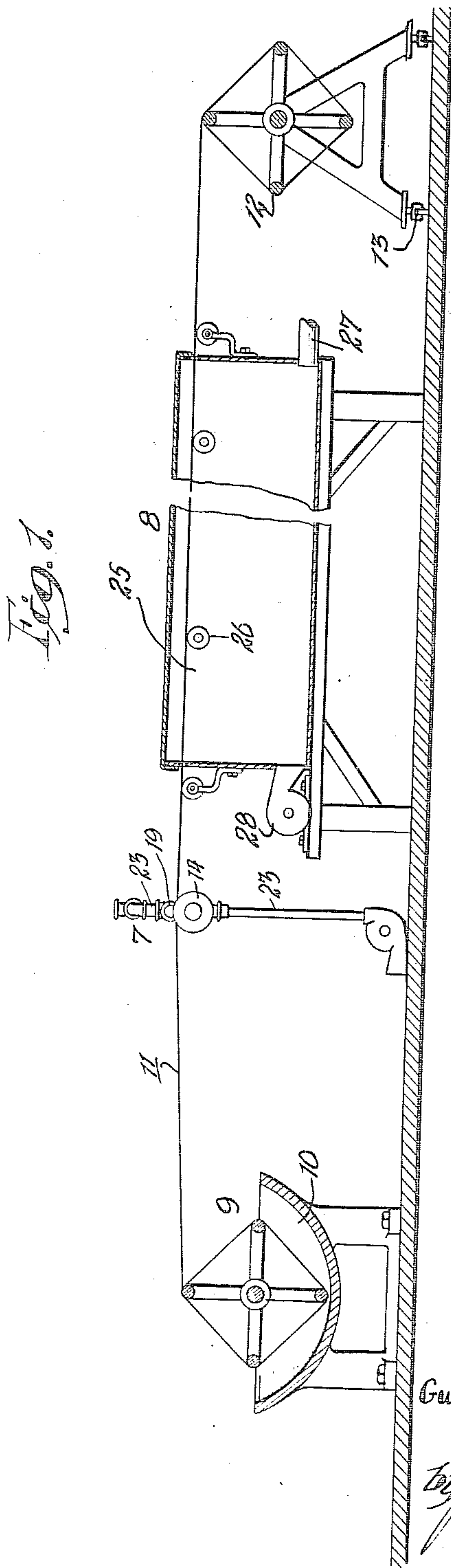


953,663.

G. E. HOGLUND.
FILM DRYING APPARATUS.
APPLICATION FILED JULY 16, 1909.

Patented Mar. 29, 1910.

2 SHEETS--SHEET 1.



Witnesses:
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Inventor:
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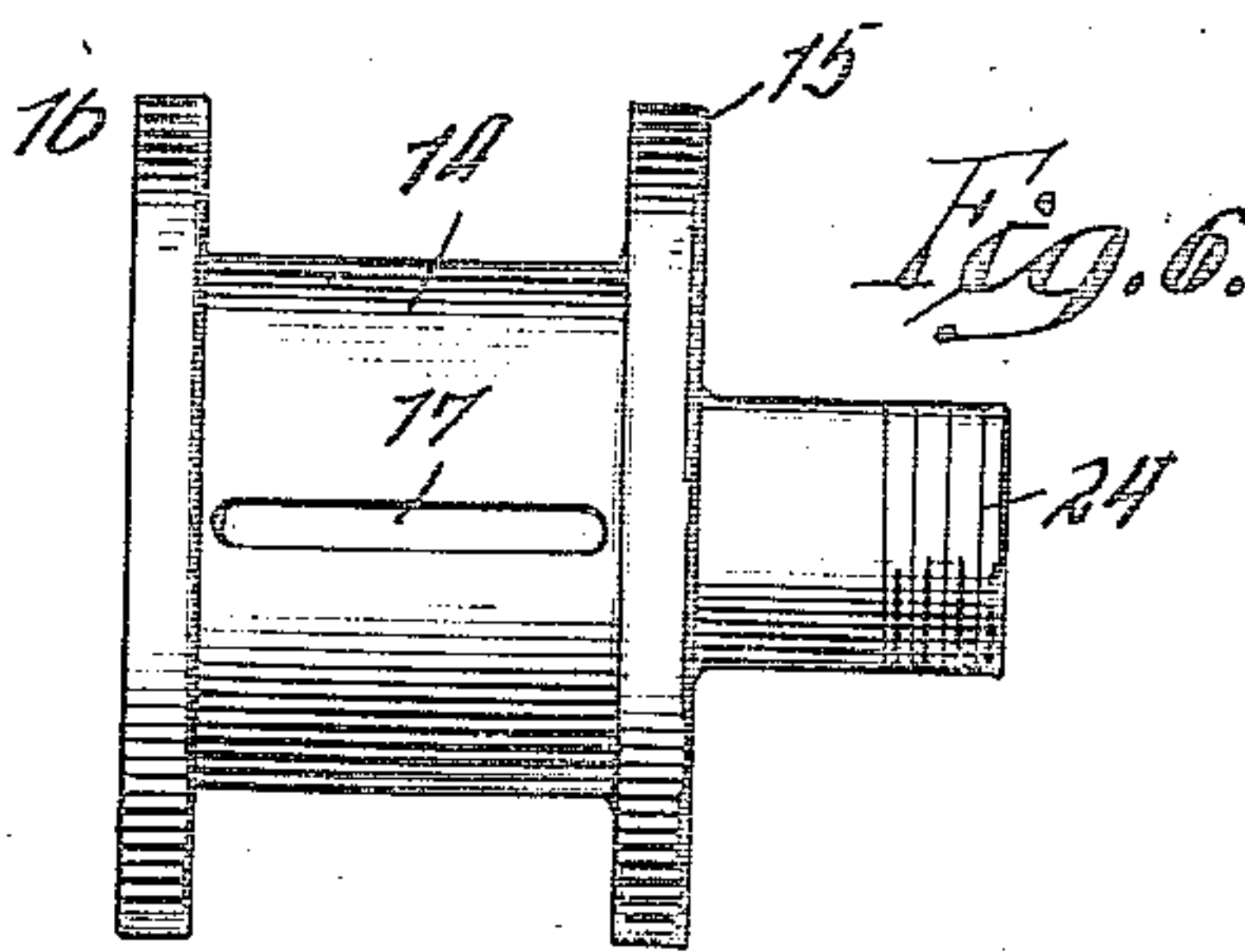
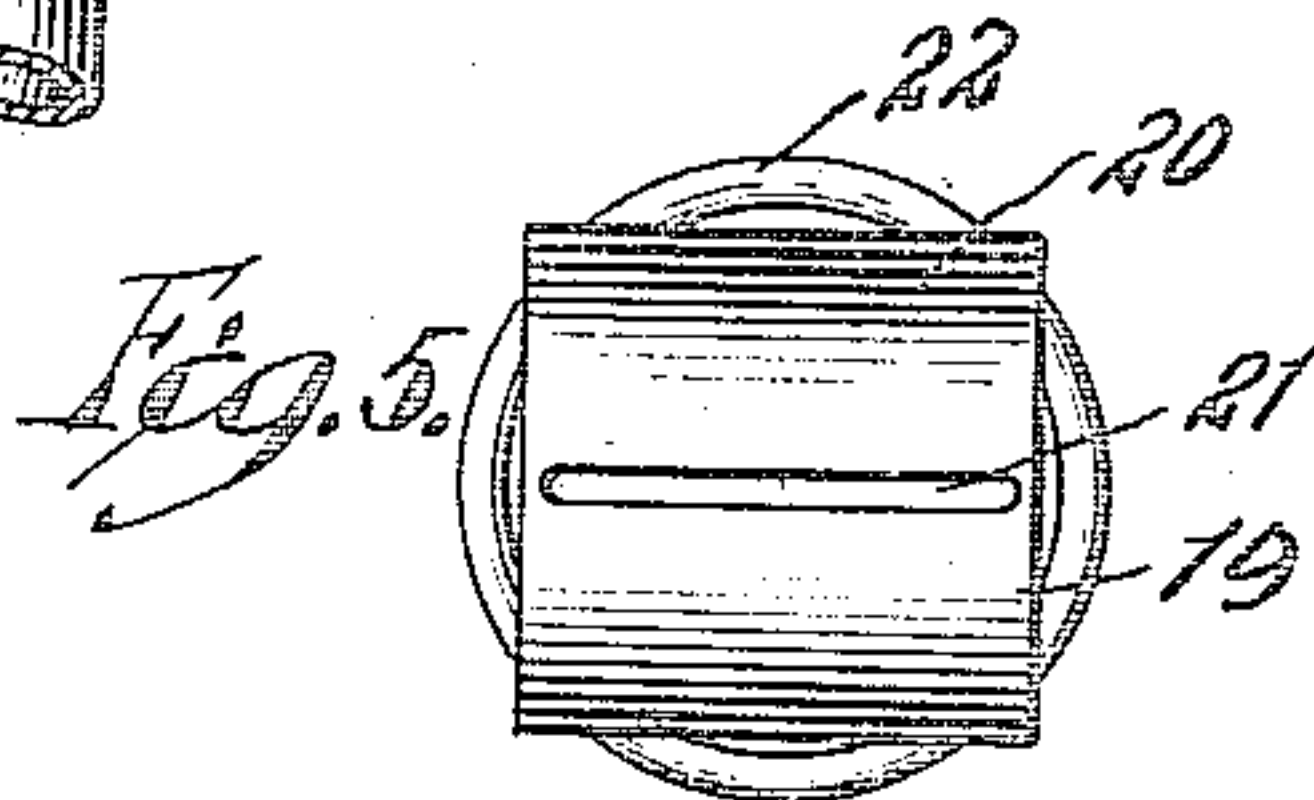
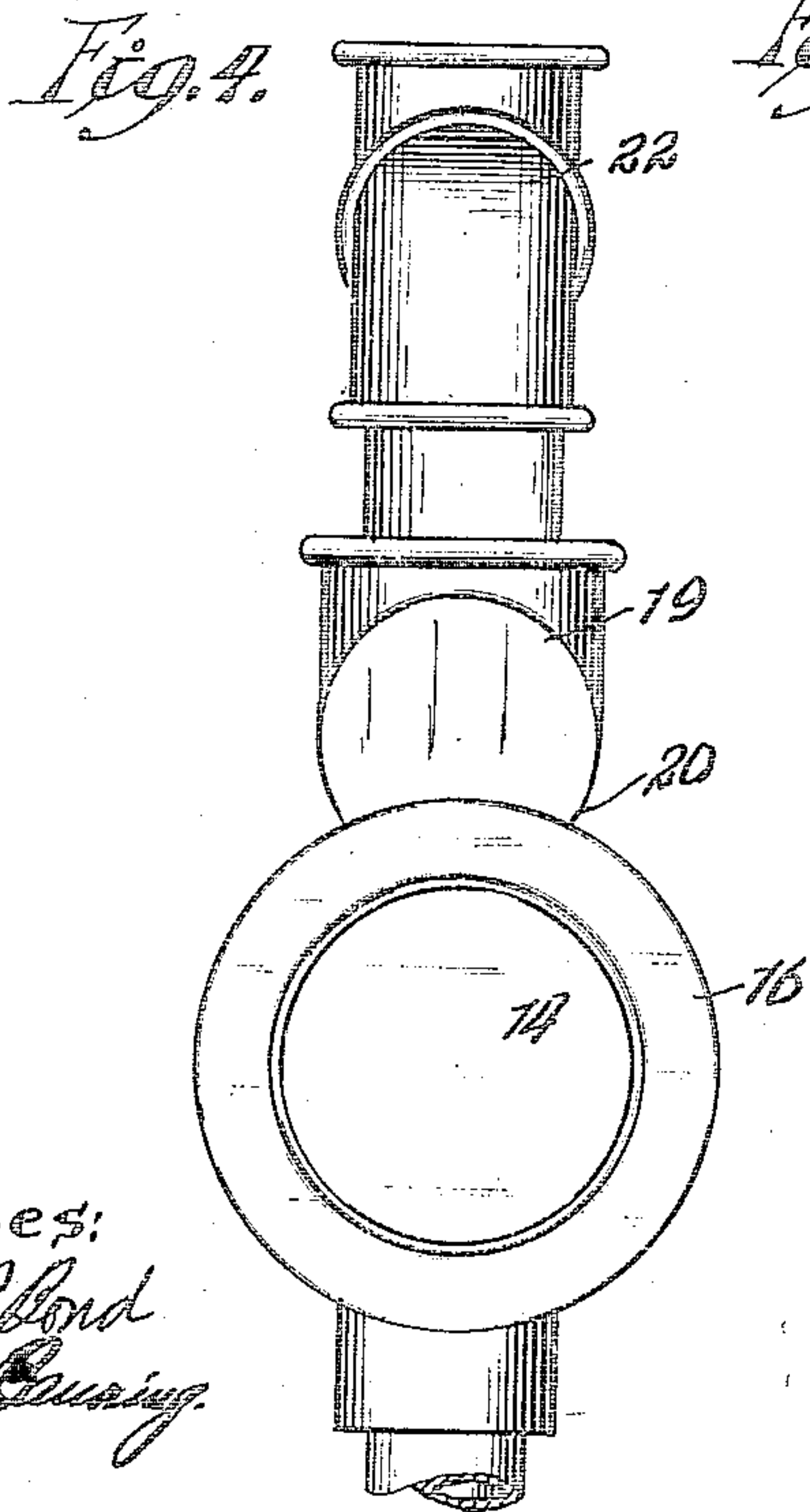
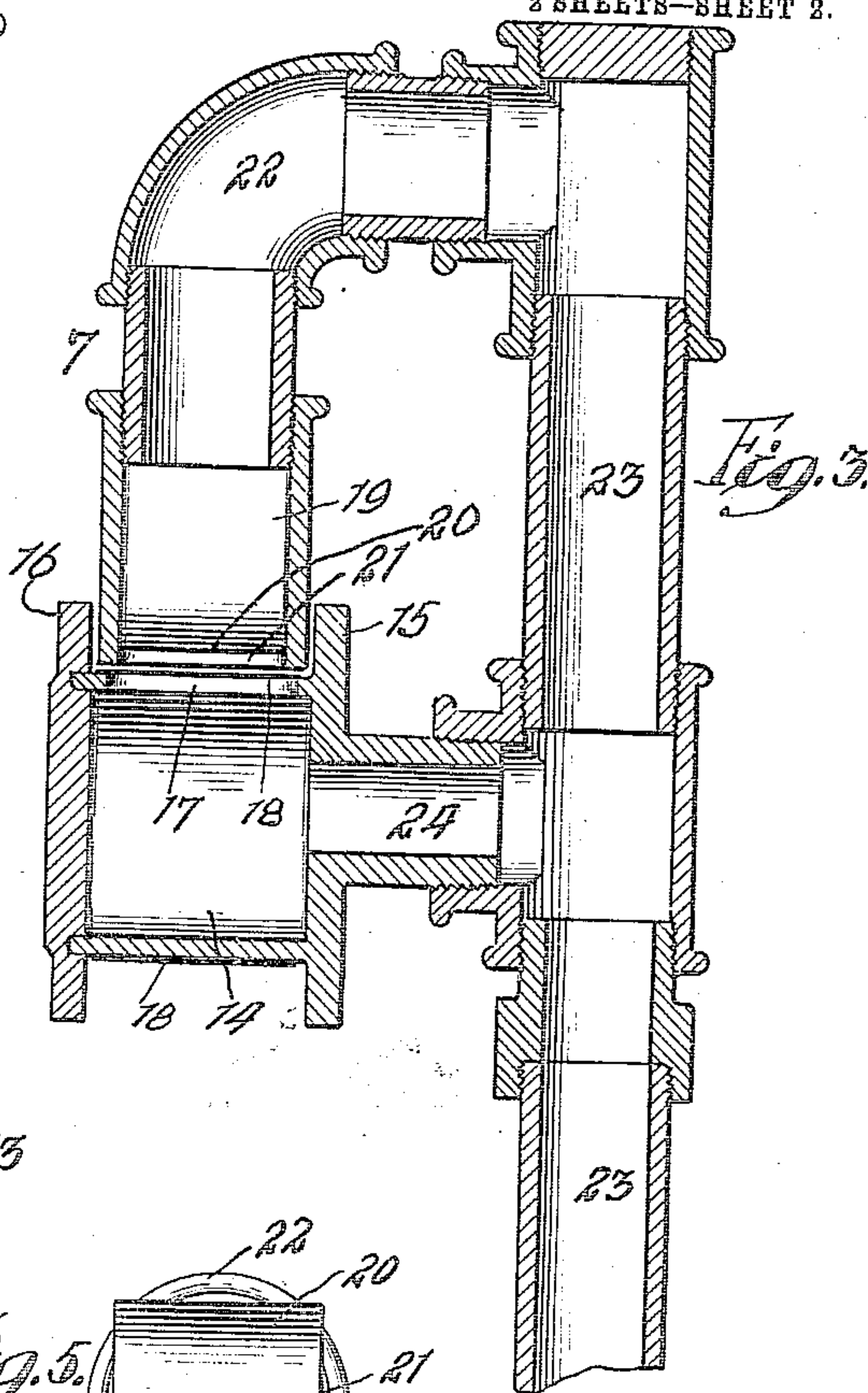
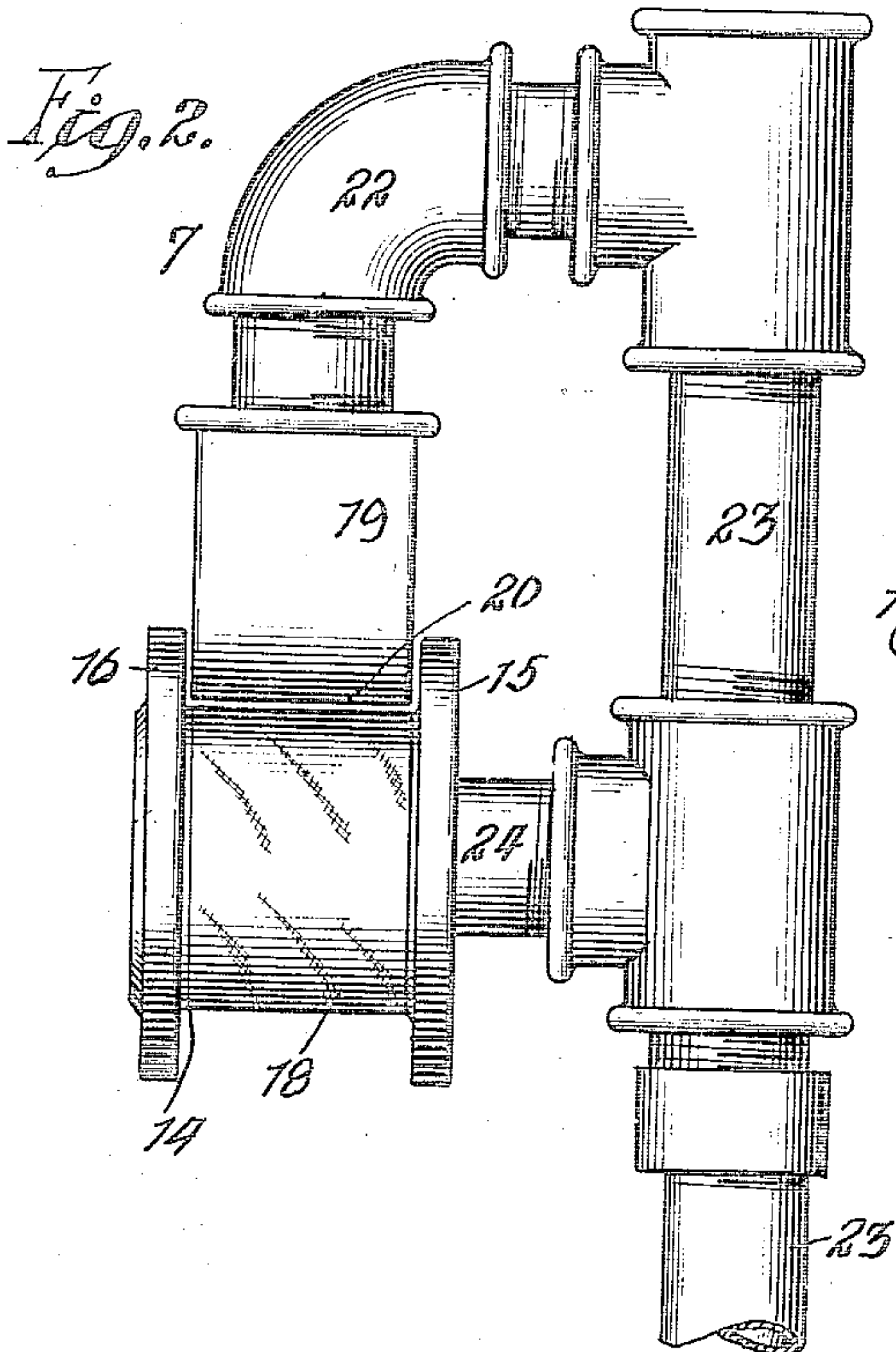
by *William A. Fitts*

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FILM DRYING APPARATUS.
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Patented Mar. 29, 1910.

2 SHEETS—SHEET 2.



Witnesses:
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Att'y.

UNITED STATES PATENT OFFICE.

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FILM-DRYING APPARATUS.

953,663.

Specification of Letters Patent.

Patented Mar. 29, 1910.

Application filed July 16, 1909. Serial No. 507,942.

To all whom it may concern:

Be it known that I, GUSTAV E. HOGLUND, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Film-Drying Apparatus, of which the following is a specification.

The apparatus of this invention is intended for use in the drying of moving picture films after the same have come from the developing and washing baths; and the object of the invention is to combine devices for rubbing off the surplus water from the reverse side of the film by a frictional action; devices for sucking off the water by pneumatic action; and devices for finally drying the film by a current of heated air. By the application of these three agencies, the films will be delivered to a receiving reel in a fairly dry condition, so that they can be easily handled and will be in condition for shipment either immediately after passage from the apparatus, or within a very short time thereafter.

In the drying of films great care must be taken to prevent the emulsion side of the film from being rubbed or scratched while damp, or from being marred by the settling of dust thereon, for which reason it is highly desirable that the films be dried by a continuous and uninterrupted process, so that all unnecessary handling of the films will be obviated and the time required for the drying process reduced to a minimum. The apparatus of the present invention is intended to perform the drying action by a continuous and uninterrupted process and in a manner to deliver the film in perfect condition to the receiving reel.

Further objects will appear from a detailed description of the invention, which consists in the features of construction and combination of parts hereinafter described and claimed.

In the drawings, Figure 1 is a longitudinal sectional elevation of the entire apparatus; Fig. 2 a side elevation of the pneumatic devices; Fig. 3 a sectional elevation of the same; Fig. 4 a front elevation of the same; Fig. 5 a face view of the upper slotted head; and Fig. 6 a similar view of the lower slotted head.

The apparatus as a whole comprises a

pneumatic sucking device 7 and a drying chamber 8. Associated with these two devices is a delivering reel 9, which will ordinarily be a reel located in the last washing tank 10, which reel delivers the film 11 in wet condition to the pneumatic sucking device 7, whence the film passes directly and uninterruptedly through the drying chamber 8, where it is subjected to a current of hot air and is finally delivered to a receiving drum 12, which is preferably mounted upon wheels 13, or in any other suitable manner which will permit of its being moved back and forth transversely of the film in order that the coils of film be not wound one upon the other until sufficiently dry to prevent the coils from sticking together.

The pneumatic sucking apparatus comprises a lower hollow drum head 14, having peripheral flanges 15 and 16, between which the film passes, and the body of the lower drum head is provided in its upper side with a transversely extending slot 17. The surface of the drum head is preferably covered with a layer of porous fabric 18, such as cheese-cloth or linen, which is adapted to wipe off the surplus water from the or reverse side of the film by a frictional action without materially interfering with the suction through the slot 17. The lower hollow drum head coöperates with an upper sucker head 19, having a rounded lower face, provided with a slot 21, which is preferably narrower than the slot 17, so that the force of the suction through the slot 21 will be less than that through the slot 17. This is desirable in order that the emulsion side of the film, which is the upper side, shall not be lifted into actual contact with the surface of the upper sucker head, but will pass in very close proximity thereto, so that the suction through the upper slot will draw off the surplus water from the emulsion side of the film without injury thereto. The upper sucker head is connected by means of an elbow 22 with a main vertical head or pipe 23, which latter is suitably jointed and is connected with the lower hollow drum head by means of a pipe or passage 24, the arrangement being one whereby a suction through the main head or pipe will create a suction in opposite directions to act upon both sides of the film.

The upper sucker head is preferably of a size to fit down between the peripheral flanges of the lower sucker drum head, so that the film will pass evenly and smoothly between and be guided by the flanges, and it is desirable that the pneumatic suction devices be located at a proper level with respect to the delivering drum or reel, so that the film in traveling over the lower sucker drum head will be held down in sufficient frictional contact therewith to rub firmly and smoothly against the frictional surface of the fabric on the lower sucker drum head.

After passing between the sucker heads, the film passes into a long rectangular box 25, constituting the drying chamber, within which it is supported at suitable intervals by rollers 26. The box is provided at one end with a warm air supply pipe 27, leading to a suitable heater or other device for supplying warm air, which air is drawn through the drying chamber by the action of an exhaust fan 28 located at the opposite end of the chamber. The chamber can be of suitable length and the speed of travel of the film can be regulated so that the film will be substantially dry by the time it emerges from the warm air drying chamber.

In use, the end of the film on the delivering reel or drum will be passed between the sucker heads and through the drying chamber and secured to the receiving drum or reel. Thereafter, by rotating the receiving drum or reel, the film will be drawn through the drying devices at the desired speed. As the film passes over the lower sucker drum head, the surplus water from its under or reverse surface will be wiped off by the friction of the fabric covering; and, at the same time, particles of water which are not removed by the wiping process will be sucked down by the suction through the lower slot. Simultaneously, the surplus water will be removed from the upper or emulsion surface of the film by the suction through the upper slot, so that most of the water will be removed without any contact whatever with the delicate upper surface of the film. Thereafter, during the passage of the film through the drying chamber, the dampness which could not be removed by the suction and by the friction will be dried out, so that the film will be delivered in a substantially dry condition. The apparatus is one which enables the films to be substantially dried without in any way touching or handling the films, so that the same will be quickly and easily dried in a perfect condition.

Although the above device has been particularly described as a drying apparatus, the suction devices may also be used for the removal of particles of dust from the films; and it will be understood that this use is

contemplated and intended to be covered in the claims forming part of the present application.

I claim:

1. In an apparatus for drying films, a sucker head having a perforated surface in proximity to which the film is adapted to pass, means for creating a suction, a connection between the sucker head and the means for creating the suction, and a porous water-absorbing covering for the perforated head, adapted to remove water from the film by friction without interfering with the action of the suction upon the film, substantially as described.

2. In an apparatus for drying films, a sucker head having a perforated surface in proximity to which the film is adapted to pass, means for creating a suction, a connection between the sucker head and the means for creating the suction, a porous water-absorbing covering for the perforated head, adapted to remove water from the film by friction without interfering with the action of the suction upon the film, a drying chamber in proximity to the sucker head, through which the film is adapted to pass after leaving the sucker head, and a device for creating a current of warm air through said drying chamber, substantially as described.

3. In an apparatus for drying films, the combination of upper and lower sucker heads, provided with perforations in position to act upon the opposite sides of a moving film, means for creating a suction through such perforations, a connection between the sucker heads and the means for creating the suction, and a porous water-absorbing covering for the lower sucker head at the point of passage of the film thereover, substantially as described.

4. In an apparatus for drying films, the combination of upper and lower sucker heads, provided with perforations in position to act upon the opposite sides of a moving film, means for creating a suction through such perforations, a connection between the sucker heads and the means for creating the suction, and a porous water-absorbing covering for the lower sucker head at the point of passage of the film thereover, the upper and lower sucker heads being spaced a sufficient distance to permit the film to travel between the sucker heads without coming in frictional contact with the surface of the upper sucker head, substantially as described.

5. In an apparatus for drying films, the combination of upper and lower sucker heads, provided with perforations in position to act upon the opposite sides of a moving film, means for creating a suction through such perforations, a connection between the sucker heads and the means for creating the suction, a porous water-absorb-

ing covering for the lower sucker head at the point of passage of the film thereover, the upper and lower sucker heads being spaced a sufficient distance to permit the film to travel between the sucker heads without coming in frictional contact with the surface of the upper sucker head, a drying chamber in proximity to the sucker heads and adapted to permit the passage of the film there-
10 through after leaving the sucker heads, and means for creating a current of warm air through the drying chamber, substantially as described.

6. The process of drying films, which con-
15 sists in subjecting a moving film to the action of suction applied to the rear side of the film through a porous absorbent material and frictionally removing the water by the contact of the moving film with such ma-
20 terial, substantially as described.

7. The process of drying films, which con-
sists in subjecting a moving film to the ac-
tion of suction applied to the rear side of the
film through a porous absorbent material
25 and frictionally removing the water by the
contact of the moving film with such ma-
terial, and simultaneously removing the
water from the upper surface of the film by
the action of suction applied at a point to

prevent frictional contact with the emulsion 30
side of the film, substantially as described.

8. The process of drying films, which con-
sists in subjecting a moving film to the ac-
tion of suction applied to the rear side of the
film through a porous absorbent material 35
and frictionally removing the water by the
contact of the moving film with such ma-
terial, and thereafter subjecting the film to
the action of a heated current of air, sub-
stantially as described. 40

9. The process of drying films, which con-
sists in subjecting a moving film to the ac-
tion of suction applied to the rear side of the
film through a porous absorbent material 45
and frictionally removing the water by the
contact of the moving film with such ma-
terial, and simultaneously removing the
water from the upper surface of the film by
the action of suction applied at a point to
prevent frictional contact with the emulsion 50
side of the film, and thereafter subjecting
the film to the action of a heated current of
air, substantially as described.

GUSTAV E. HOGLUND.

Witnesses:

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WALKER BANNING.