

June 19, 1922

1,459,211

S. KALISZ

DRIER

Filed April 30, 1921

9 Sheets-Sheet 1

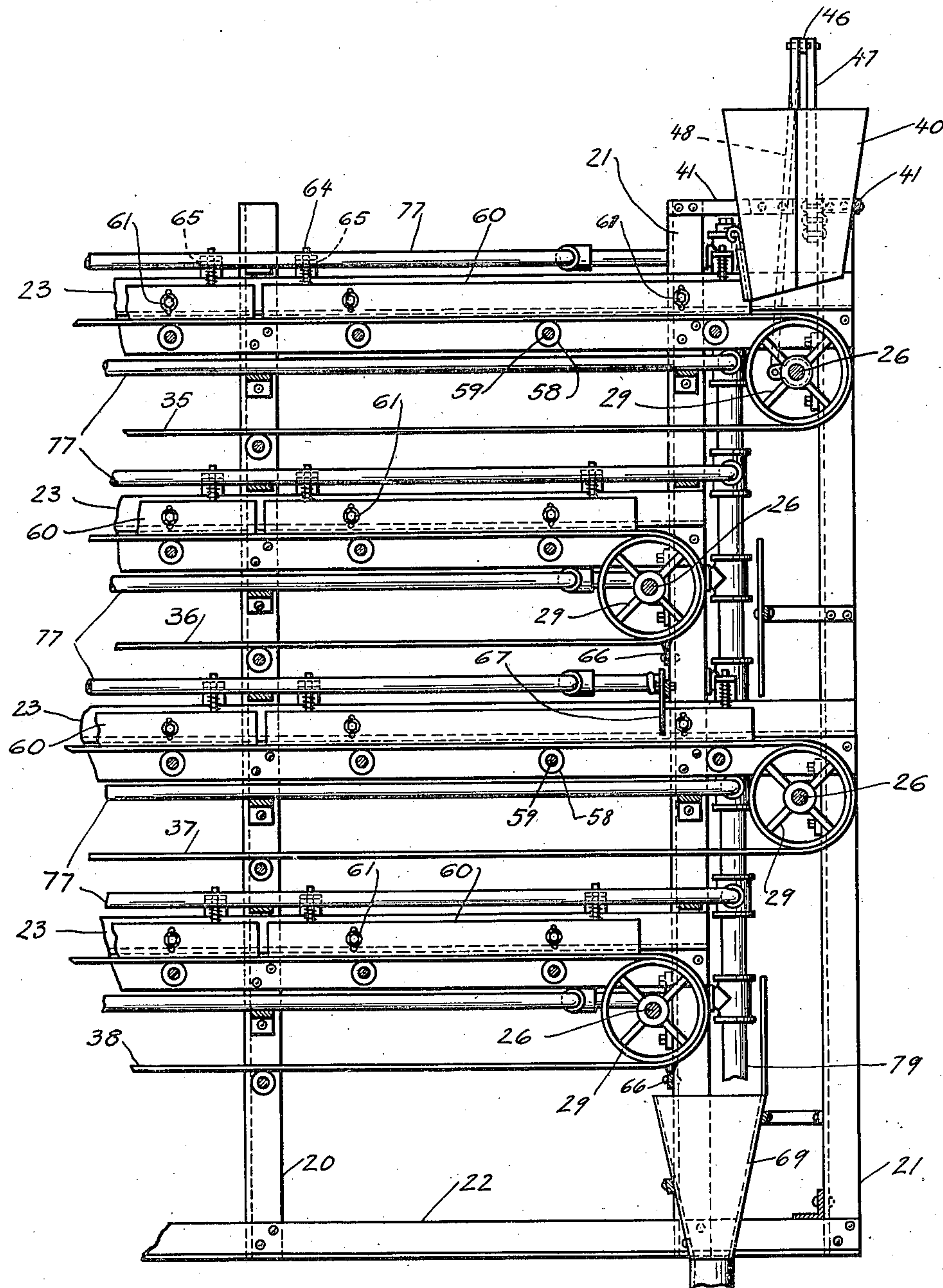


Fig. 1

Witnesses:

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E. E. Sweeney

Inventor

Steve Kalisz

By Joshua R. H. Potts
His Attorney

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DRIER

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9 Sheets-Sheet 2

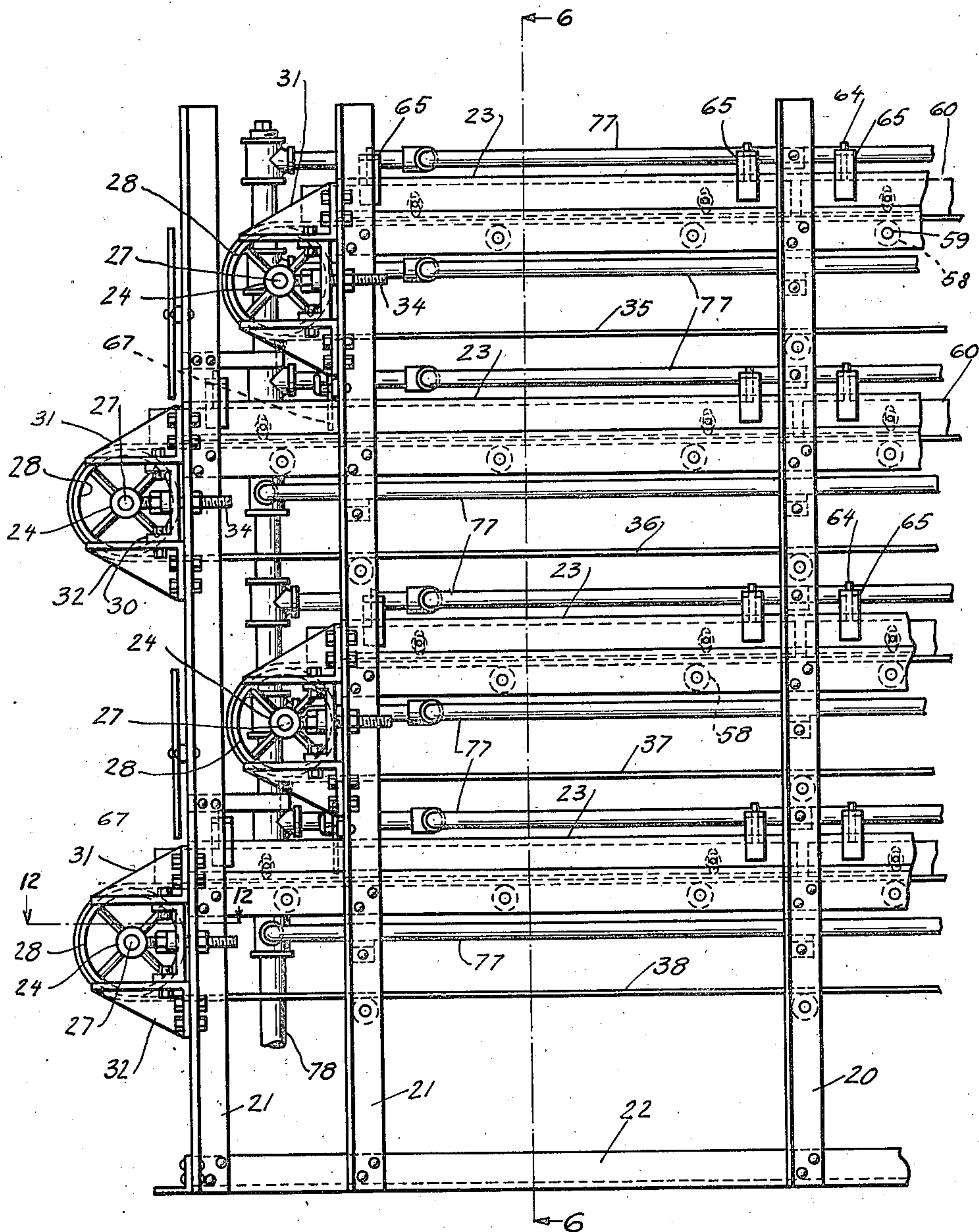


Fig. 2

Witnesses:

Wm. Schnellhardt.

C. E. Thiede

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His Attorney

June 19, 1923.

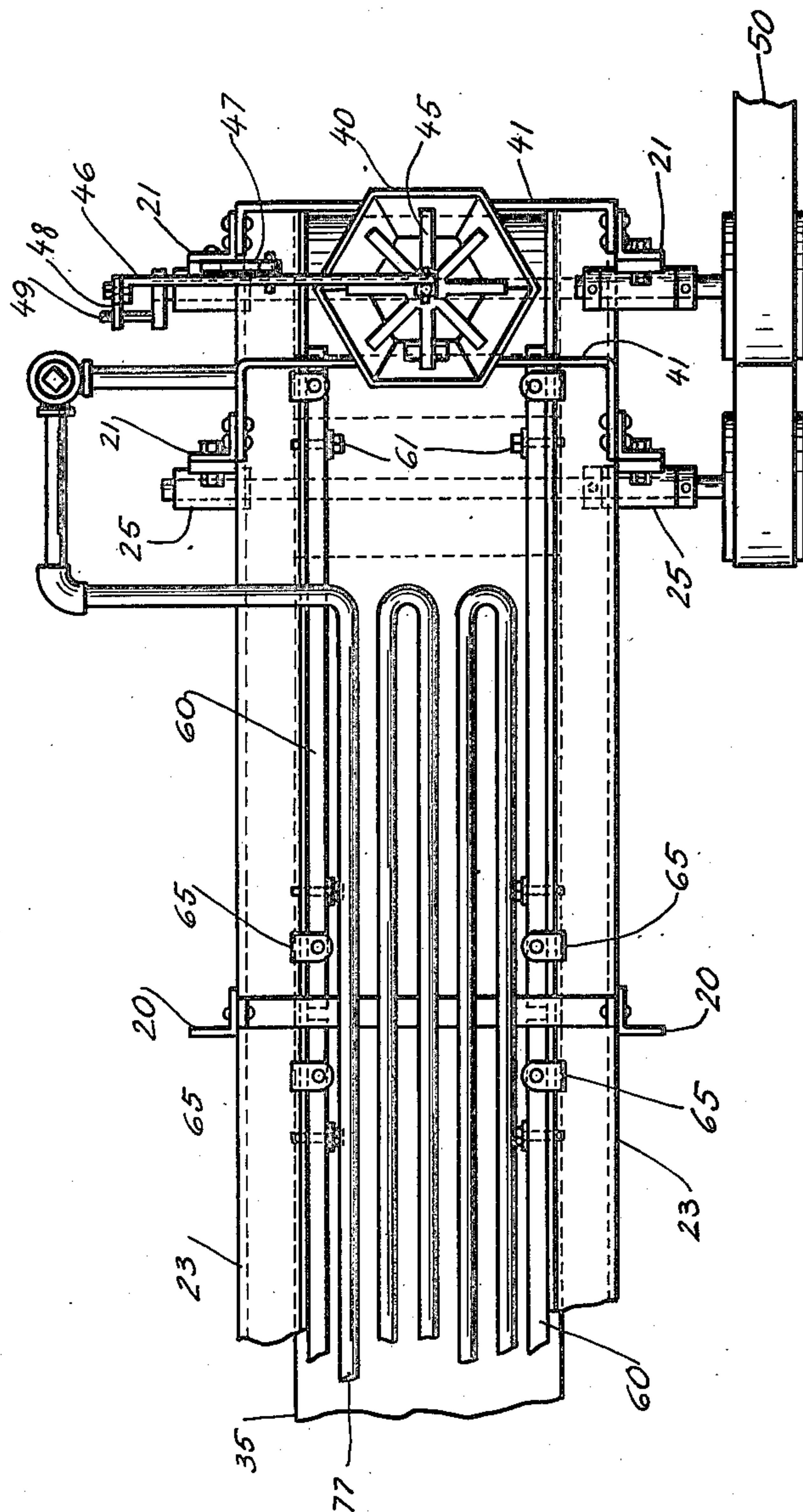
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S. KALISZ

DRIER

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9 Sheets-Sheet 3



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S. KALISZ

DRIER

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9 Sheets-Sheet 4

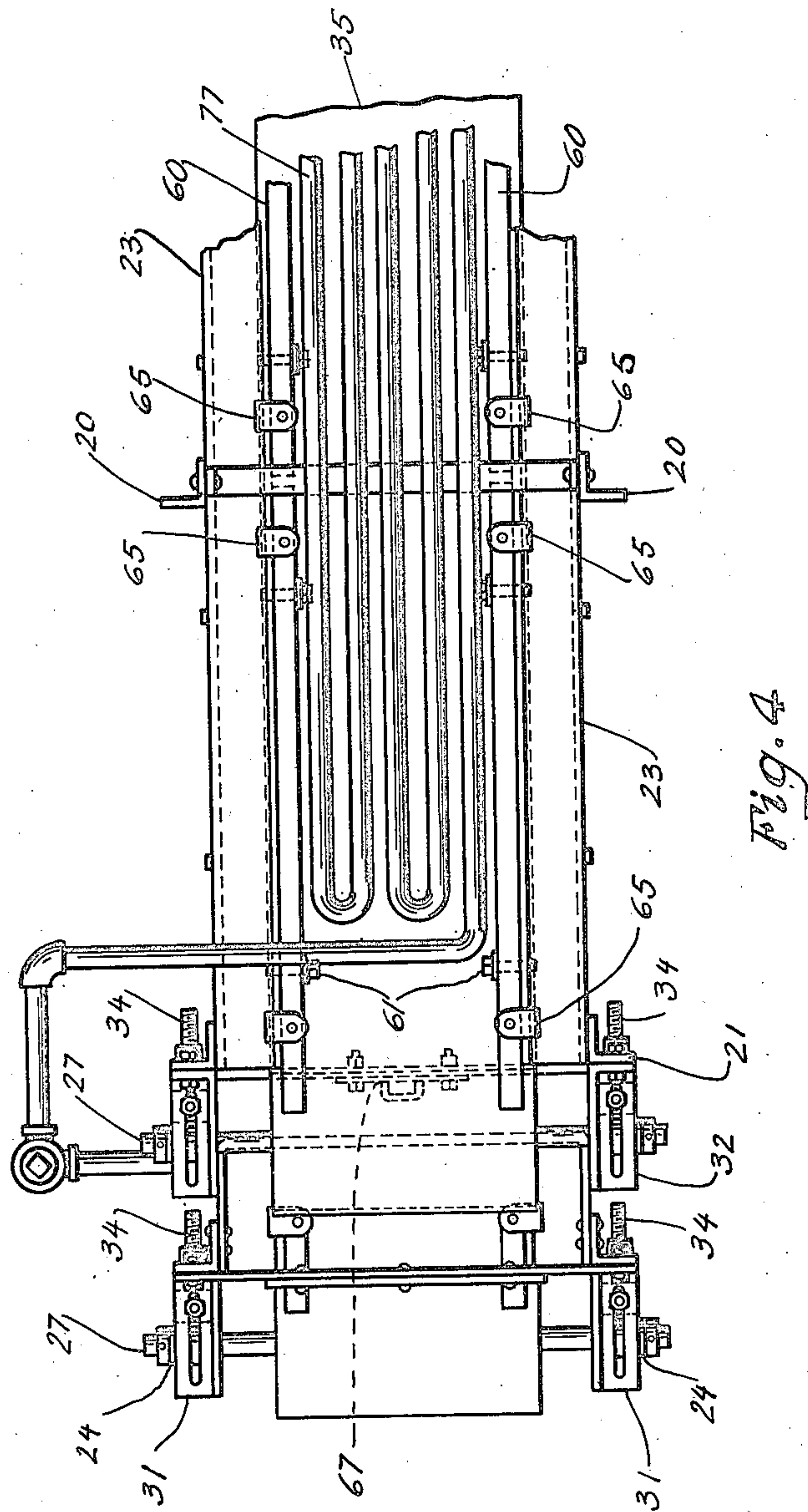


Fig. 4

Witnesses:
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S. KALISZ

DRIER

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9 Sheets-Sheet 5

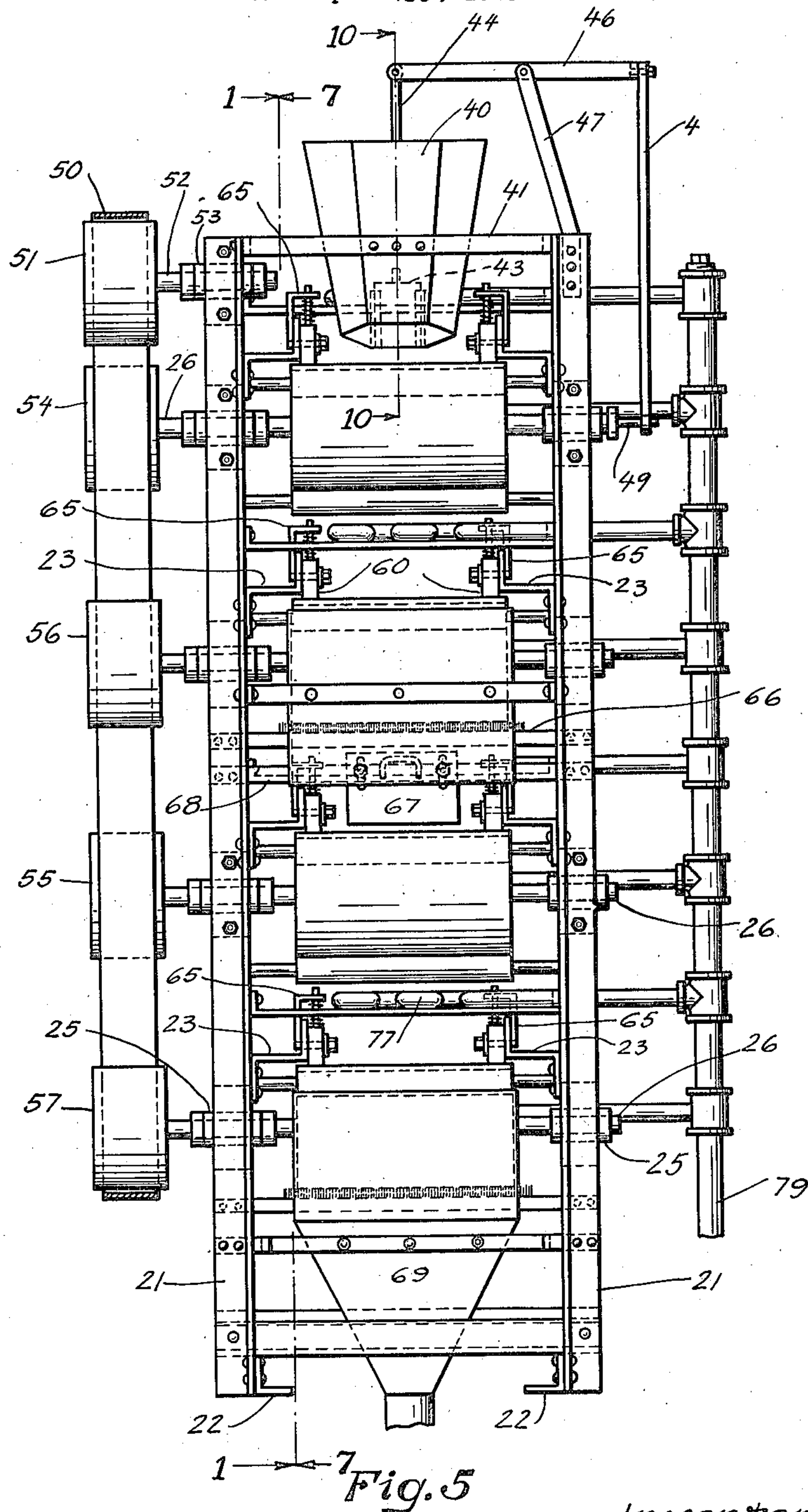


Fig. 5

Witnesses:

Wm. Schnellhardt.

[Signature]

Inventor

Steve Kalisz

By Joshua R. H. Roth.

His Attorney

June 19, 1923.

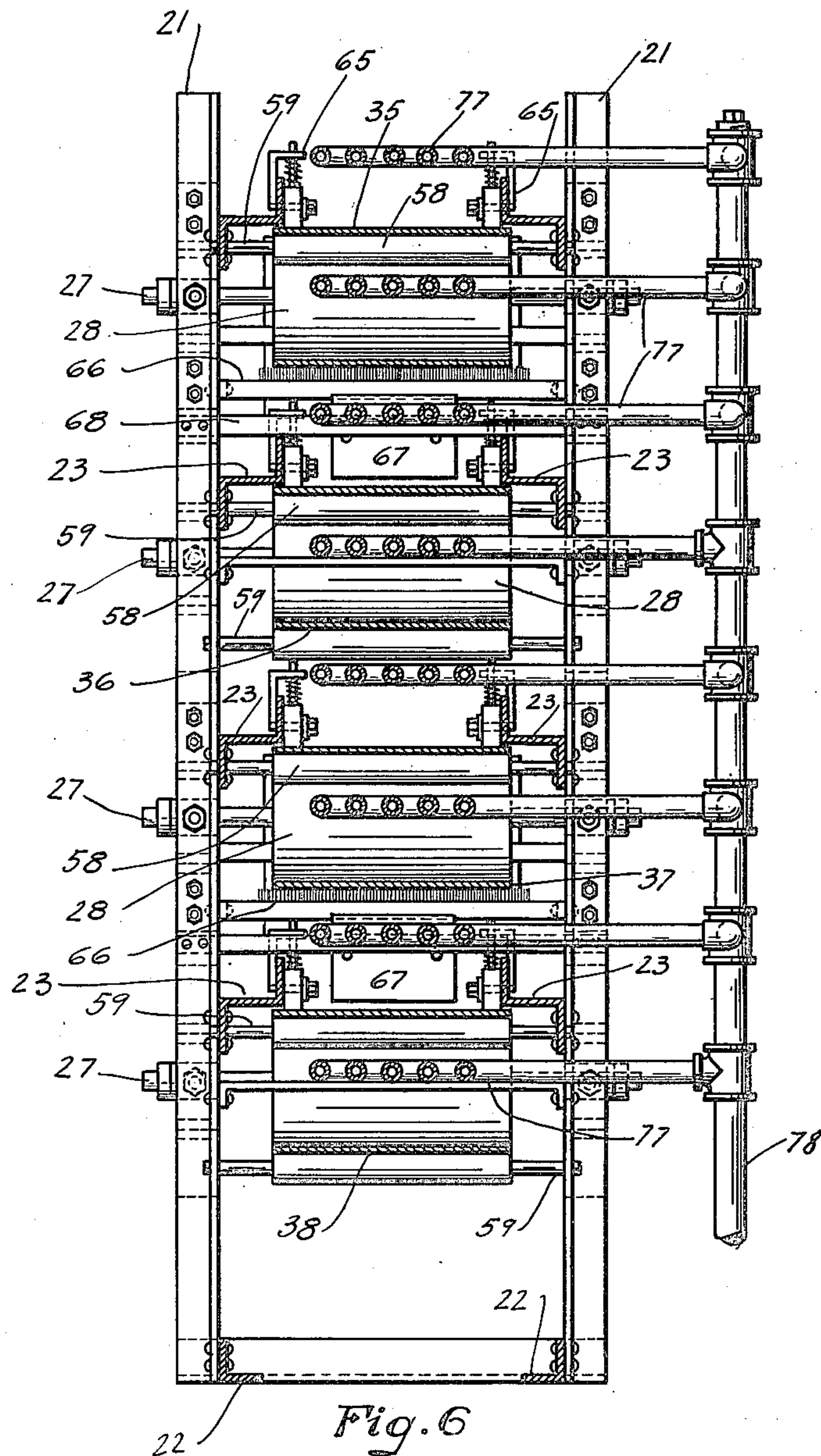
1,459,211

S. KALISZ

DRIER

Filed April 30, 1921

9 Sheets-Sheet 6



Witnesses:
J. Schnellhardt.
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S. KALISZ

DRIER

Filed April 30, 1921

9 Sheets-Sheet 7

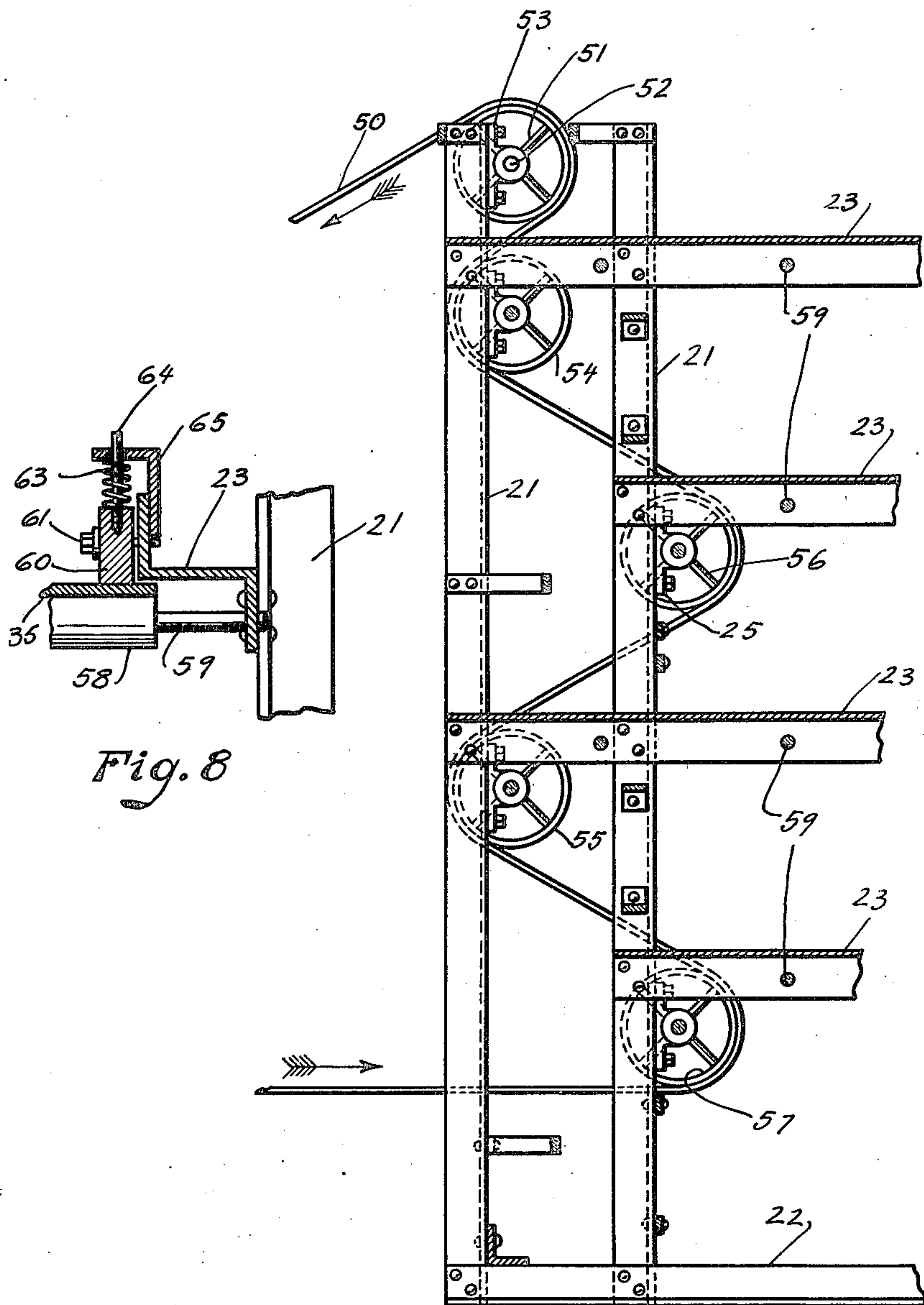


Fig. 8

Fig. 7

Witnesses:

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Inventor

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S. KALISZ

DRIER

Filed April 30, 1921

9 Sheets-Sheet 8

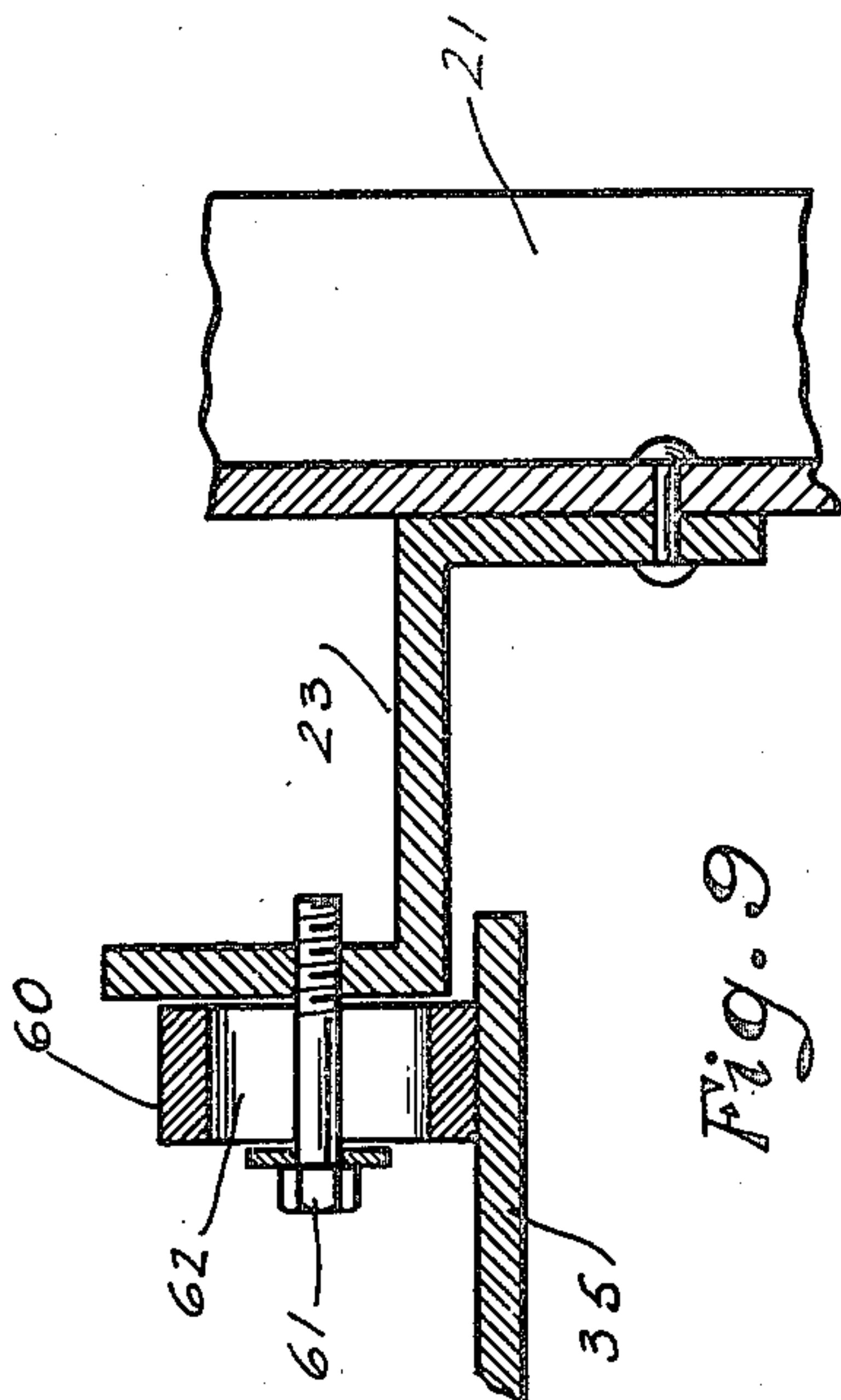


Fig. 9

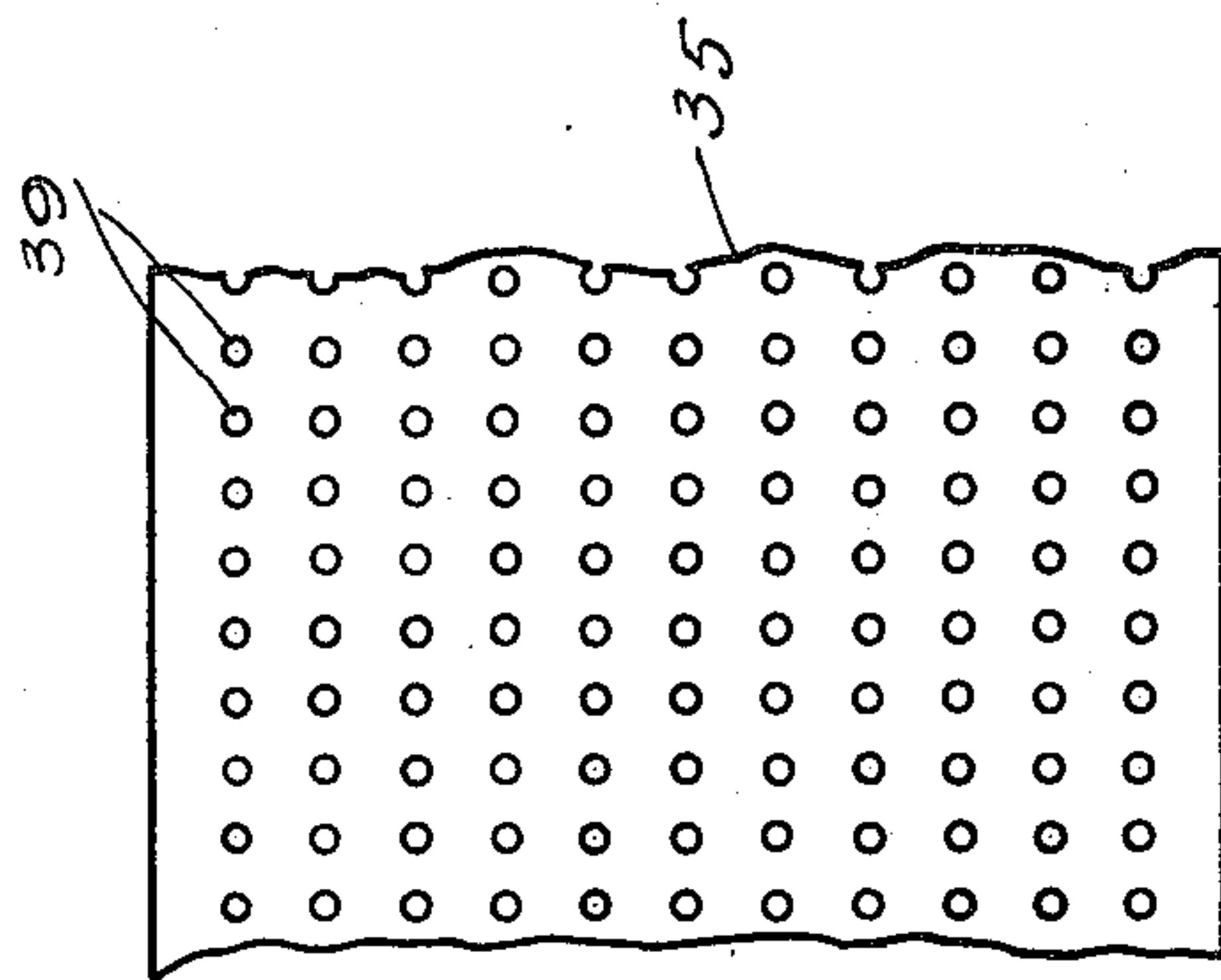


Fig. 11

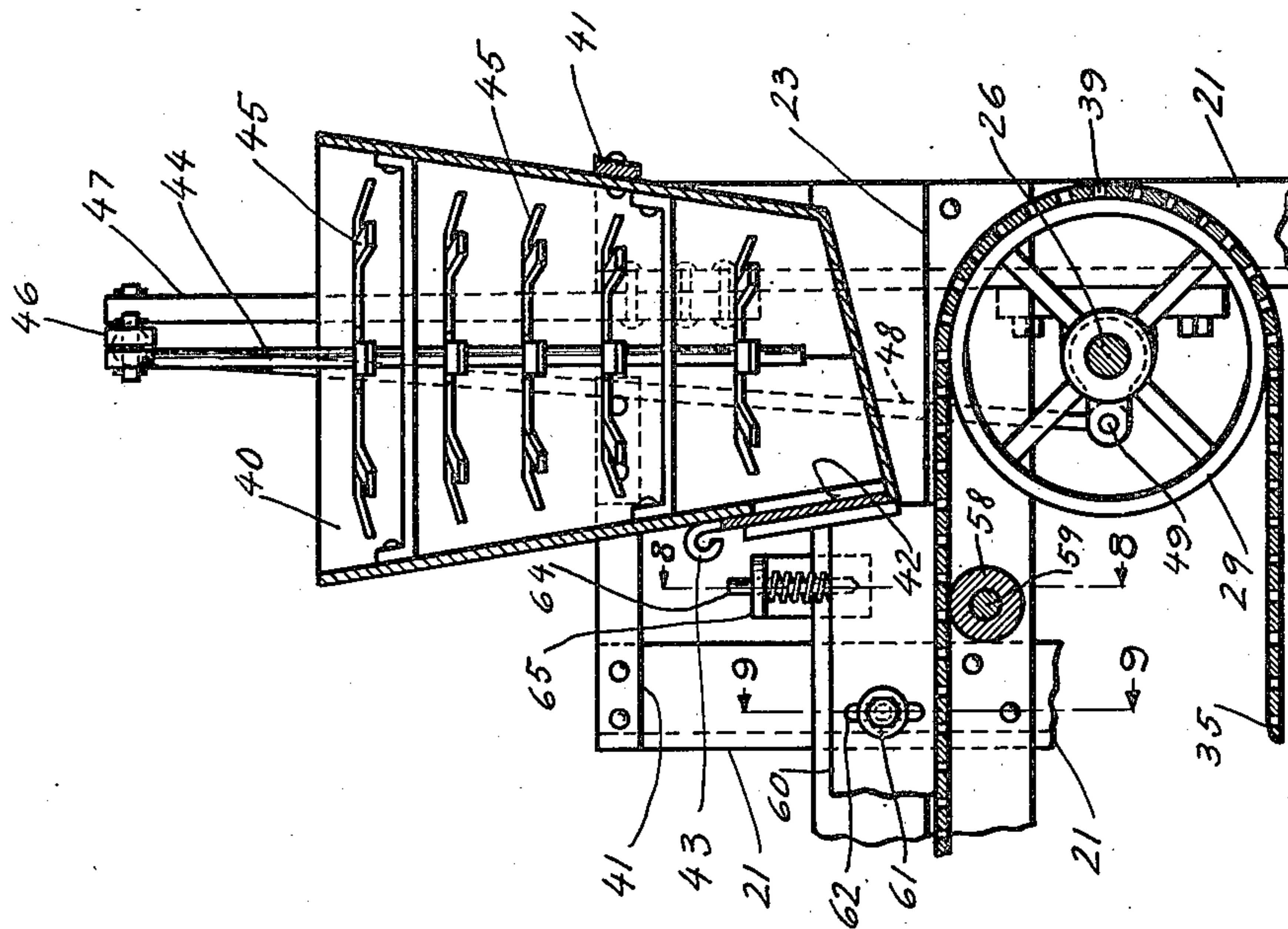


Fig. 10

Witnesses:

W. Schnellhardt.

[Signature]

Inventor

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His Attorney

June 19, 1923.

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S. KALISZ

DRIER

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9 Sheets-Sheet 9

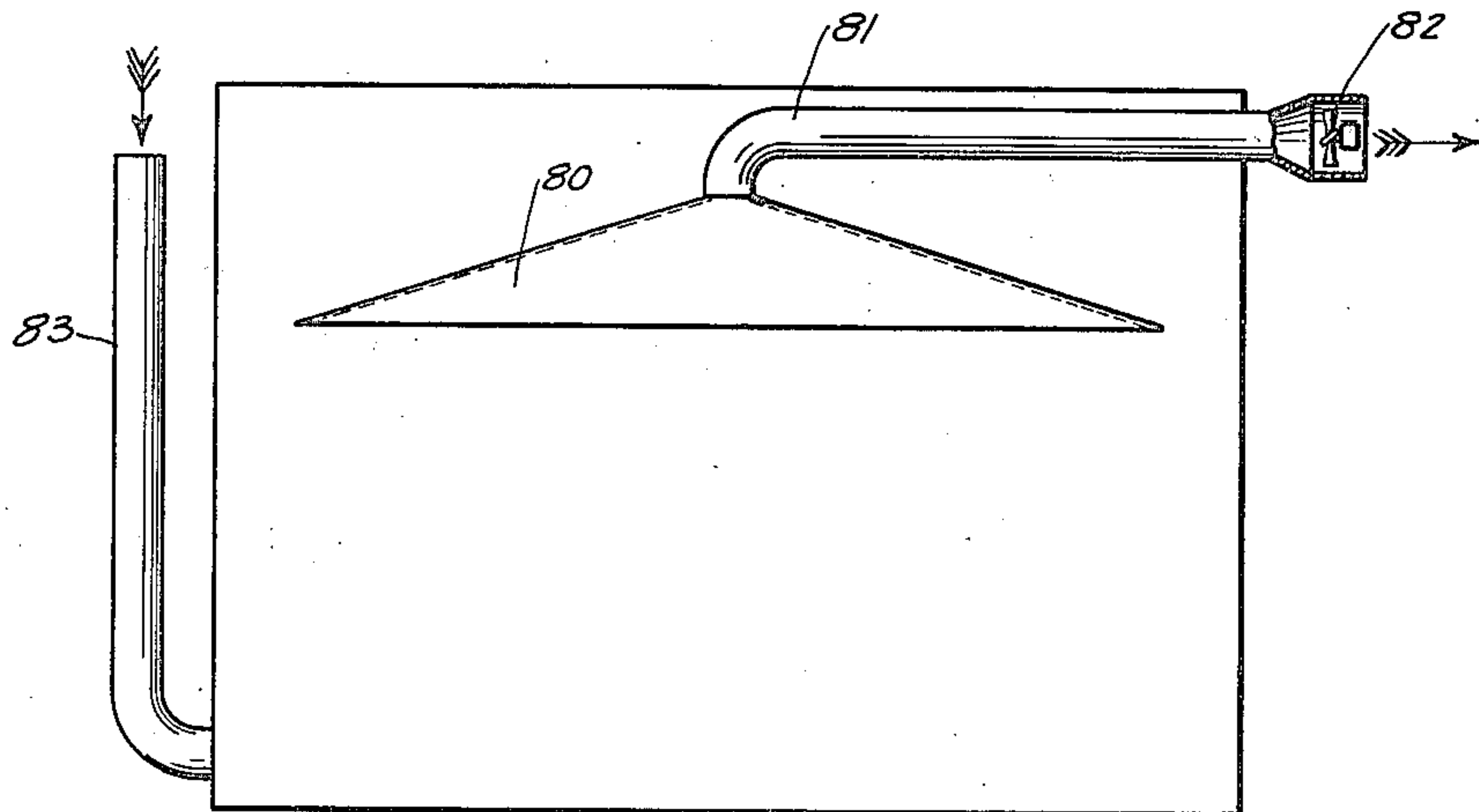


Fig. 14

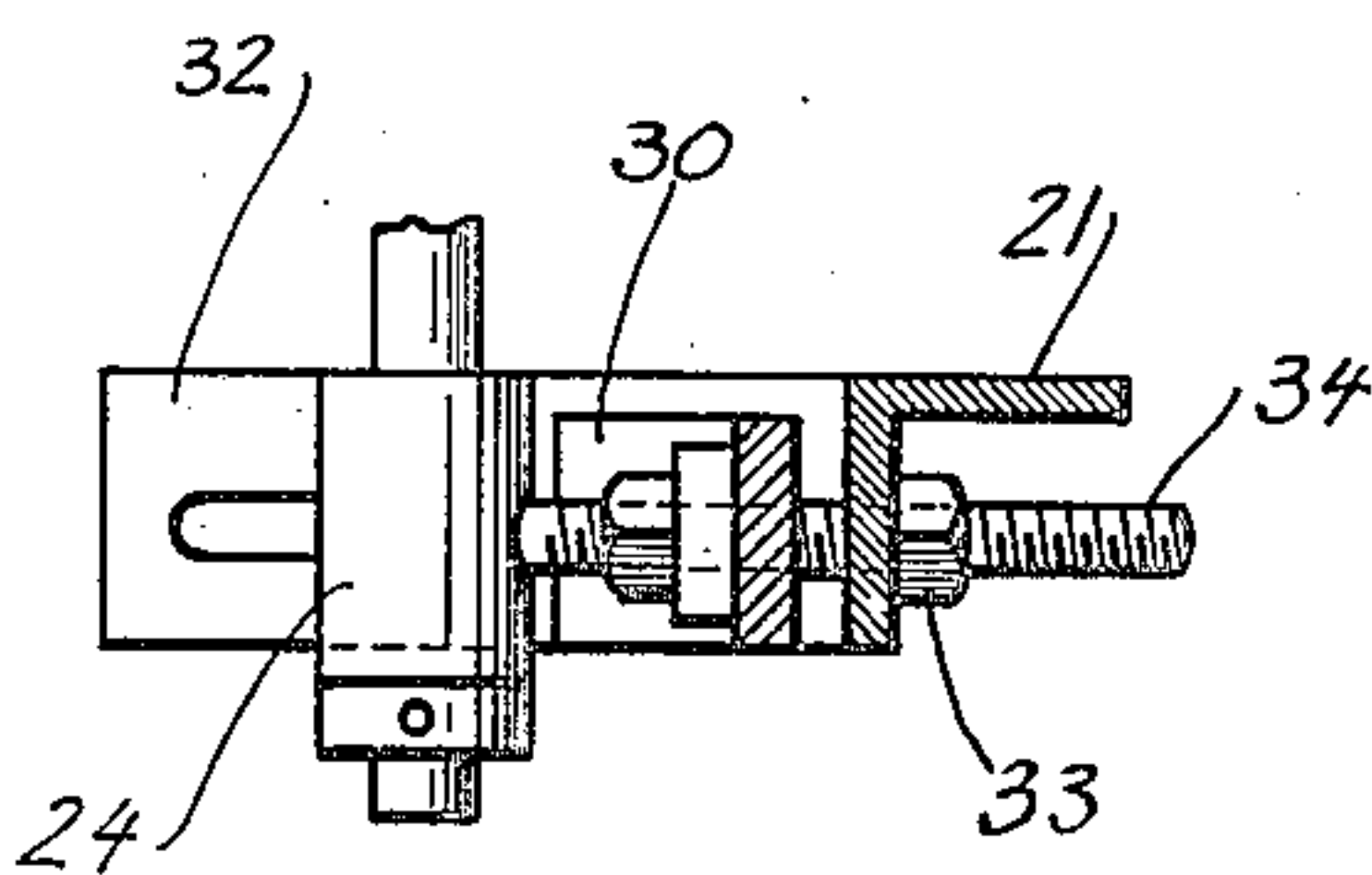


Fig. 12

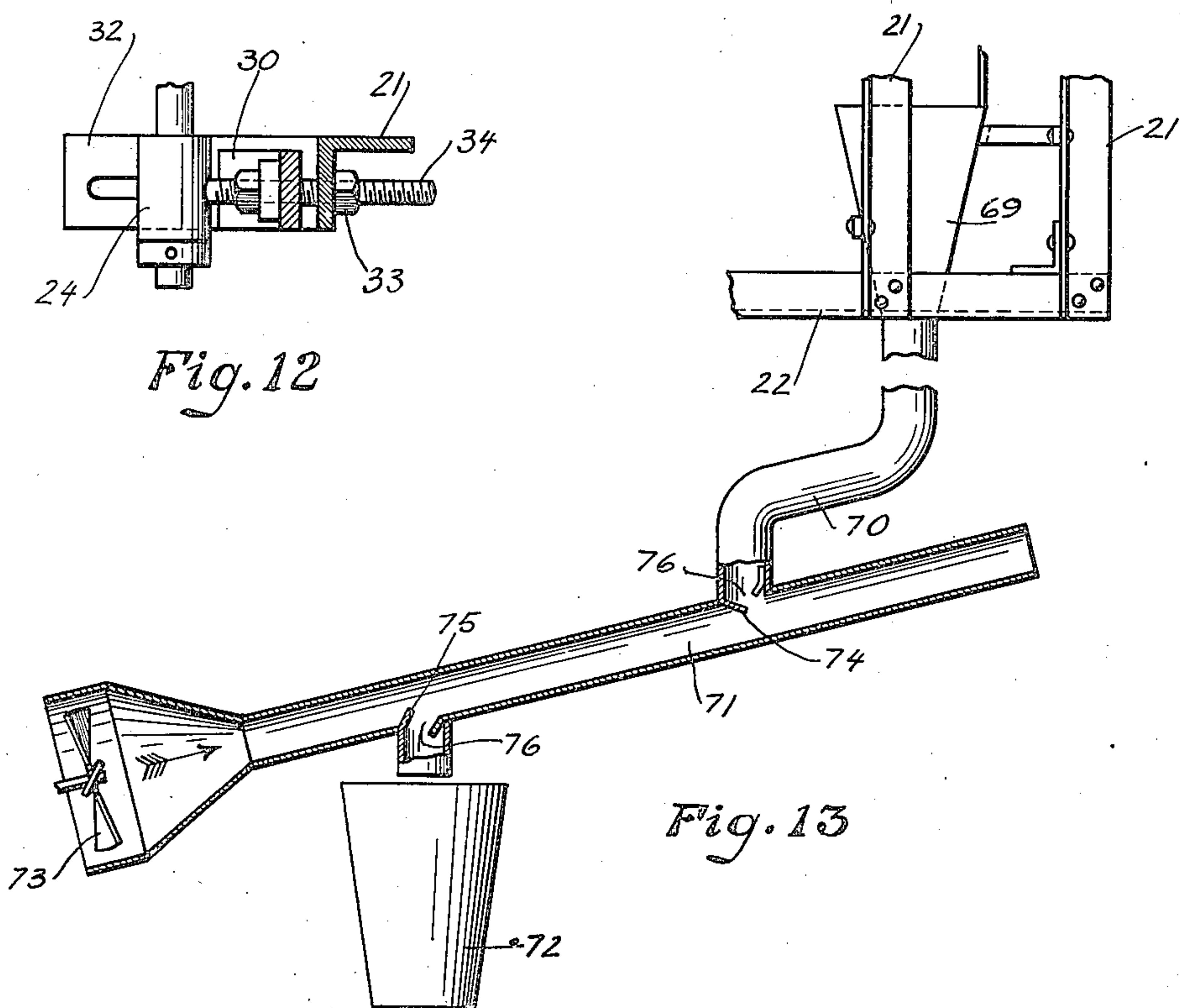


Fig. 13

Witnesses:
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E. E. Meeby

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By Joshua R. Bothwell
His Attorney

Patented June 19, 1923.

1,459,211

UNITED STATES PATENT OFFICE.

STEVE KALISZ, OF CHICAGO, ILLINOIS.

DRIER.

Application filed April 30, 1921. Serial No. 465,664.

To all whom it may concern:

Be it known that I, STEVE KALISZ, a former subject of the Republic of Poland, who has foresworn his allegiance to said Republic of Poland and declared his intention of becoming a citizen of the United States, and therefore is not now a citizen or subject of any country, and is a resident of the city of Chicago, county of Cook, and State of Illinois, have invented certain new and useful Improvements in Driers, of which the following is a specification.

My invention relates to driers and is especially constructed for drying food products, such as wheat, oats, corn or the like, and has for its principal object the provision of a plurality of conveyors adapted to receive the products and convey the same while in the process of drying, discharging said products as finished elements.

A further object of my invention is the provision of a heating system whereby food products may be thoroughly dried without danger of burning or becoming covered with products of combustion, while in the process of drying.

A further object of my invention is the provision of a plurality of conveyors each of which is provided with perforations whereby the heat employed may pass through the said conveyors, evenly drying the food products carried thereon.

Other objects will appear hereinafter.

The invention consists in the combinations and arrangements of parts hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings forming a part of this specification, and in which,

Fig. 1 is a fragmentary side elevational view of the receiving and discharge end of the machine embodying the invention;

Fig. 2 is a fragmentary side elevational view of the opposite end of the machine embodying the invention;

Fig. 3 is a fragmentary top plan view of the receiving and discharge end of the machine embodying the invention;

Fig. 4 is a top plan view of the opposite end of the same;

Fig. 5 is an end elevational view of the receiving and discharge end of the machine embodying the invention;

Fig. 6 is a sectional view taken substantially on line 6—6 of Fig. 2;

Fig. 7 is a fragmentary sectional view taken substantially on line 7—7 of Fig. 5, showing the driving arrangement employed in the invention.

Fig. 8 is a sectional detail of one of the weight blocks embodied in the invention and taken substantially on line 8—8 of Fig. 10;

Fig. 9 is a sectional detail view of the same taken substantially on line 9—9 of Fig. 10;

Fig. 10 is a sectional detail view taken substantially on line 10—10 of Fig. 5;

Fig. 11 is a fragmentary detail view of one of the conveying belts embodied in the invention;

Fig. 12 is a sectional detail view of one of the adjustable bearings embodied in the invention and taken substantially on line 12—12 of Fig. 2;

Fig. 13 is an elevational view partly in section of the receiving hoppers embodied in the invention, and

Fig. 14 is a diagrammatical view showing the arrangement of the ventilating system employed in the invention.

The preferred form of construction as illustrated in the drawings comprises vertically extending supporting frame members 20 and 21 held rigidly together by horizontal frame members 22 and 23. Secured to each of the frame members 21 are adjustable bearings 24 and stationary bearings 25, having shafts 26 and 27 journaled therein, said shafts having rollers or pulleys 28 and 29 mounted thereon, which are formed of hard wood or the like. The adjustable bearings 24 are supported by slidable bearing blocks 30 slidably mounted on supporting lugs 31 and 32. By unthreading the nut 33 provided on the bearing arm 34 the slidable bearing block 30 can be moved outward or backward as the case may require. Passing over each of the rollers 28 and 29 are continuous conveying belts 35, 36, 37 and 38 formed of sheet metal or the like and provided with perforations 39 to allow the heat to be evenly distributed over the drying products. A supply hopper 40, into which the food products to be dried are received, is secured to the foremost end of the frame, and supported by a cross bar 41 which is secured to the frame members 21. The lower end of the hopper 40 is provided with an opening 42 through which the food products pass into the conveying belt 35, and is controlled by a vertically sliding door 43, which is formed of sheet metal or the like.

Centrally located in the hopper 40, is a reciprocatory bar 44 having a plurality of star shaped plates 45 secured thereto and connected to one end of a rocker arm 46 which is supported by a vertically extending supporting member 47 secured to one of the frame members 21. The other end of the said rocker arm 46 is connected to a vertically extending rocker shaft 48 which is connected to a crank shaft 49 rigidly fixed to one end of one of the shafts 26, and arranged to reciprocate the star shaped members 45. By this arrangement of the star shaped plates 45 the food products contained in the hopper 40 are prevented from becoming lumpy which would interfere with the passage of the said products through the opening 42 of the said hopper. This arrangement also forces the products through the said opening and thereby provides a steady flow of the said products onto the conveying belt 35. The pulleys 29 are driven by a driving belt 50, driven by suitable driving power, passing over the idle pulley 51 rigidly fixed on a shaft 52 journaled in the bearing 53 which is secured to the upper end of one of the frame members 21. The said driving belt 50 passes over pulleys 54, 55, 56, and 57 rigidly fixed to one end of each of the shafts 26 and so arranged that the conveying belts 35 and 37 will travel in opposite direction of the conveying belts 36 and 38. Located under the top portion of the conveying belts are a number of rollers 58 spaced a suitable distance apart and mounted on shafts 59 secured to the frame members 23. The rollers 58 are arranged under the upper portion of the said conveying belts to prevent the said belts from sagging when in the operation of conveying the food products from one end of the drier to the other end. A plurality of weight blocks 60, formed of hard wood or the like and having a smooth finish are located adjacent the outer edges of each of the said conveying belts and held in position by adjustable threaded bolts 61 passing through a slot 62 provided in each end of the said weight blocks 60. Each of the threaded bolts 61 is positioned loosely in the slots 62 in order to allow the weight blocks a free movement. The said weight blocks rest solely upon the upper surface of the upper portion of each of the said conveying belts and are held against the said surface by a resilient spring 63 held in position by a pin 64 secured to the said block and slidably mounted on a lug 65 secured to the frame members 23. By this arrangement the said conveying belts are pressed against the rollers 58 keeping the said belts level allowing the same to run smoothly over the said rollers, and also serving as a guide preventing the food products from rolling off of the said conveyors when in operation. As the conveying belts pass over the rollers 28 and 29,

traveling in the direction of the discharge end, the lower portion of the said belts engages with a brush 66, of any suitable construction, secured to the frame members 21 and arranged to remove any of the food products which remain on the said conveying belts after leaving the discharge end, thus keeping the conveying belts clean. Should the products to be dried be received too fast by the conveying belts, the said products are evenly spread over the said conveying belts by a sheet metal spreader 67 adjustably mounted on a supporting bar 68 rigidly fixed to the frame members 21. By this arrangement the food products are spread over the conveyors in the form of a thin layer which can be more easily and readily dried. After the products have been dried the same are discharged from the lower conveying belt 38 into a receiving hopper 69, secured to the frame members 21 and 22, passing through a metallic pipe 70 into another metallic pipe 71, passing through the same into another hopper or receiving receptacle 72, where the products are ready for packing or shipping. One end of the pipe 71 is provided with a fan 73, having suitable driving power, which forces cool air over the finished products as they are discharged into the said receiving receptacle. The force of the cool air is not strong enough to blow the finished products back up through the pipes 70 and 71, but will pass over the finished products cooling the same before they are discharged into the said receiving receptacle. Guide members 74 and 75 are provided in the pipe 71 adjacent the openings 76, arranged to prevent the cool air from being blown up into the pipe 70 or into the pipe leading into the receiving receptacle 72.

The heating apparatus employed in drying the products as the same is conveyed from one end of the drier to the other end, consists of a number of steam coils 77 connected to a supply pipe and return pipe 78 and 79, and located above the top portion of the conveying belts and between the upper and lower portion of each of the said conveying belts. Thus by this arrangement of the heating apparatus the heat passes through the perforations 39 provided in each of the conveying belts striking the food products carried by the same.

In Fig. 14 of the drawings is clearly shown the system of ventilating a room occupied by the herein described drier. The drier is located directly under the hood or canopy 80 having an outlet pipe 81 connected thereto and centrally located on the said hood, said pipe provided with a fan 82, having suitable driving power and arranged to force the impure air out of the room. Located in any convenient location of the room is an inlet ventilating pipe 83 which supplies fresh air to the said room. By this arrangement of

ventilation the air in the said room is constantly kept fresh and dry and the impure or moist air is forced out of the room by the said fan 82.

5 In operation the food products to be dried are fed into the hopper 40, by any suitable means and the slidable door 43 is opened allowing the desired flow of the said prod-
 10 ucts onto the top conveying belt 35. Should the food products become lumpy or lodge in the said hopper, preventing the outlet flow of the same the star shaped plates 45 are reciprocated breaking up the lumps and
 15 forcing the food products through the opening 42. The food product is then conveyed to the rear end of the drier, during which operation the heat produced from the steam coils strikes the food products carried by
 20 the said conveyor beginning the drying process. As the food product conveyed by the said conveyor reaches the end of the drier it is discharged onto the conveyor 36 travel-
 25 ing in the opposite direction of the conveyor 35, discharging the said food products onto the conveyor 37 traveling in the same direction as the conveyor 35 and dis-
 30 charging the said products onto the lower or bottom conveyor 38 where it is discharged into the receiving hopper 69. During the operation of conveying the food products
 35 from one end of the drier to the other the products are in the process of drying and when discharged into the said receiving receptacle 69 they are finished products. If
 40 at any time the products to be dried should stick or remain on the said conveyors as they are traveling to the receiving end the brushes 66 engaging the surface of the
 45 said conveyors will remove the said food products. When the finished products are discharged into the receiving hopper 60 the said products pass through the pipe 70 into
 50 the pipe 71 where they come in contact with cool air furnished by the fan 73 and as they pass through the pipe 71 they are partly cooled off before discharged into the receiv-
 55 ing hopper 72. As will be understood food products of any description which are to be dried in this manner will produce an odor and to remove this odor from the room occu-
 60 pied by the drier the hood 80 is located directly over the said drier and forces the air out of said room by the fan 82. The room is constantly furnished with a supply of
 65 fresh air through the ventilating pipe 83. During the operation of carrying the food products on the conveyors the weight of the food product may have a tendency to press the said conveyors downwardly, to overcome
 this difficulty the rollers 58 are spaced a suitable distance apart and will prevent the said conveyors from being pressed downwardly or buckling by the weight of said products. To prevent the said conveyors
 from an unsteady travel the weight blocks

61 rest upon the upper surface of the upper portion of the said conveyors pressing the same against the rollers and steadying the said conveyors while traveling. The weight blocks also serve as a guide preventing the
 70 food products from falling off of the said conveyors while being conveyed from one end of the drier to the other.

By the construction of a drier as herein set forth food products of any description or
 75 form may be thoroughly dried without burning or becoming covered with products of combustion.

While I have illustrated and described the preferred form of construction for carrying
 80 my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction set forth, but desire to avail myself of such variations and modifications as come within the scope of the appended claims.

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

1. A device of the class described comprising a supply hopper; conveyors arranged to receive matter discharged from
 95 said hopper; a reciprocatory member arranged in said hopper; and star-shaped members carried by said reciprocatory member arranged to assure a constant flow of said matter through the discharge opening
 100 of said hopper, substantially as described.

2. A device of the class described comprising a supply hopper; star-shaped members arranged in said hopper to force matter
 105 through the discharge opening of said hopper; belt conveyors arranged one above the other to receive said matter discharged from said hopper; means adjacent the undersurface of said conveyors for drying
 110 matter carried by said conveyors; and perforations formed in each of said conveyors for the passage of said drying means, substantially as described.

3. A device of the class described comprising a supply hopper having a discharge opening adjacent the bottom thereof; recip-
 115 rocatory means for forcing matter through said opening; means for regulating the flow of matter through said opening; conveying means arranged to receive said matter from said hopper, means for leveling the matter
 120 over said conveyors and a receiving receptacle arranged to receive said matter from said conveying means, substantially as described.

4. A drying apparatus comprising a plu-
 125 rality of conveyors; steam coils adjacent the underside of said conveyors for drying matter carried by said conveyors, there being perforations formed in said conveyors for the passage of the heat radiated from said
 130

steam coils; and brush members engaging said conveyors arranged to remove matter therefrom, substantially as described.

5 5. A drying apparatus comprising a frame; conveying belts associated with said frame; spaced rollers engaging said conveying belts; and spring held weight members engaging said belts for retaining said belts in close proximity with said rollers, substantially as described.

10 6. A drying apparatus comprising a frame; a supply hopper at one end of said frame; rollers at opposite ends of said frame arranged one above the other; belt conveyors passing over each of said rollers arranged to receive matter discharged from said hopper; supporting rollers engaging the upper portion of said conveyors; and yieldable means for retaining said conveyors in close proximity with said supporting rollers, substantially as described.

15 7. A drying apparatus comprising a frame; a supply hopper at one end of said frame; rollers at opposite ends of said frame arranged one above the other; belt conveyors passing over each of said rollers arranged to receive matter discharged from said hopper; supporting rollers engaging the upper portion of said conveyors; and yieldably held weight blocks engaging the top portion of said conveyors for steadying said conveyors and preventing matter received from said hopper from falling over the sides of said conveyors, substantially as described.

20 8. A drying apparatus comprising a supply hopper; belt conveyors arranged to receive matter discharged from said hopper; means for drying said matter carried by said conveyors; a receiving hopper arranged to receive said matter discharged from said conveyors; a receiving receptacle arranged to receive said matter discharged from said second receiving hopper; and means for cooling said matter during the travel of said matter from said receiving hopper to said receiving receptacle, substantially as described.

25 9. A device of the class described comprising a supply hopper; means for forcing matter through the discharge opening of said hopper; means for regulating the passage of said matter through the said discharge opening; continuous sheet metal conveyors having perforations therein arranged to receive the said matter discharged through said opening; brush members engaging said conveyors for removing matter therefrom; means for drying the matter carried by said conveyors; a receiving container arranged to receive matter discharged from said conveyors; and means for cooling the said matter before discharged into said receiving container, substantially as described.

10. A device of the class described comprising

a supply hopper; a plurality of star shaped plates mounted in said conveyor for forcing the said matter through the discharge opening of said hopper; means for regulating the passage of said matter through the said discharge opening; continuous sheet metal conveyors having perforations therein arranged to receive the said matter discharged through said opening; means for drying the matter carried by said conveyors; a receiving receptacle arranged to receive matter discharged from said conveyors; and means for cooling the said matter before discharged into said receiving receptacle, substantially as described.

11. A device of the class described comprising a supply hopper; a plurality of star shaped plates mounted in said conveyor for forcing the said matter through the discharge opening of said hopper; means in said hopper regulating the passage of said matter through the said discharge opening and continuous belt conveyors arranged to receive the said matter discharged through the said hopper; substantially as described.

12. A device of the class described comprising a supply hopper having a discharge opening and a slidable door for the opening for regulating the passage of matter there through; reciprocatory means for forcing matter through the opening; continuous perforated belt conveyors arranged to receive the matter from the hopper; means for drying the matter carried by the conveyors; a receiving receptacle arranged to receive the matter from said conveyors; brush members engaging said conveyors adapted to remove the matter therefrom; and means for cooling the matter before received by the receiving receptacle, substantially as described.

13. A device of the class described comprising a supply hopper; reciprocatory means for forcing matter through a discharge opening of the said hopper; a slidable door for regulating the passage of said matter through the discharge opening of said container; continuous sheet metal conveyors having perforations therein arranged to receive the said matter discharged through said opening; means for drying the matter carried by said conveyors; a receiving container arranged to receive matter discharged from said conveyors; and means for cooling the said matter before discharged into said receiving container, substantially as described.

14. A device of the class described comprising a supply hopper; reciprocatory means for forcing matter through a discharge opening of the said hopper; a slidable door for regulating the passage of said matter through the discharge opening of said container; continuous sheet metal conveyors having perforations therein arranged to receive the said matter discharged

through said opening; means for drying the matter carried by said conveyors; a receiving receptacle arranged to receive matter discharged from said conveyors; and a fan arranged to cool the said matter before discharged into said receiving container, substantially as described.

15. A device of the class described comprising a supply hopper; means for forcing matter through a discharge opening of the said container; a slidable door for regulating the passage of said matter through the discharge opening of said container; continuous sheet metal conveyors having perforations therein arranged to receive the said matter discharged through said opening; means for drying the matter carried by said conveyors; a receiving container arranged to receive matter discharged from said conveyors; and a fan arranged to cool the said matter before discharged into said receiving container, substantially as described.

16. A device of the class described comprising a supply hopper; means for forcing matter through a discharge opening of the said hopper; a slidable door for regulating the passage of said matter through the discharge opening of said hopper; continuous sheet metal conveyors having perforations therein arranged to receive the said matter discharged through said opening; a plurality of steam coils for drying said matter carried on said conveyors; a receiving receptacle arranged to receive matter discharged from said conveyors; and a fan arranged to cool the said matter before discharged into said receiving receptacle, substantially as described.

17. A device of the class described comprising a supply hopper; means for forcing matter through a discharge opening of the said hopper; a slidable door for regulating the passage of said matter through the discharge opening of said hopper; continuous sheet metal conveyors having perforations therein arranged to receive the said matter discharged through said opening; a plurality of steam coils for drying said matter carried on said conveyors; a receiving receptacle arranged to receive matter discharged from said conveyors; and a fan arranged to cool the said matter before discharged into said receiving receptacle, substantially as described.

18. A device of the class described comprising a supply hopper; means for forcing matter through a discharge opening of the said hopper; a slidable door for regulating the passage of said matter through the discharge opening of said hopper; continuous sheet metal conveyors having perforations therein arranged to receive the said matter discharged through said opening; steam coils positioned above and below said conveyors for drying said matter carried there-

on; a receiving receptacle arranged to receive matter discharged from said conveyors; and a fan arranged to cool the said matter before discharged into said receiving receptacle, substantially as described.

19. A device of the class described comprising a supply hopper; means for forcing matter through a discharge opening of the said hopper; a slidable door for regulating the passage of said matter through the discharge opening of said hopper; continuous sheet metal conveyors having perforations therein arranged to receive the said matter discharged through said opening; steam coils positioned above and below said conveyors for drying said matter carried thereon; a receiving receptacle arranged to receive matter discharged from said conveyors; and a fan arranged to cool the said matter before discharged into said receiving receptacle, substantially as described.

20. A device of the class described comprising a supply hopper; a plurality of star shaped members positioned in said hopper for forcing matter through a discharge opening in said hopper; a slidable door for regulating the passage of the said matter through the said opening; a conveyor arranged to receive matter discharged from said hopper; conveyors below said first mentioned conveyor arranged to receive the matter discharged from the said conveyor; means for spreading the said matter over the said conveyors; steam coils positioned above and below said conveyors for drying the said matter carried thereon; a receiving receptacle arranged to receive the said matter discharged from said conveyors, and means for cooling the said matter before discharged into the said receiving container, substantially as described.

21. A device of the class described comprising a supply hopper; a slidable door mounted on said hopper for regulating the passage of matter through the discharge opening of said conveyor; star shaped members positioned in said conveyor for forcing said matter through said discharge opening; continuous belt conveyors having perforations therein arranged to receive matter discharged from said hopper, two of said conveyors being arranged to travel in opposite direction of the other of said conveyors; guide members adjustably mounted on each of the sides of the said conveyors to prevent the said matter from falling off of the said sides; steam coils positioned over and above said conveyors for drying the said matter; a receiving container arranged to receive said matter discharged from one of the said conveyors; and a fan arranged to cool the dry matter before discharged into the said receiving container, substantially as described.

22. A device of the class described comprising a supply hopper; a slidable door

mounted on said hopper for regulating the passage of matter through the discharge opening of said hopper; star shaped members positioned in said hopper for forcing said matter through said discharge opening; continuous belt conveyors having perforations therein arranged to receive matter discharged from said hopper, two of said conveyors being arranged to travel in opposite directions of the other of said conveyors; a metallic member adjustably mounted adjacent each end of said conveyors arranged to spread the said matter over the said conveyors; guide members adjustably mounted on each of the sides of the said conveyors to prevent the said matter from falling off of the said conveyors; steam coils positioned over and above said conveyors for drying the said matter; a receiving container arranged to receive said matter discharged from one of the said belts; and a fan arranged to cool the dry matter before discharged into the said receiving container, substantially as described.

23. A drying apparatus comprising a supply hopper; belt conveyors arranged to receive matter from said hopper; drying means adjacent the underside of the top portion of each of said conveyors, there being perforations in said conveyors affording a passage for the drying agent from said drying means; a receiving hopper arranged to receive said matter from said conveyors; a receiving receptacle arranged to receive said matter from said receiving hopper, there being a pipe connection between said receiving hopper and said receiving receptacle for the passage of said matter to said receiving receptacle; and means for cooling said matter during its travel from said receiving hopper to said receiving receptacle, substantially as described.

24. A drying apparatus comprising a supply hopper; flexible conveyors arranged to receive matter from said hopper; means for forcing said matter through the discharge opening of said hopper; means for regulating the flow of said matter through said opening; drying means adjacent the underside of the top portion of each of said conveyors, there being perforations in said conveyors affording a passage for the drying agent from said drying means; a receiving hopper arranged to receive said matter from said conveyors; a receiving receptacle arranged to receive said matter from said receiving hopper, there being a pipe connection between said receiving hopper and said receiving receptacle for the passage of said matter to said receiving receptacle; and means for cooling said matter during its travel from said receiving hopper to said receiving receptacle, substantially as described.

25. A drying apparatus comprising a supply hopper; flexible metallic conveyors ar-

anged one above the other to receive matter from said hopper; a reciprocatory plunger in said hopper for forcing said matter through the discharge opening of said hopper; a slidably mounted door on said hopper for regulating the flow of said matter through said opening; drying means adjacent the underside of the top portion of each of said conveyors, there being perforations in said conveyors affording a passage for the drying agent from said drying means; a receiving hopper arranged to receive said matter from said conveyors; a receiving receptacle arranged to receive said matter from said receiving hopper, there being a pipe connection between said receiving hopper and said receiving receptacle for the passage of said matter to said receiving receptacle; and means for cooling said matter during its travel from said receiving hopper to said receiving receptacle, substantially as described.

26. A drying apparatus comprising a supply hopper; belt conveyors arranged one above the other to receive matter discharged from said hopper; adjustable means for evenly spreading said matter over said conveyors; and a receiving receptacle arranged to receive said matter discharged from said conveyors, substantially as described.

27. A drying apparatus comprising a supply hopper; belt conveyors arranged one above the other and traveling in opposite directions with respect to each other to receive matter discharged from said hopper; and an adjustable plate traversing said conveyors for evenly spreading said matter over said conveyors, substantially as described.

28. A drying apparatus comprising belt conveyors arranged one above the other and travelling in opposite directions with respect to each other; steam coils adjacent the underside of the top portion of said conveyors, there being perforations in said conveyors affording a passage for the heat radiated from said steam coils; a receiving hopper arranged to receive matter carried by said conveyors; a receiving receptacle arranged to receive said matter from said receiving hopper; and means for cooling said matter during its travel from said receiving hopper to said receiving receptacle, substantially as described.

29. A drying apparatus comprising a frame; flexible metallic belt conveyors adjustably mounted on said frame; means arranged adjacent the undersides of the upper portions of said conveyors for drying matter carried thereon; a receiving hopper arranged to receive said matter discharged from said conveyors; a receiving receptacle arranged to receive said matter from said receiving hopper, there being a pipe connection between said receiving hopper and said receiving receptacle; and a fan at one end of said pipe adapted to force cool air through

said pipe for cooling said matter while passing through said pipe to said receiving receptacle, substantially as described.

30. A drying apparatus comprising a frame; continuous conveyors adjustably mounted on said frame; steam coils arranged adjacent the undersides of the top portions of said conveyors for drying matter carried by said conveyors; and means arranged above said conveyors and said frame for carrying off moisture and impure air discharged by said matter while being dried, substantially as described.

31. A drying apparatus comprising a frame; a supply hopper at one end of said frame; continuous belt conveyors adjustably mounted on said frame arranged to receive matter discharged from said hopper; means arranged adjacent the undersides of the upper portions of said conveyors for drying said matter carried by said conveyors; a hood arranged above said conveyors and said frame; a pipe connected to said hood for carrying off moisture and impure air discharged from said matter while being dried; and a fan arranged to force said moisture and impure air through said pipe, substantially as described.

32. A drying apparatus comprising a supply hopper having a discharge opening adjacent the bottom thereof; a reciprocatory plunger mounted in said hopper for forcing matter through said opening; a door for regulating the flow of said matter through said opening; perforated conveyors arranged to receive said matter discharged from said hopper; steam coils arranged adjacent the undersides of said conveyors for drying said matter carried by said conveyors; a receiving hopper arranged to receive said matter discharged from said conveyors; a receiving receptacle arranged to receive said matter from said receiving hopper, there being a pipe connection between said receiving hopper and said receiving receptacle; and a fan at

one end of said pipe arranged to force cool air therethrough for cooling said matter during its travel to said receiving receptacle, substantially as described.

33. A drying apparatus comprising a supply hopper; reciprocatory means for forcing said matter through the discharge opening of said hopper; means slidably mounted on said hopper for regulating the flow of said matter through said opening; conveying means arranged to receive said matter from said hopper; means for drying said matter carried by said conveyor; a receiving hopper arranged to receive said matter from said conveyors; a receiving receptacle arranged to receive said matter from said receiving hopper; and means for cooling said matter during its passage from said receiving hopper to said receiving receptacle, substantially as described.

34. A drying apparatus comprising a frame; a supply hopper at one end of said frame; reciprocatory star shaped members in said hopper for forcing matter through the discharge opening of said hopper; means for regulating the flow of said matter through said opening; perforated conveyors arranged one above the other to receive said matter from said hopper; means for drying said matter carried by said conveyors; a receiving hopper arranged to receive said matter from said conveyors; a receiving receptacle arranged to receive said matter from said receiving hopper; and cooling means for cooling said matter during its passage from said receiving hopper to said receiving receptacle, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

STEVE KALISZ.

Witnesses:

JOSHUA R. H. POTTS,
FREDA C. APPLETON.