduit 60 has a reducing valve 67 interposed therein with a shut-off valve 68 and the pressure is indicated by the gauge 69. By this arrangement the different reducing valves may be controlled or adjusted so that the desired pressure may be applied upon the upper roll of the back rolls or the upper roll of the front rolls and each of these may be any selected amount.

In some cases instead of using a diaphragm a bellows 70 may be substituted for the diaphragm and the pressure pin 71 connected to the lower wall 72 of the bellows for the application of fluid pressure to the pressure pin.

By this arrangement all of the mechanical leverage and gravitational weights which hung on such leverages hanging down beneath rolls on the base 13 is eliminated and the work may be drawn from the supply in the back of the frame through the different pairs of rolls and delivered in its attenuated condition as at 75 to the flyer 76 and thence to the take-up package in a frame having less weight and less clumsy mechanism. Further, the maintenance is very much simplified, it being merely necessary to relieve the pressure on the fluid system as a whole when the frame is stopped and no weight is then placed upon the rolls which might cause a flattening of the rolls as sometimes occurs when the frames are stopped without relieving the pressure of the weights. Further, a much more even pressure may be established and a closer control of this pressure maintained by the hydraulic system eliminating the friction of the mechanical system of weights and levers. The alignment of the upper rolls is maintained as the flexible joint permits them to be forced to a point where the distance is the shortest. It will also be apparent that whether rolls or belts over rolls are utilized, the weighting system would be similar.

I claim:

1. In a drafting frame, pairs of front and back rolls, an arm for supporting the upper roll of the front pair of rolls, means to pivotally mount said arm at a location back of the back rolls, another arm for supporting the upper roll of the back pair of rolls, means to pivotally mount said other arm at a location back of the back rolls, said arms telescoping one within the other, and fluid means for applying pressure on said arms to weight said upper rolls.

2. In a drafting frame as in claim 1 wherein each of said arms is pivoted about the same axis.

3. In a drafting frame as in claim 1 wherein said arms swing about a ball type joint having a common pivotal point.

4. In a drafting frame as in claim 1 wherein said fluid means individually applies a selected pressure to each arm.

5. In a drafting frame, pairs of front and back rolls, an arm for supporting the upper roll of the front pair of rolls, means to pivotally mount said

arm at a location back of the back rolls, another arm for supporting the upper roll of the back pair of rolls, means to pivotally mount said other arm at a location back of the back rolls, an additional intermediate pair of rolls located between said front and back pairs of rolls, a third arm for supporting the upper roll of the third pair, and means to pivotally mount said third arm at a location back of the back rolls, all of said arms telescoping one within the other.

6. In a drafting frame as in claim 5 wherein the pivot for all of said arms is about the same axis.

7. In a drafting frame, pairs of front and back rolls, an arm for supporting the upper roll of the front pair of rolls, means to pivotally mount said arm at a location back of the back rolls, another arm for supporting the upper roll of the back pair of rolls, means to pivotally mount said other arm at a location back of the back rolls, a third arm swingingly mounted over said arms and individual fluid pressure applying means for each of the said roll supporting arms carried by said third arm.

8. In a drafting frame, pairs of front and back rolls, an arm for supporting the upper roll of the front pair of rolls, means to pivotally mount said arm at a location back of the back rolls, another arm for supporting the upper roll of the back pair of rolls, means to pivotally mount said other arm at a location back of the back rolls, a third arm swingingly mounted over said arms and individual fluid pressure applying means for each of the said roll supporting arms carried by said third arm and separate conduits connected to each of said pressure applying means and housed in said third arm.

9. In a drafting frame, pairs of front and back rolls, an arm for supporting the upper roll of the front pair of rolls, means to pivotally mount said arm at a location back of the back rolls, another arm for supporting the upper roll of the back pair of rolls, means to pivotally mount said other arm at a location back of the back rolls, an additional intermediate pair of rolls located between said front and back pairs of rolls, a third arm for supporting the upper roll of the third pair, and means to pivotally mount said third arm at a location back of the back rolls, all of said arms telescoping one within the other and swinging about a ball type joint having a common pivotal point.

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