

(No Model.)

3 Sheets—Sheet 1.

W. P. CANNING.

APPARATUS FOR SIZING YARN.

No. 360,654.

Patented Apr. 5, 1887.

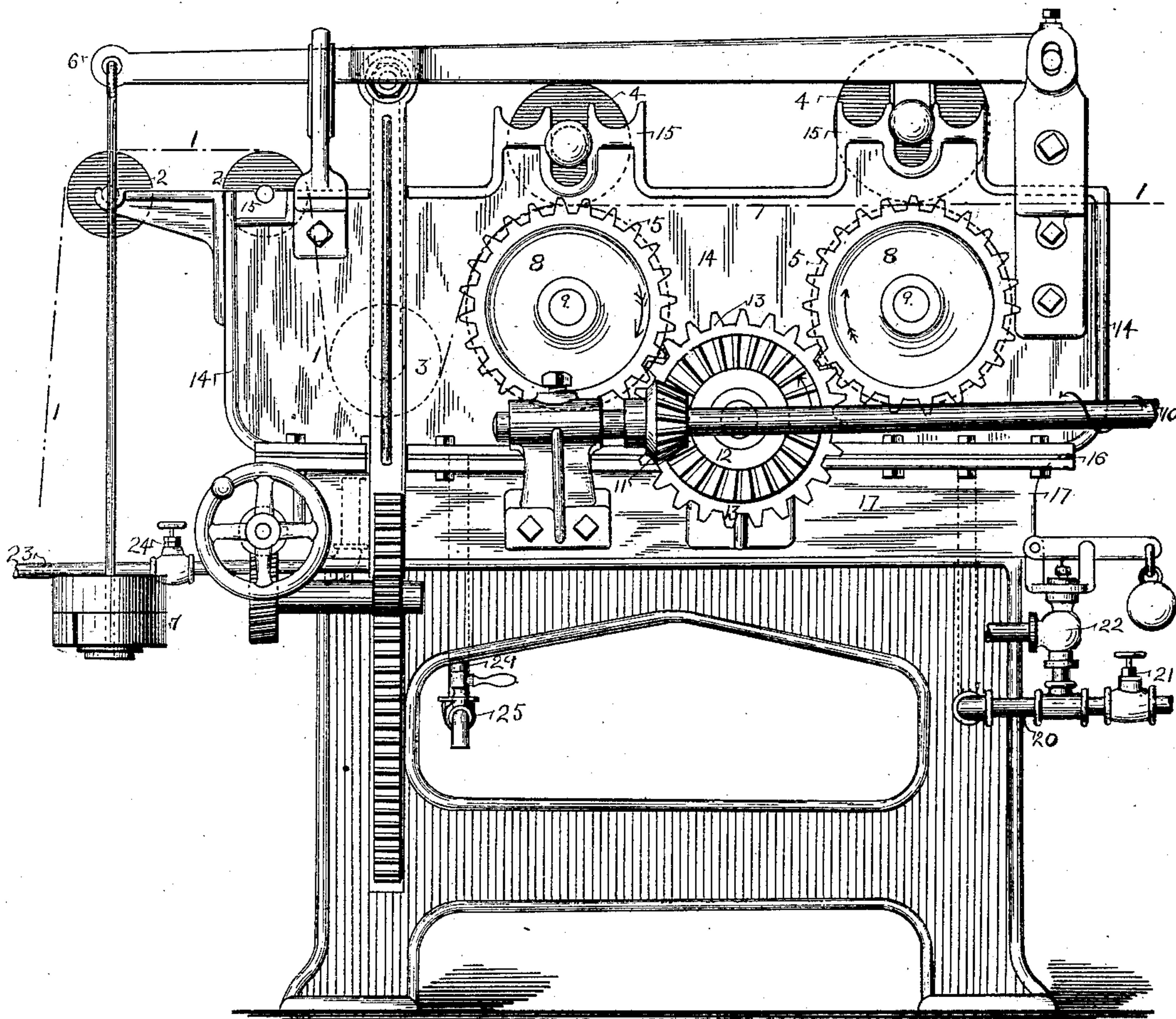


Fig. 1.

WITNESSES:

C. S. Gooding,
John M. Carter
Loren W. Penney

INVENTOR:

W. P. Canning.

(No Model.)

3 Sheets—Sheet 2.

W. P. CANNING.

APPARATUS FOR SIZING YARN.

No. 360,654.

Patented Apr. 5, 1887.

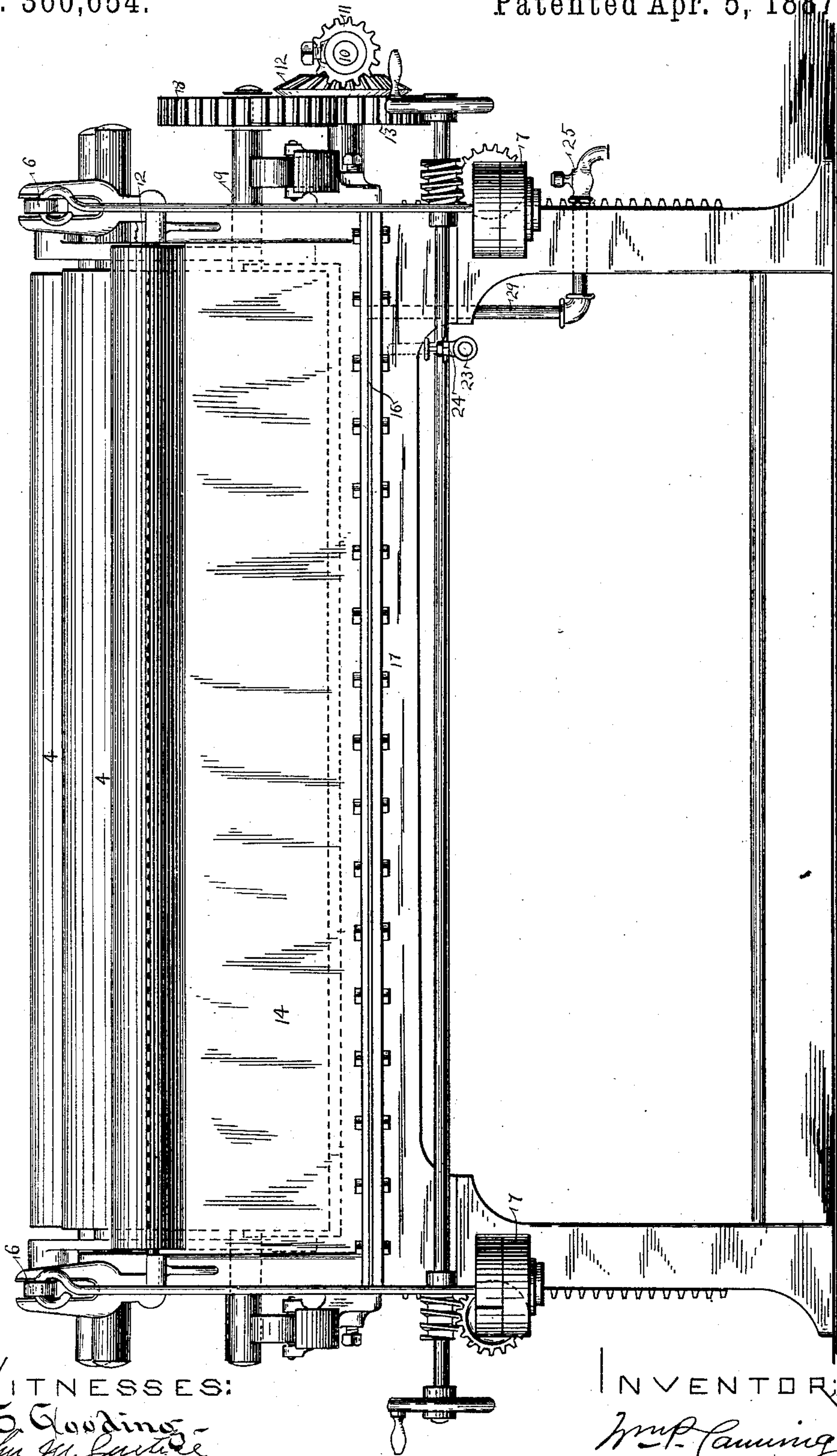


FIG. 2.

WITNESSES:

C. S. Gooding
John W. Carter
Loren W. Penney

INVENTOR:

W. P. Canning.

(No Model.)

3 Sheets—Sheet 3.

W. P. CANNING.

APPARATUS FOR SIZING YARN.

No. 360,654.

Patented Apr. 5, 1887.

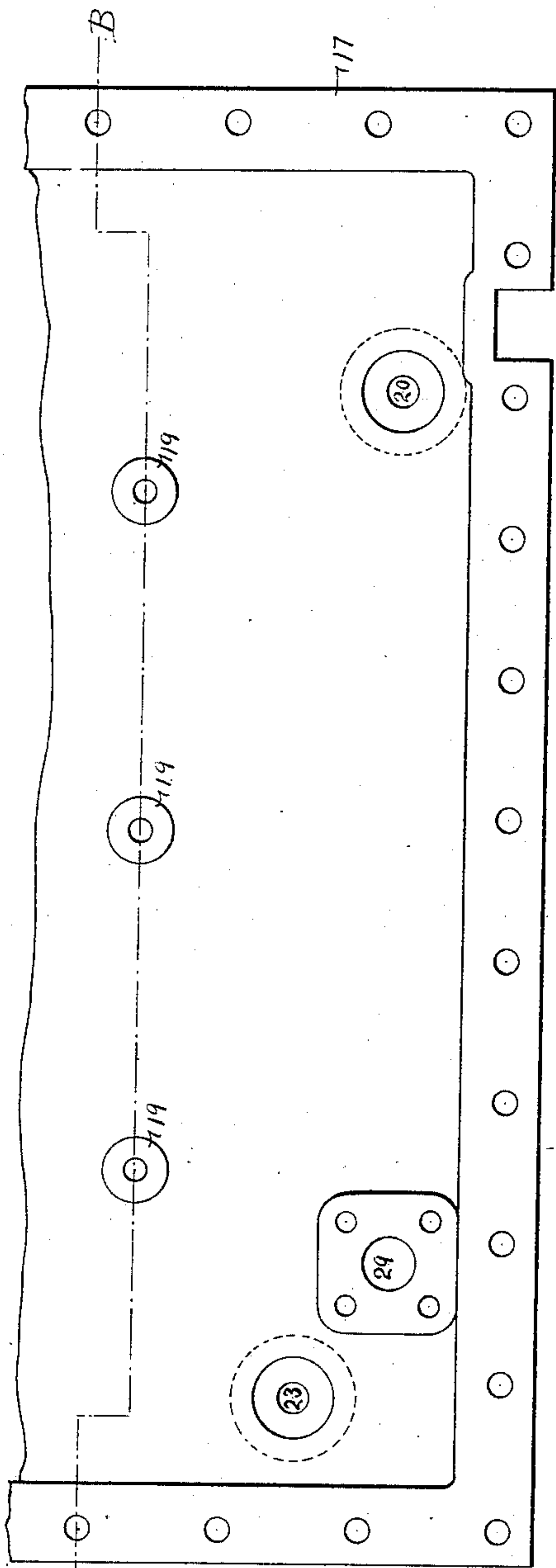


Fig. 3.

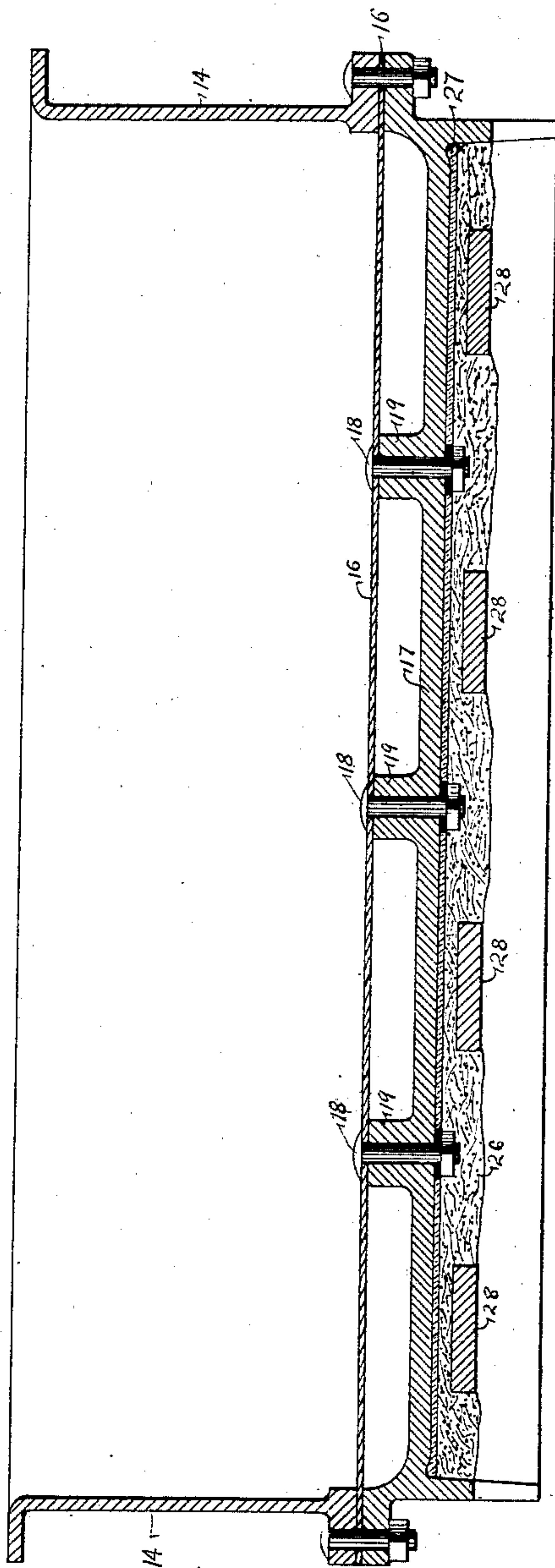


Fig. 4.

WITNESSES:

C. S. Gooding
John M. Carice
Loren W. Penney

INVENTOR

W. P. Canning

UNITED STATES PATENT OFFICE.

WILLIAM P. CANNING, OF LOWELL, MASSACHUSETTS, ASSIGNOR TO THE
LOWELL MACHINE SHOP, OF SAME PLACE.

APPARATUS FOR SIZING YARN.

SPECIFICATION forming part of Letters Patent No. 360,654, dated April 5, 1887.

Application filed April 9, 1886. Serial No. 198,316. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM P. CANNING, a citizen of the United States, residing at Lowell, in the county of Middlesex and State of Massachusetts, have invented a new and useful Improvement in Apparatus for Sizing Yarns, of which the following is a specification.

My invention relates particularly to the art of applying size to fibrous material, when this material is in the state of yarn, which is later to be formed into warps and woven into cloth, and the objects of my invention are to make it possible that the said size may be applied to the yarn with greater certainty and uniformity than has hitherto been the practice. I attain this result by the use, as hereinafter set forth, of the apparatus illustrated in the accompanying drawings, in which—

Figure 1 is an end elevation of a size-vat in which the size is retained in a considerable quantity and in the proper condition. Fig. 2 is a side elevation of the said size-vat. Fig. 3 is a plan of a portion of the bottom of the heating-chamber which forms the bottom of the size-retaining chamber, and Fig. 4 is a sectional elevation at the line A B of Fig. 3 after the sides of the size-retaining chamber and the top of the heating-chamber have been placed in their proper position.

Similar reference-numbers refer to similar parts throughout the several views.

Size is usually made by cooking starch or glue in a sufficient quantity of water, and it is usually applied while hot to the yarn, in order to protect the same from being frayed and worn in the process of weaving. It is at the present time very important that the size should be applied to the yarn with great uniformity, and distributed evenly on every portion of the yarn which is operated upon. In order that the size may not be too readily rubbed from the yarn in the process of weaving, it is desirable to cause it to penetrate to the interior of the individual threads to a certain extent.

To apply the size to the yarn the following method is largely in use: The yarn is run through the fluid or semi-fluid size contained in a suitable vat, and then through one or more pairs of squeeze-rolls, the under roll of each

pair of squeeze rolls usually being partially immersed in the size.

Since the size of the strength which is ordinarily used is not fluid enough at the ordinary temperature of the air to penetrate sufficiently well into the substance of the individual threads, and to be evenly distributed on their surfaces, it is necessary to heat the size very considerably, sometimes nearly or quite to the boiling-point.

Hitherto, previous to my invention, the method of heating the size which has always been practically adopted in recent times, so far as I have been able to learn, is that where a steam-pipe has carried steam directly into the cooked size in the size-vat, the pipe running along near the bottom of the vat, and being perforated so that the steam would escape into the surrounding fluid mass of the size.

Since the yarn which enters the size and the surrounding air are both much colder than the size, they abstract a large quantity of heat therefrom, and since it is necessary to maintain the proper temperature of the contents of the size-vat steam must in this process be continually blown into the vat, in order to supply the necessary amount of heat. This I have found to be injurious in its effects, since the steam condenses in the size and thereby changes its composition, thinning it down to such an extent at times that the size does not perform the desired functions in the later processes to which the yarn is subjected. Moreover, the presence of the steam-pipe in the size-vat is objectionable, since it makes it difficult to thoroughly clean out the size-vat when for any reason it is necessary to do so.

I have found that a size-vat constructed as hereinafter set forth and operated as described affords a means of keeping the size at the proper temperature, and at the same time prevents it from becoming reduced in consistency by the addition of condensed steam. Besides these advantages, the vat may be easily cleaned out whenever it is desirable to do so, and no size is baked or burned onto the heating-surfaces, as has been the case when some other attempts have been made to heat size in a sizing-vat without allowing steam to condense within the mass of the size.

In the drawings, 1 represents the course taken by the yarn in passing through the size-vat. Several hundred threads are usually passed through the size at once, lying side by side upon the various rolls of the machine. The yarn first passes over the guide-rolls 2, thence under the immersing-roll 3, and then between the pairs of squeezing-rolls 4 and 5. These squeeze-rolls are usually provided with a heavy top roll, 4, which presses the size into the yarn as it passes through the rolls, and sometimes, when it is desired that but little size shall adhere to the surface of the yarn, the levers 6 and weights 7 are arranged to squeeze out the surplus size. With some kinds of size and yarn, however, the top roll itself is sufficiently heavy for this purpose, and these levers and weights are removed. The yarn is caused to move through the size-vat by means of the squeeze-rolls, the lower roll, 5, of each pair being driven by gear-wheels 8 upon their axles 9. The gears 9 are driven from the machinery which usually serves to dry out the surplus moisture from the yarn after it has been sized by means of the shaft 10, the bevel-gears 11 and 12, and the spur-gear 13.

The arrangements illustrated for guiding and moving the yarn through the size, for removing the surplus size therefrom, for supporting the size-vat, and for actuating the immersing-roll 3 form no part of my invention, except as combined with other parts, and any equivalent means will answer for these purposes.

The size-retaining chamber is made up of the sides 14, provided with the supports 15 for the various rolls, and clamped upon the top of the plate 16, which forms the bottom of the size-retaining chamber. A heating-chamber for holding the low-pressure steam which is used to heat the size is made up of the casting 17 and the plate 16, the plate 16 being prevented from yielding to the pressure of the steam by the stay-bolts 18 passing through the distance-pieces 19, and by being clamped to the flanges upon the casting 17 at its edges. The same bolts which clamp the plate 16 and casting 17 together at their edges also serve to hold the plate 16 and the sides 14 together, as is plainly shown in Figs. 1, 2, and 4.

I prefer to make the plate 16 of copper, as it is, when copper is used in this place, easy to make the various joints which are in the apparatus sufficiently tight to prevent the leakage of size or steam, although a plate of some other suitable material will answer every purpose of my invention if properly put into the structure.

Steam is supplied to the heating-chamber through the pipe 20, which is provided with the controlling-valve 21 and the safety-valve 22. This safety-valve is so loaded that the

steam-pressure in the heating-chamber cannot rise so high as to injure the said chamber or the size in the size-retaining chamber above. The condensed water is removed from the heating-chamber by means of the pipe 23, that is provided with the controlling-valve 24. When it is desired to clean out the size-retaining chamber, the cock 25 is used to draw out the size which it may contain through the pipe 29.

In order that heat may not be unnecessarily wasted by radiation, I prefer to clothe the bottom of the heating-chamber with hair, felt, or other non-conducting substance, 26, protecting it from being scorched by the sheet of asbestos board 27, retaining the whole in position by the bars 28.

What I claim as new, and desire to secure by Letters Patent, is—

1. The size retaining and heating vat, which consists of the flanged bottom to the heating-chamber with the distance-pieces projecting from the said bottom and connected therewith by being cast thereon, the covering-plate clamped upon the said flanged bottom and upon the said distance-pieces, the sides clamped upon the said covering-plate, and means of supplying steam to and removing condensed water from the space between the said covering-plate and heating-chamber bottom, substantially as described, and for the purposes specified.

2. The size retaining and heating vat, which consists of the flanged bottom to the heating-chamber with the distance-pieces cast thereon, the covering-plate clamped upon the said bottom and upon the tops of the said distance-pieces, the sides clamped upon the said covering-plate, means of supplying steam to and removing condensed water from the space between the said covering-plate and the said heating-chamber bottom, and a means of preventing the temperature and pressure of the said steam from rising to an injurious amount, substantially as described, and for the purposes specified.

3. The apparatus for sizing yarn, which consists of the squeeze-rolls and means of supporting and rotating the same, the size-retaining vat, the heating-chamber having the covering-plate and the flanged bottom with the distance-pieces cast thereon, the said covering-plate forming the bottom of the said vat, and means of supplying steam to and removing condensed water from the said heating-chamber, and means of preventing the temperature and pressure of the said steam from rising to an injurious amount, substantially as described, and for the purposes set forth.

WM. P. CANNING.

Witnesses:

JOHN M. CURTICE,
LOREN W. PENNEY.