

Feb. 24, 1953

W. SCHWEITER  
COP SUPPLYING MECHANISM

2,629,483

Filed May 24, 1947

2 SHEETS—SHEET 1

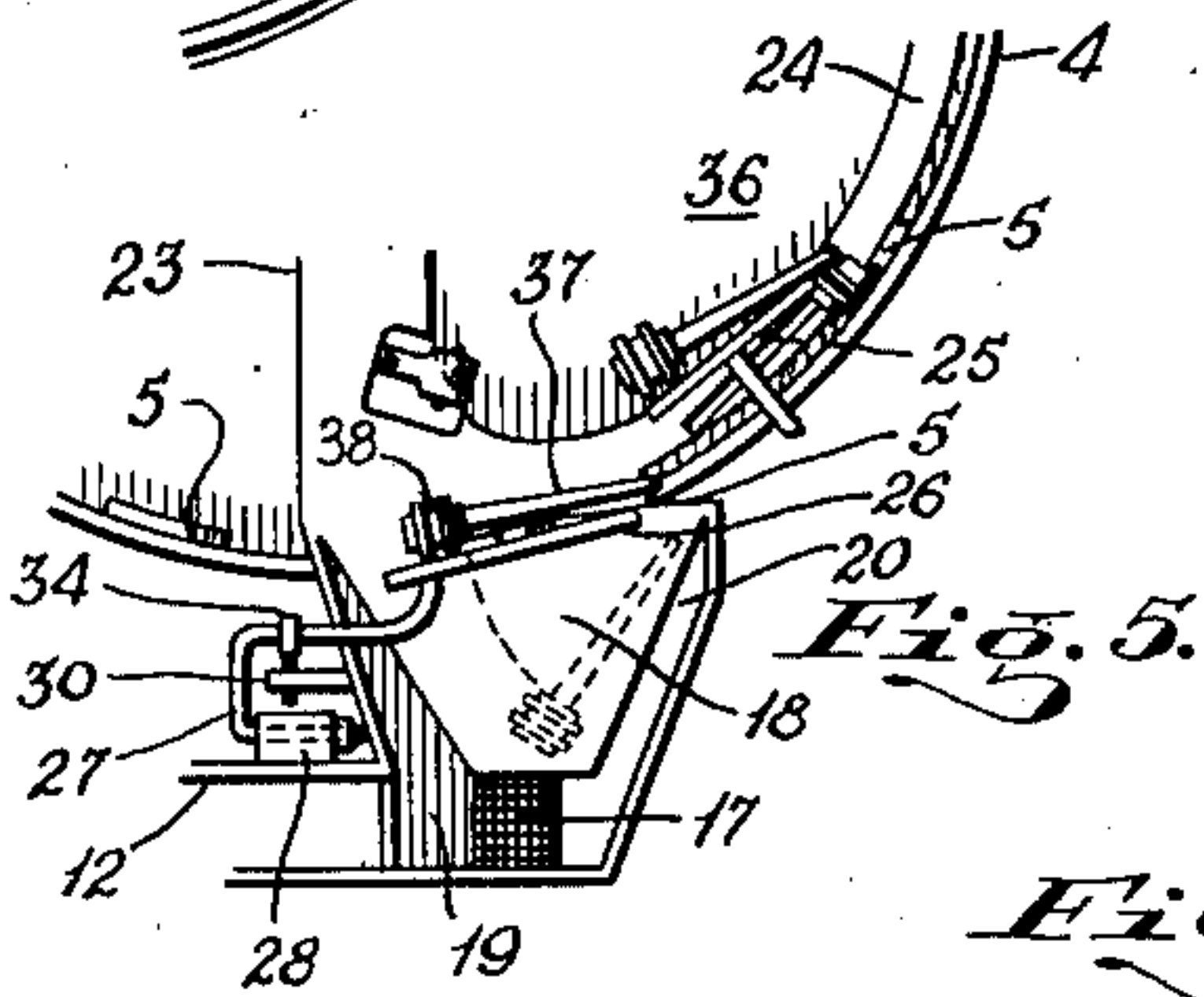
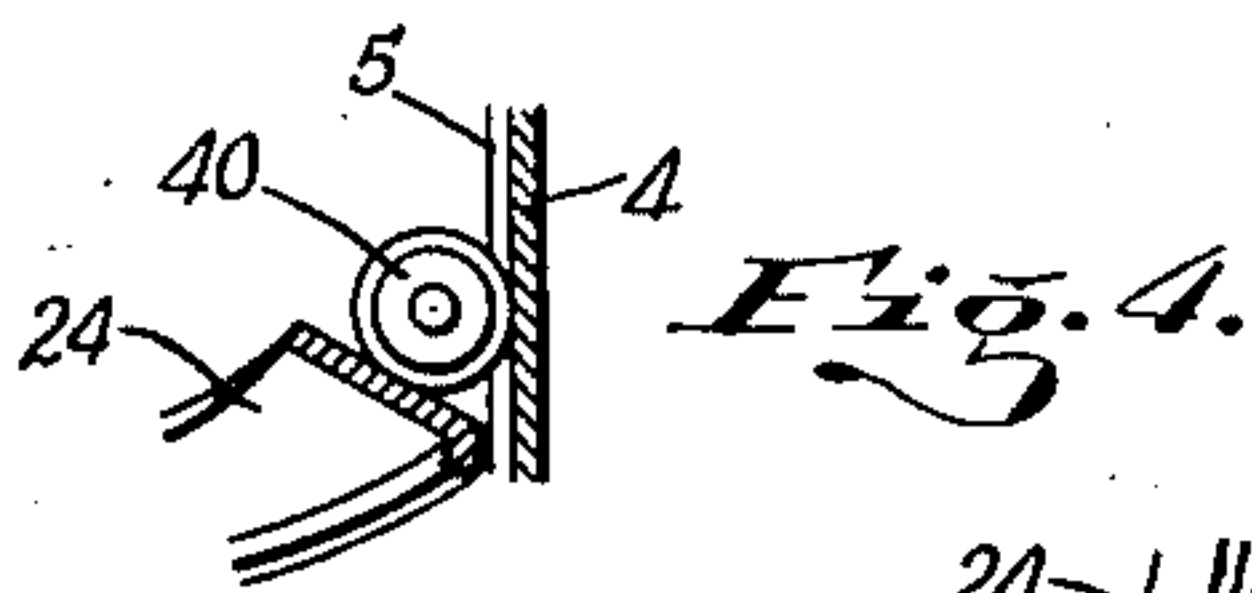
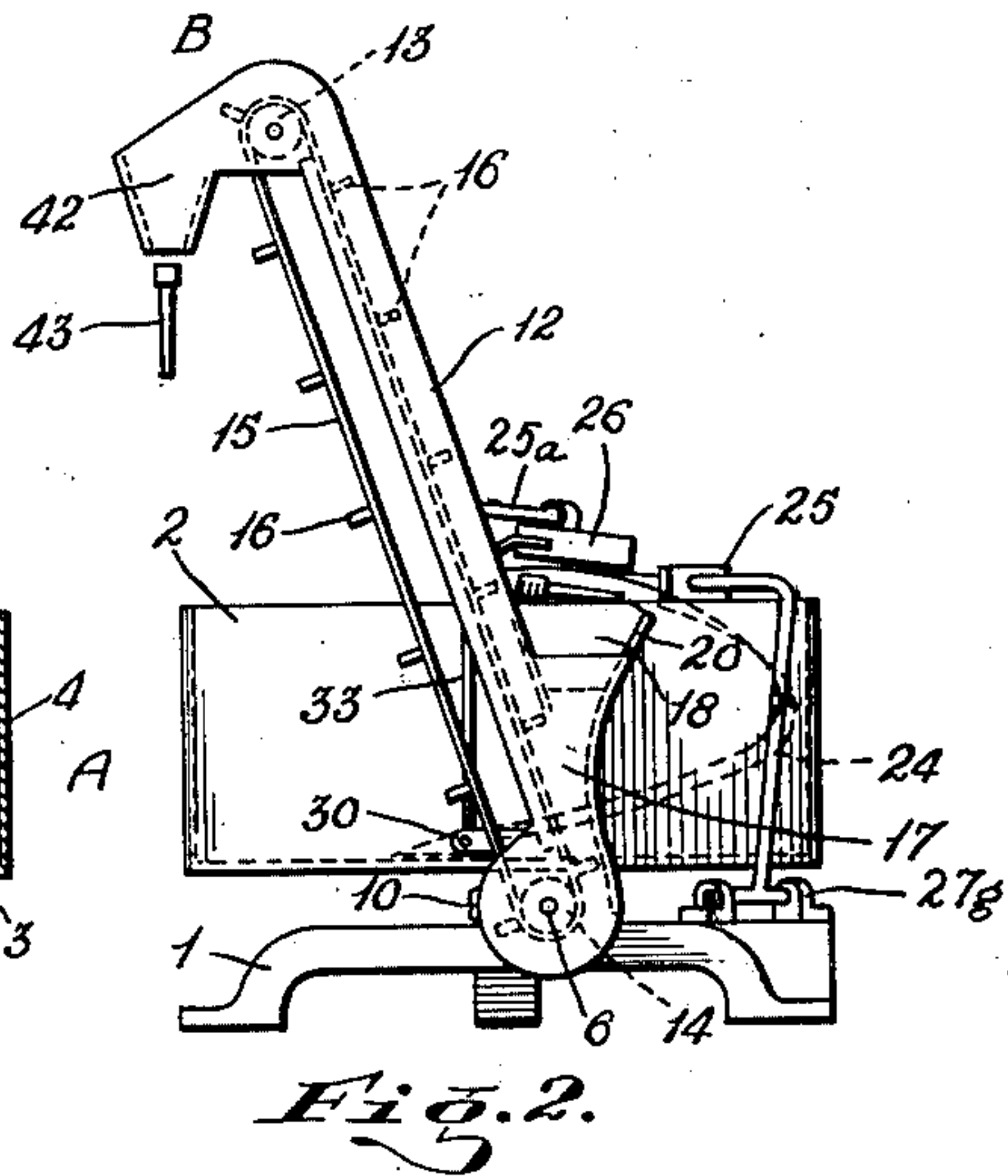
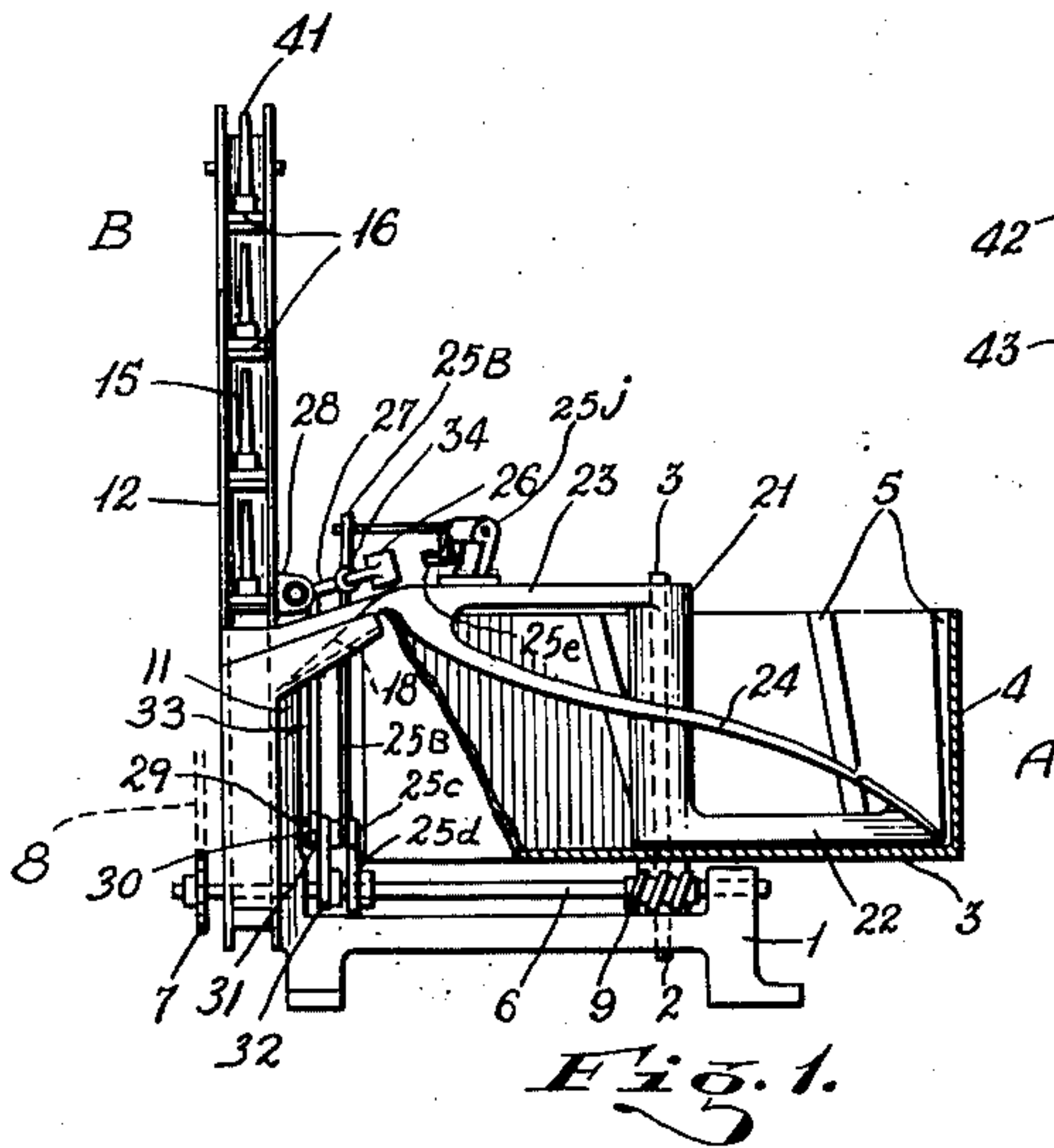


Fig. 3.

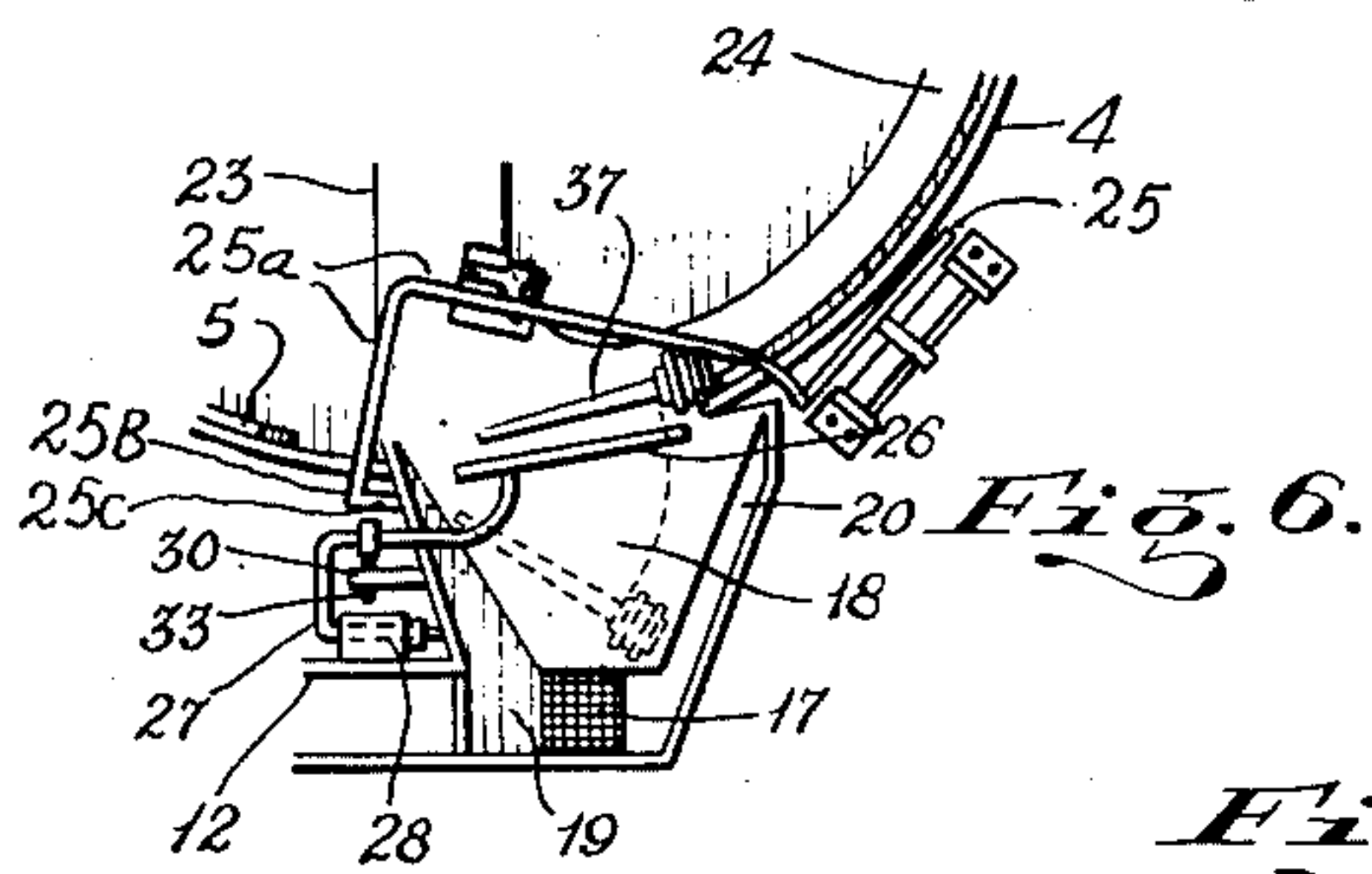
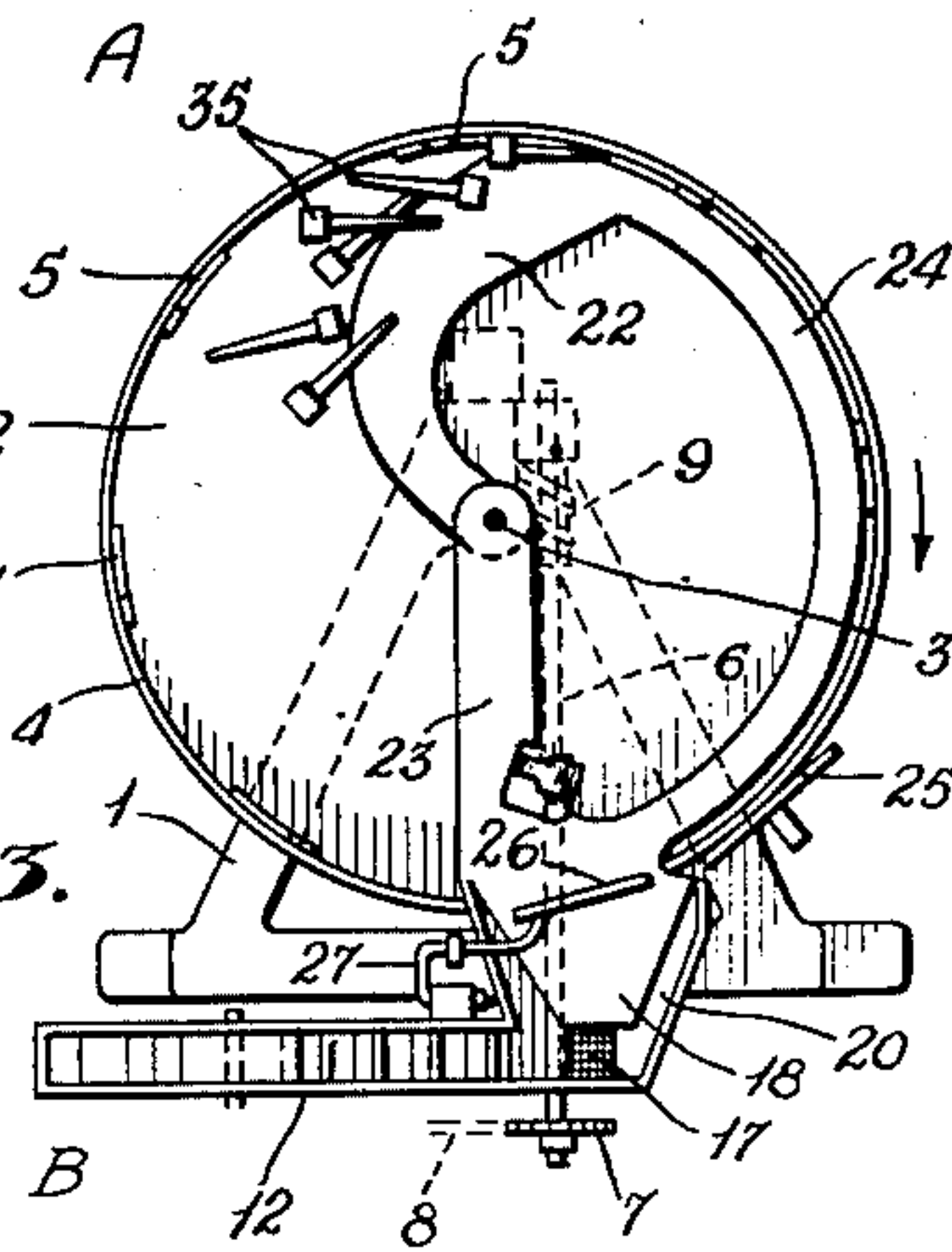
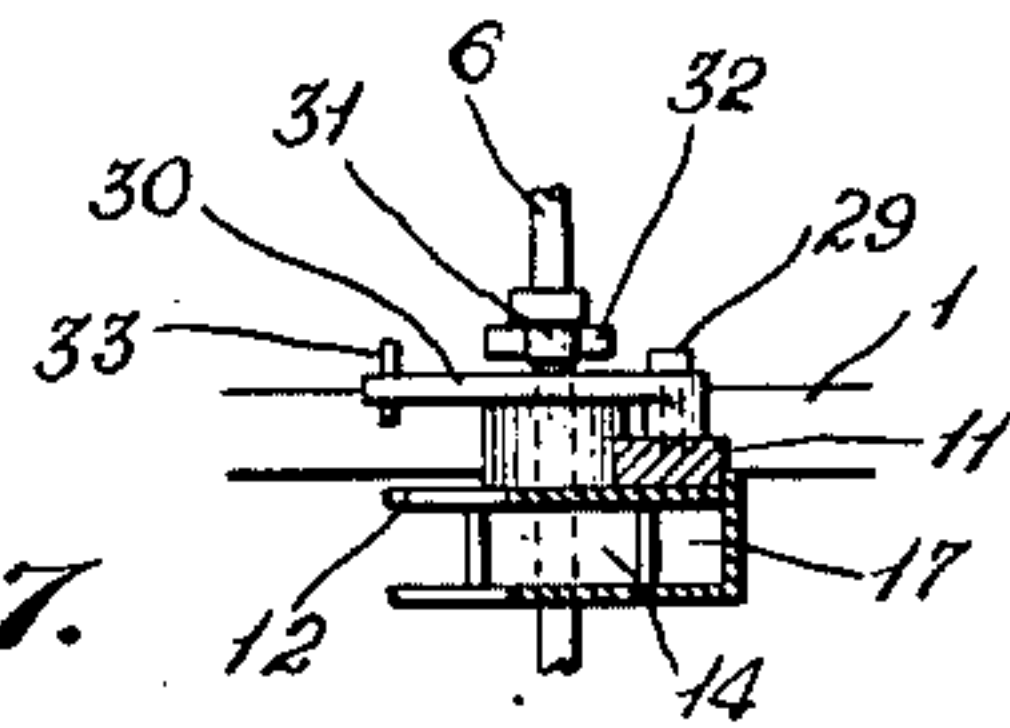


Fig. 7.



INVENTOR  
Walter F. Schweiter  
BY Stanley Frost  
ATTORNEY

Feb. 24, 1953

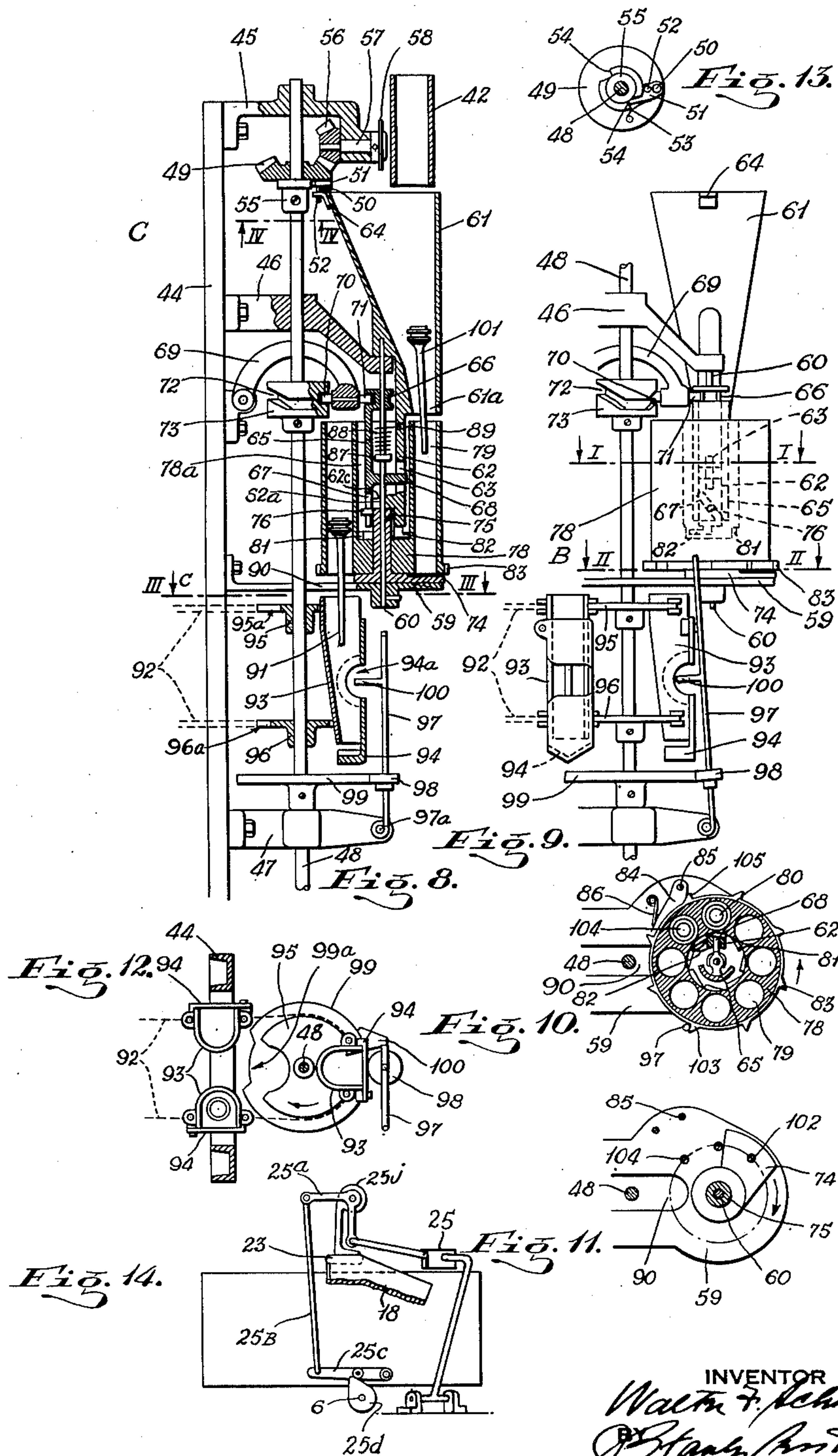
W. SCHWEITER

2,629,483

COP SUPPLYING MECHANISM.

Filed May 24, 1947

2 SHEETS—SHEET 2



INVENTOR  
*Walter F. Schweiter*  
 BY *Stanley A. ...*  
 his ATTORNEY



## UNITED STATES PATENT OFFICE

2,629,483

## COP-SUPPLYING MECHANISM

Walter Schweiter, Horgen, Switzerland, assignor  
to Maschinenfabrik Schweiter A. G., a corpo-  
ration of Switzerland

Application May 24, 1947, Serial No. 750,271  
In Switzerland June 5, 1946

7 Claims. (Cl. 198—103)

1

My invention relates to mechanism or a machine for supplying cops, spindles, quills and analogous circular or rolling bodies (all of which are referred to herein as cops) to whatever apparatus they may be destined for. It is especially suitable for supplying empty cops to winding machines having automatic cop changing mechanisms, that is to say, mechanisms that automatically discharge each cop from the winder as it is filled and substitute an empty cop for it.

Speaking generally (and for conciseness, with special reference to supplying cops to winding machines) the invention includes taking the cops one by one from a bin into which the cops are dumped or thrown perhaps pell mell, by the workmen, and then depositing them, say one by one, in receptacles of a conveyor of the endless belt type that transports the cops to a group of winders and leaves a cop at each winder of the group as and when the respective winder may require it. Provision is made for delivering cops to only such receptacles of the conveyor as return to their cop-receiving station empty, i. e. without a cop as yet undelivered to a winder. Also an equalizing magazine, as I call it, and associated mechanism, is provided intermediate the mechanism that takes the cops from the bin and conveyor; this serves to compensate for the fact that the mechanism which takes the cops from the bin delivers its cops at an irregularly variable rate, and also the winders take cops from the conveyor at an independently irregular variable rate and accordingly the conveyor can take cops only irregularly.

The accompanying drawings illustrate a preferred form of my invention as applied to supplying empty cops to cop-winding machines. In these drawings, Fig. 1 is an elevation, partly in section, of a bin and sorting and cop-arranging apparatus, and an elevator to raise the cops to the higher level at which the conveyor is placed, usually, for convenience. Figs. 2 and 3 are, respectively, a side view and a plan of the same mechanism. Fig. 4 is a section of a detail of the sorting mechanism. Figs. 5 and 6 are plan views adjacent the mechanism which arranges the cops in an orderly manner, and serving to illustrate operations. Fig. 7 illustrates a detail of the sorter mechanism. Fig. 8 is a vertical section of the equalizer magazine and associated apparatus, and a portion of the conveyor that carries the cops to the winders. Fig. 9 is an elevation of the same mechanism with a part of the apparatus in a different position. Figs. 10 and 11 are sections on the lines I—I and II—II of Fig. 9.

2

Fig. 12 is a section on line III—III of Fig. 8. Fig. 13 is a section on the line IV—IV of Fig. 8, certain parts being omitted. Fig. 14 is a detail of the sorting mechanism.

The principal parts or groups of parts of the machine illustrated are the following: The sorting and arranging apparatus A, including the separating drum or bin into which the cops are deposited by the workmen; the elevator B; the equalizing magazine and associated mechanism C; and the conveyor D or endless chains with the cop receptacles or carriers which convey the cops to the cop-winding machines (not shown here).

In the portion of the apparatus A (Figs. 1 to 7 inclusive and Fig. 14) a frame 1 supports the bin, or separating or supply drum 2 into which the empty cops to be supplied to the winding machines one by one are deposited by the mill hands. It is revolvable on an upright post 3 which is rigidly mounted on frame 1. The inner face of the drum wall 4 is provided with several slats 5 (eight, for example) which are slightly inclined from a vertical position. A horizontal shaft 6 is rotatably journaled in frame 1 and is driven continuously by, say, a pulley or sprocket 7. A thread gear 9, on shaft 6 and turning therewith, meshes with a gear 10, rigidly mounted on drum 2, and thereby rotates the drum 2 continuously.

On an arm 11 of frame 1 is fixed the elevator B (Figs. 1, 2 and 3) having a housing 12 in which are mounted upper and lower rollers 13 and 14 respectively which carry a belt 15. The roller 14 is fixed on shaft 6 and drives the belt 15 which is provided with projecting blocks 16. The housing 12 terminates at its upper end at a tube or funnel 42 and has at its lower end a funnel-shaped inlet 17 into which leads an inclined surface 18 forming a rolling path for the cops between the walls 19 and 20. As before indicated the purpose of the elevator B is to raise the cops to a level above the conveyor. This permits the bin or drum 2 to be located on the floor of the mill where the mill hands can dump empty cops into it without much lifting, and at the same time permits the conveyor to be located about on the level of or above the winding heads of the cop-winder or cop-winders supplied by the apparatus.

On the upright post 3 is rigidly mounted tubular member 21 (not rotatable) from which extends, at its bottom end, a substantially radial beam 22, preferably curved in the direction of rotation of the drum 2 (Fig. 3), and at its top end a radial top arm 23 connected to the inclined



3

plane 18. Beam 22 extends gradually into a guide rail 24 which rises gradually and is disposed close to the slats 5, and at its top continues into the inclined plane 18. The guide rail 24 is inclined toward drum wall 4 to form with the drum wall 4 a V-shaped channel whereby the cops passing up the guide rail 24 tend to rest in the path of the slats 5 (Figs. 4 and 5).

A vertical plate or bar 26 disposed about at the upper end of the guide rail 24 and about where the plane 18 begins to incline downwardly, together with its supporting arm 27, is pivoted in, say, a bracket 28 fixed laterally to housing 12. On arm 11 a pin 29 pivotally mounts a lever 30 fitted with a cam roller 31 engaging a cam disk 32 fixed on shaft 6 (Figs. 1, 5 and 7). This lever 30 is provided with rod 33 which is articulated at 34 at its top end to the arm 27. The purpose of this mechanism is to retain each cop at the top of the incline 18 until it is entirely or substantially free of the side wall 4 of the bin or drum, and only then, by rising, permit the cop to roll down the incline 18 (see Figs. 5 and 6). There may also be provided a plate 25, e. g. hinged at 27g, to sweep surplus cops from the guide rail 24 so that only one arrives at the incline 18 at a time (Figs. 5 and 3). This may be operated from the top arm 23 (see Fig. 14), say by a bell-crank lever 25a pivotally supported on the bracket 25j (mounted on the top radial arm 23) connected by a rod 25b to a lever 25c having a cam follower roller engaging the edge of a cam 25d on shaft 6, so that the plate 25 sweeps over the guide rail 24, say just in advance of each slat 5 (Fig. 5), to sweep surplus cops back into the bin.

The tube or funnel 42 at the outlet of the elevator B (Fig. 2) extends to the distributing or delivery apparatus C (Figs. 8 to 13, inclusive), including the oscillating funnel 61 and the equalizing magazine 78. To a wall 44 of a support frame are bolted brackets 45, 46 and 47 (Fig. 8) which act as bearings for shaft 48 which is rotated continuously. Fixed to and near the top of shaft 48 so as to turn therewith is bevel gear wheel 49 carrying on its underside a locking pawl 51 (Fig. 13). This pawl 51 is hinged on pin 50, is fitted with a projecting pin 52, and is pressed by spring 53 into one of two recesses 54 in the driver member 55 fixed on shaft 48. Bevel gear wheel 49 engages another bevel wheel 56 carried on shaft 57 journaled in bracket 45. On shaft 57 is a sprocket 58 which, through chain 8 and sprocket 7 (Fig. 1), drives shaft 6 of the separating drum and elevator apparatus.

Also supported by a bracket attached to wall 44, is a stationary plate 59 which holds immovably therein an upright rod 60. The top part of rod 60 is supported by bracket 46 through which it protrudes to enter an extension on the wall of the guide funnel 61 thus providing an axis on which the funnel can swing or oscillate. Also projecting downward from the guide funnel 61 is an arm 62. This arm 62 has a vertical slot 63. To provide additional support for the funnel 61, the arm 62 can be provided with a horizontal extension 62a to rest on, say, a bushing 75 carried by the plate 59, and provided with an eye 62c through which shaft 60 passes. The guide funnel 61 has a finger or stop 64 at its top.

A slide member 65 rotatable around rod 60, has near its top an annular groove 66 and, at its bottom, an oblique cam slot 67. It has also a projection finger 68 above cam slot 67 which ex-

4

tends into the vertical slot 63 of arm 62 of guide funnel 61, so that oscillation of the slide member 65 will cause guide funnel 61 to swing simultaneously around the rod 60.

An arm 69 hinged on wall 44 carries two rollers 70 and 71. The roller 70 engages in a cam track 72 in cam-drum 73 which is fixed on shaft 48, while the roller 71 engages in the annular groove 66 in the slide member 65. Accordingly rotation of the cam drum 73 by shaft 48 causes arm 69, and therewith the slide member 65, to reciprocate vertically continuously. The bushing or hub 75 is rotatably mounted on rod 60 and plate 59, and is provided with a flange segment 74 (Figs. 8 and 11) and also above the plate 59. This bushing or hub 75 carries the equalizing magazine 78 which has a large center bore 78a and a number of smaller bores 79 (eight for example) arranged in a circle around the center bore. The outlet 61a of guide funnel 61 is at the same distance radially from rod 60 as bores 79 of equalizing magazine 78 so that the guide funnel 61 can swing over the bores 79. At the lower end of center bore 78a are ratchet teeth 81 engaged by a spring pressed pawl 82 (Fig. 10) which is affixed to the bottom of the arm 62 of the funnel 61. Also on the outer surface of the magazine 78, at its lower end, are provided ratchet teeth 83 engaged by a locking pawl 84 which can swing around pin 85 affixed to plate 59 and which is urged by a strong spring 86 against the teeth 83. The pawl 84 completely fills the interval between two locking teeth 83, and because of this and the strong spring 86, the locking pawl 84 permits the equalizing magazine 78 to rotate only in a counterclockwise direction (direction of arrow in Fig. 10) and then only by exertion of a comparatively strong force. On rod 60 is fixed a ring 87. One end of a torsion spring 88 is fixed to this ring and its other end engages in a hole 89 in the upper end of arm 62. This torsion spring 88 constantly urges the guide funnel 61 to swing in a counterclockwise direction (direction of the arrow in Fig. 10), but since the locking pawl 82 on arm 62 always engages a locking tooth 81 on the equalizing magazine 78, the guide funnel 61 can swing in that direction only when equalizing magazine 78 is rotated in that direction. The spring 88 is too weak to turn the equalizing magazine 78 in the counterclockwise direction against the pressure of the pawl 84.

An aperture 90 is provided in one side of plate 59 under equalizing magazine 78, to permit the escape of cops from the magazine at this point as shown at 91, Fig. 8. Under this aperture pass the endless chains 92 of conveyor D bearing the receptacles or carriers 93 for the cops, each of which is closed in front by cover 94 having an aperture or center opening 94a at its center. The chains 92 carry the carriers 93 in a direction as indicated by the arrow in Fig. 12, being driven by, say, two sprockets 95 and 96 fixed on the driven shaft 48 and provided with recesses 95a and 96a (Figs. 8 and 12) which permit the carriers or receptacles to pass them. A feeler rod 97 having a cam roller 98 which rests against the curved working face of a cam disk 99 fixed on shaft 48, is hinged on the pin 97a on the bracket 47, and is so bent that it extends upwardly across and in the path of the ratchet teeth 83 on the outside of the magazine 78 (compare Figs. 9, 10 and 12). It is so hinged to the bracket 47 that it can swing tangentially of the path of the teeth 83 as it were, but, for example, is resilient so that on swinging it remains in contact with those



5

teeth and the circumference of the magazine 78, and in returning from right to left, Fig. 10, it can pass over any tooth 83 that may be in its return path. The feeler rod 97 is provided with a feeler 100 disposed to enter the center opening in each of the cover plates 94 of the cop receptacles or carriers 93. Normally the cam disk 99, acting on roller 98, holds the feeler 100 out of the path of the receptacles or carriers 93, but opposite each receptacle recess of the conveyor sprockets 95 and 96 the disk is cut away, as at 99a, sufficiently deeply to permit the feeler rod 97 to swing inwardly at least far enough to permit the feeler 100 to enter the receptacles and strike any cop that may be in the respective receptacle. The ratchet teeth 83 of the magazine 78 are so spaced that when the feeler 100 finds a cop in a receptacle, and thus limits the inward swing of the feeler rod 97, the upper end of the feeler rod remains between two adjacent teeth, but when the feeler 100 finds no cop in a particular receptacle, the inward swing of the feeler rod 97 permitted by the adjacent cut 99a in the cam disk 99 is sufficient to permit the upper end of the feeler rod 97 to pass one tooth 83 and assume a position about as shown in Fig. 10. When an action such as this last occurs, the immediately following outward swing of the feeler rod under the thrust of the cam disk 99 on its roller 98, causes the feeler rod 97 to engage this tooth 83 and turn the magazine 78 sufficiently to carry one bore 79 of the magazine away from the delivery opening 90 in plate 59 and bring the next bore (carrying a cop 104, Fig. 10) to the delivery opening 90.

My mechanism operates in the following manner: Rotation of shaft 6, driven from drive shaft 48 through sprocket 58, chain 3 and sprocket 7, causes the sorting or separating drum 2 to revolve. Empty cops in the bin or drum 2 accumulate on the stationary beam 22 and the lower part of guide rail 24 and against the wall 4 of the drum. Any cop that may lie flat against the wall 4 in this region may be caught by a slot 5 of the drum wall (Fig. 3), and pushed, head end 38 first or pointed end 39 first, up the trough of 24 and thence onto the incline 18 in front of the gate plate 26 (Figs. 5 and 6). At this point the slots 5 leave the cops by passing around under the rolling-plane or guide rail 24. If two cops become tangled and move up the trough together, one may be pushed off the track 24 by the plate 25 as before described (Fig. 5). The cops are thus picked up out of the bin one by one, but at somewhat varying intervals usually.

A cop reaches the top of the incline 18 either head 38 first or point 39 first (Figs. 5 and 6), and there is held by plate 26 until it is entirely on that surface. Cam disc 32 (Fig. 7) is so placed on shaft 6 that the plate 26 is then lifted. This permits the cop to roll down incline 18, and in doing so reaches the bottom of incline 18 with its head 38 foremost. It then passes to the elevator B where a block 16 on the elevator catches the cop and carries it, head downward (Fig. 1), to the top of the elevator. Here it is overturned through funnel or tube 42, falling point downward (Fig. 2, cop designated 43), into the guide funnel 61 of the delivery or distributing apparatus C (Fig. 8). From the guide funnel 61 the cop (designated 101) passes into whatever bore 79 of the magazine 78 may be beneath it at the moment. The cop comes to rest with its point (102 in Fig. 11) resting on segment 74. At this time (or rather, so long after each elevator block

6

16 passes over the top of the elevator B that its cop, if it carries one, will have reached the segment 74; the cam drum 73 on shaft 48 slides member 65 on rod 60 downward. This causes pin 76 to turn its hub 75, on account of its engagement in the cam slot 67 in slide member 65, and therewith turn the segment 74 in a clockwise direction (direction of arrow in Fig. 11). This moves the segment 74 away from underneath the point 102 of cop 101 and the latter drops down to plate 59, providing a cop 101 came down the funnel 61 as assumed; if none came down the funnel at the time (because some slot 5 of the drum failed to pick up a cop), the segment makes the same movement nevertheless.

At the same time the locking pawl 84 keeps equalizing magazine 78 stationary by engaging a tooth 83 thereon, and the locking pawl 82 on arm 62 of guide funnel 61 keeps the funnel motionless by engaging a tooth 81 within the centerbore 78a of the equalizing magazine 73.

As cam drum 73 continues to rotate, slide member 65 is moved upward by it, with the result that the pin 76 on hub 75, because of its engagement in the cam slot 67 in slide member 65, tends to turn its hub 75 and the segment 74 thereon in the reverse or counterclockwise direction. If no cop came down to a bore in the magazine at the time assumed, the hub 75 and segment 74 return to their initial positions to await the beginning of another cycle. On the other hand if a cop 101 came down as assumed, then the segment 74, in trying to return encounters the cop point 102 which now rests on plate 59, and thus is prevented from moving further. Therefore, since the slide member 65 is moving upward, the pin 76 coacts with the cam slot 67 and causes the slide member 65 to rotate around rod 60 an angular distance equal to the distance between two bores 79 of the magazine 78. Through projection finger 68 in slots 63 in arm 62 this shifts the funnel 61 clockwise until it comes above the next bore 79 of the magazine in this direction. This bore will be empty, because in passing the delivery opening 90 it lost the cop that was delivered to it sometime before.

It is thus apparent that if the magazine 78 remains at rest its various bores 79 will be given cops successively, in the clockwise direction. However, while the funnel 61 is thus trying to fill the magazine with cops, receptacles or carriers 93 of the conveyor are being passed under aperture 90 in plate 59. The bore 79 in the magazine 78 that is positioned above the aperture 90 at this time happens to be empty because the cop given to it earlier has fallen from it into an empty receptacle 93. As each receptacle 93 thereafter passes the delivery opening 90, the feeler 100 on the feeler rod 97 enters it, and as soon as the feeler finds an empty receptacle the feeler rod 97 advances the magazine one step, thereby bringing a filed bore 79 to the aperture 90 and the cop 104 of that bore falls into the receptacle. While the magazine thus advances, the torsion spring 83 tends to cause the funnel 61 to follow the magazine 78 in the counterclockwise direction, and through arm 62 and slot 63, the slide 65 and pin 76 on hub 75, segment 74 also tends to follow the magazine. Accordingly the action of feeding cops to the magazine and the action of the magazine in delivering cops do not interfere with each other.

These actions of feeding cops to the magazine and the magazine feeding cops to the conveyor D that carries the cops to the winding machines,



are repeated of course. If momentarily the slats 5 tend to separate out cops more slowly than the conveyor D calls for cops, the funnel 61 will tend, in the aggregate, to shift counterclockwise (i. e. in the direction of the arrow in Fig. 10), and give cops to the magazine more and more closely to the delivery port 90. However when this situation changes and momentarily the slats 5 supply cops for the funnel more rapidly than the conveyor can take cops from the magazine, the reverse occurs; that is to say, the funnel 61 will tend, in the aggregate, to move clockwise, and add cops to the magazine more rapidly than they are taken away. Whenever the two rates are about even, the funnel 61 will oscillate back and forth in a fixed arc.

Speaking generally however, I usually so design the apparatus that, on the average, the slats 5 are able to deliver cops at a greater rate than conveyor D is able to accept cops. While this tends to assure a cop for every receptacle or carrier 93 that may arrive empty at the delivery port 90, it may result at times in having the funnel progressing clockwise (direction of the arrow in Fig. 11) so far that every bore 79 of the magazine contains a cop, excepting the bore directly above the delivery port 90. To prevent further delivery of cops to the magazine while such a situation exists, I arrange for discontinuing the delivery of cops to the funnel at such times. In the present instance this is done by mounting the cop-supplier driving gear 49 loose on the driving shaft 48 and coupling it to the shaft by means of the pawl 51 which is mounted on the underside of this gear and the sleeve 55 which is fastened to the shaft 48 and notched engagingly to receive the pawl as at 54. The pin 52 projecting from the pawl is so placed that it engages with the projection 64 from the top of the funnel 61 when this funnel approaches the particular bore 79 of the magazine that stands, at the moment, above the delivery port 90. Whenever the funnel 61 comes to this position, then this projection 64 is struck by 52, and this turns the pawl 51 out of its notch 54. Accordingly the gear 49 stops rotating, and with it the elevator B and the bin or drum come to rest. As soon as the magazine turns to deliver another cop to the conveyor D, the funnel 61 swings with it of course, and thereby releases the pawl 51 its spring 53 again thrusts the pawl into one of the notches 54 and the separating and arranging mechanism, and the elevator B, again begin to operate.

It will be understood that my invention is not limited to the details of construction and operation shown in the accompanying drawings and described above, except as appears in the claims. I claim:

1. Mechanism to supply articles substantially individually to a place of use comprising a separator to segregate the articles substantially successively from a mass of them, a conveyor including individual receptacles for the articles to convey the articles successively to such place of use, an equalizing magazine between the separator and the conveyor to receive articles from said separator, and a feeler to feel the receptacles to control the discharge of said articles from said magazine to said receptacles, said conveyor and separator operating independently of each other.

2. The subject matter of claim 1, characterized by the fact said separator is connected to said magazine to deliver to the magazine all the articles passing from the separator.

3. In mechanism to supply cops, a rotary magazine having bores to contain cops, a guide to feed cops to empty bores of the magazine, said magazine and guide being relatively oscillatable back and forth, and a feeler to cause said magazine to turn to a cop-delivery position.

4. The subject matter of claim 1, wherein said magazine has a number of bores to contain said articles as segregated by said separator and said feeler directs the delivery of articles from individual bores of the magazine to individual empty receptacles.

5. Mechanism for supplying cops to cop-winders, including in combination a bin for cops, a separator to individually select cops from the bin and move said cops individually to the oscillatable guide hereinafter mentioned, an oscillatable guide to receive said cops, a rotary equalizing magazine having bores therein, means to oscillate said guide forward and back over said magazine to deliver cops to empty bores, a belt type conveyor to transport cops from said equalizing magazine to the cop winders, said conveyor having receptacles to carry the cops, a feeler to feel said receptacles to cause said magazine to rotate to deliver cops therefrom to empty receptacles, and means on the guide to discontinue the operation of the separator when said guide is oscillated to a position whereat each of a certain number of the bores of the magazine contains a cop.

6. In mechanism to supply articles, a magazine to contain the articles, a guide to feed the articles to the magazine, said magazine and guide being relatively oscillatable back and forth, and a feeler to cause said magazine to move to an article-delivery position.

7. Mechanism to supply articles substantially individually to a place of use comprising a conveyor to convey the articles to the place of use, a magazine to feed the articles to said conveyor and a guide to receive articles from the separator and deliver to the magazine, said magazine and guide being movable, one with respect to the other, in feeding articles from said guide, a separator to segregate the articles substantially successively from a mass of them to said magazine, and a feeler to feel said conveyor and direct the delivery of the articles from said magazine to said conveyor.

WALTER SCHWEITER.

#### REFERENCES CITED

The following references are of record in the file of this patent:

#### UNITED STATES PATENTS

Number	Name	Date
1,195,571	Flaherty	Aug. 22, 1916
1,333,065	Douglass	Mar. 9, 1920
1,355,488	McKenney	Oct. 12, 1920
1,516,170	Young	Nov. 18, 1924
1,609,802	Elkstrom	Dec. 7, 1926
1,749,801	Chapman	Mar. 11, 1930
1,857,815	Tafferty	May 10, 1932
1,892,670	Jaeger	Jan. 3, 1933
1,991,699	Reiners	Feb. 19, 1935
2,378,579	Popov	June 19, 1945