

(No Model.)

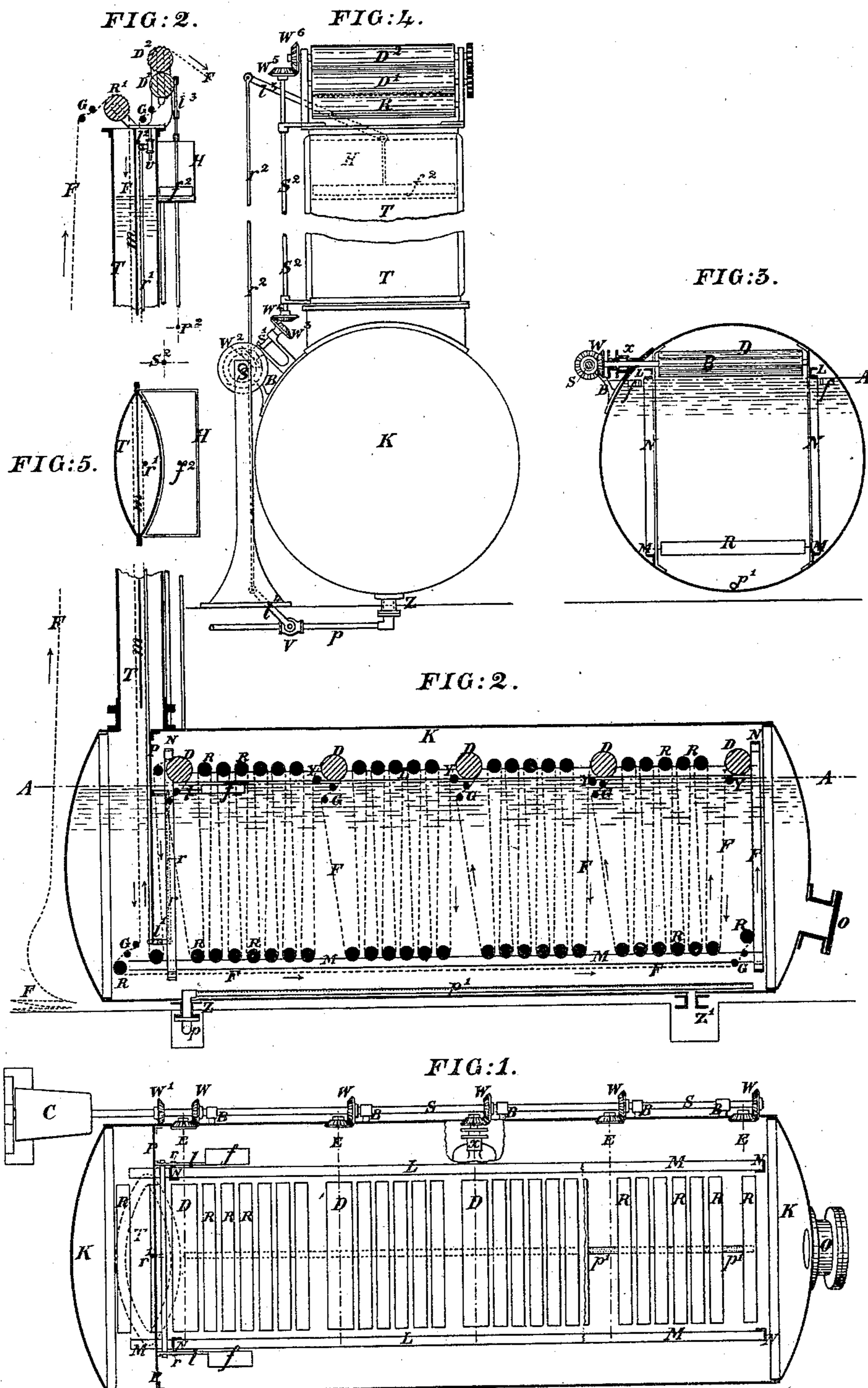
2 Sheets—Sheet 1.

W. BIRCH.

APPARATUS FOR BLEACHING WOVEN FABRICS, &c.

No. 256,957.

Patented Apr. 25, 1882.



Witnesses.
James F. Jobin.
Harry Orvay

Inventor.
William Birch
By his Attorneys
Hosson and Jones

(No Model.)

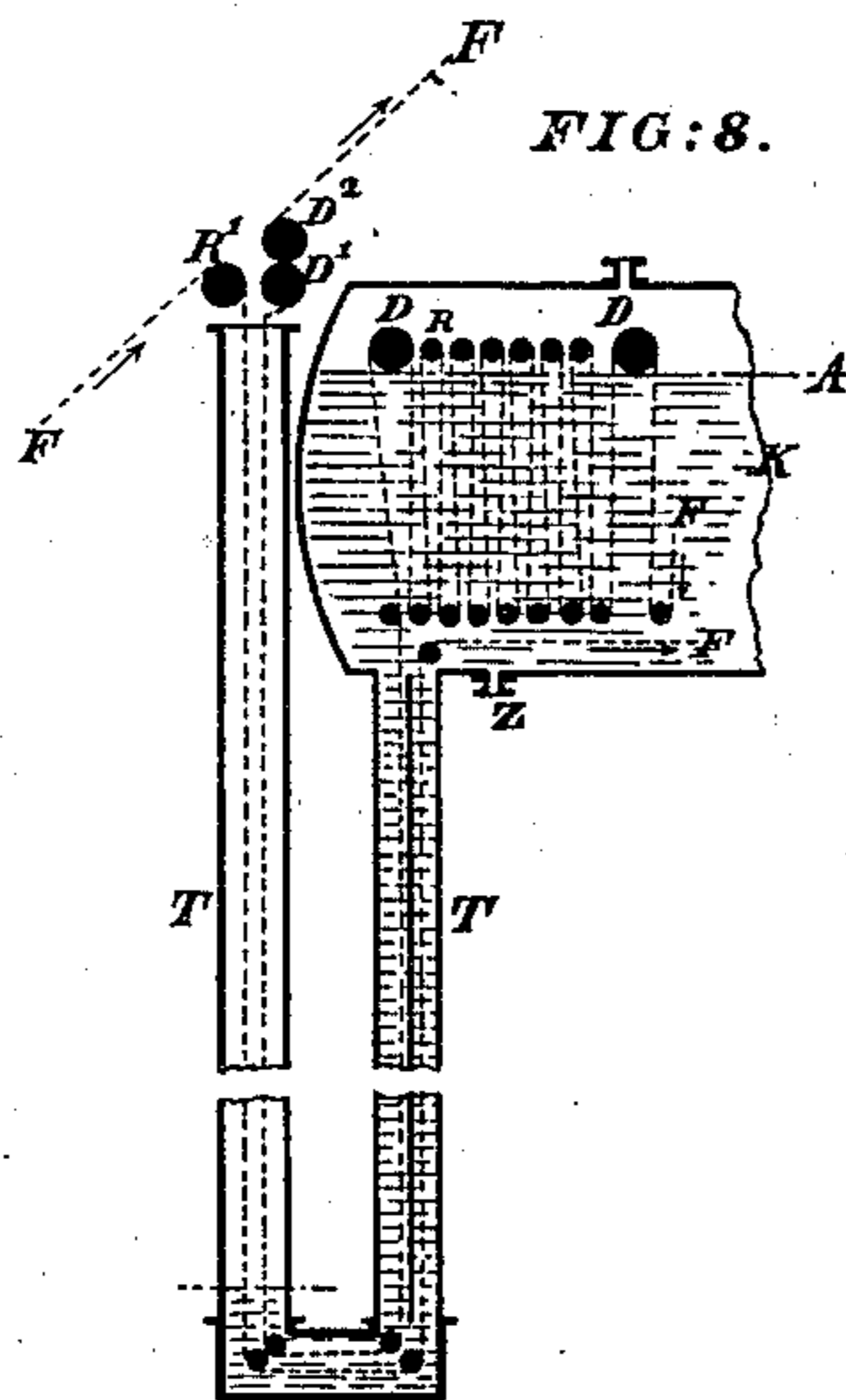
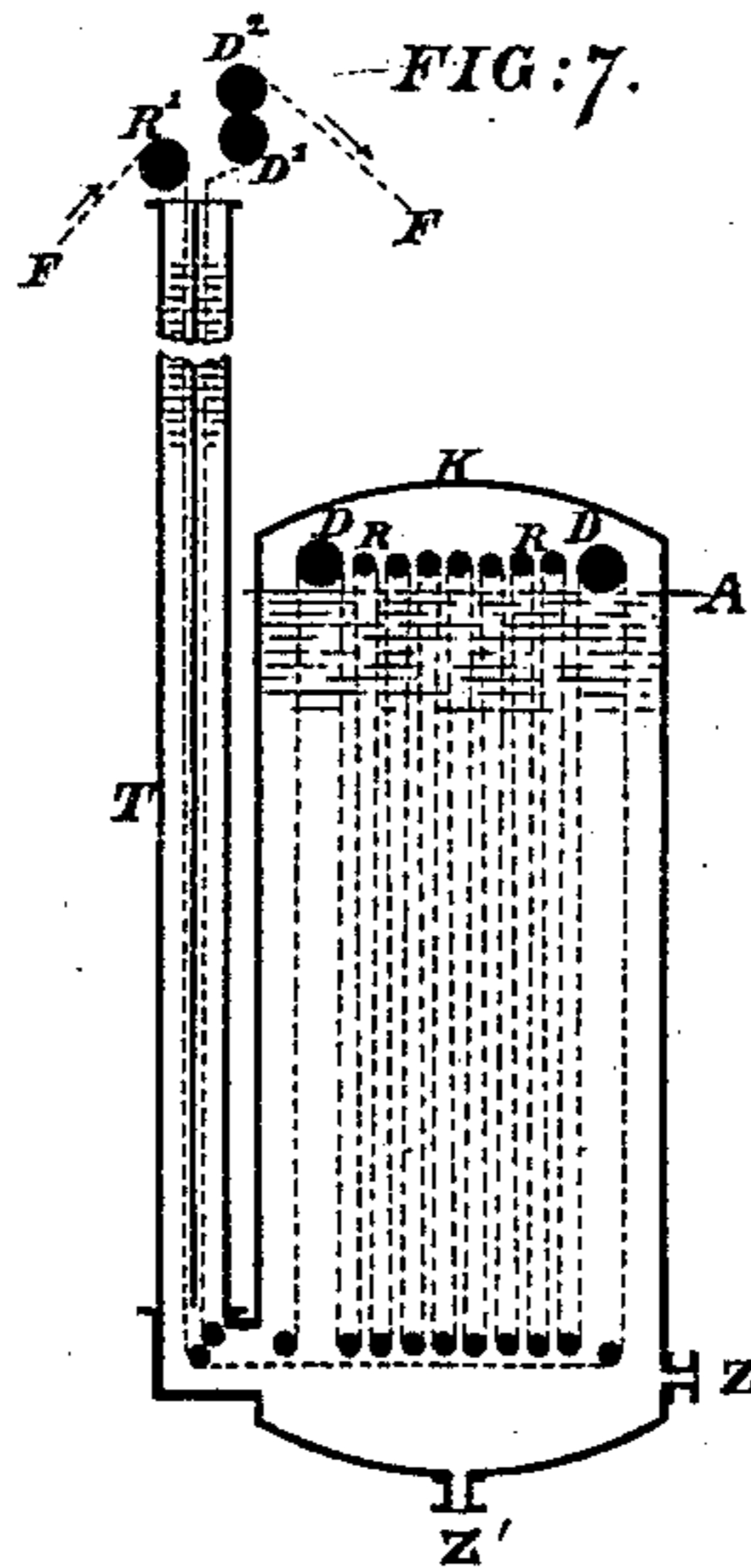
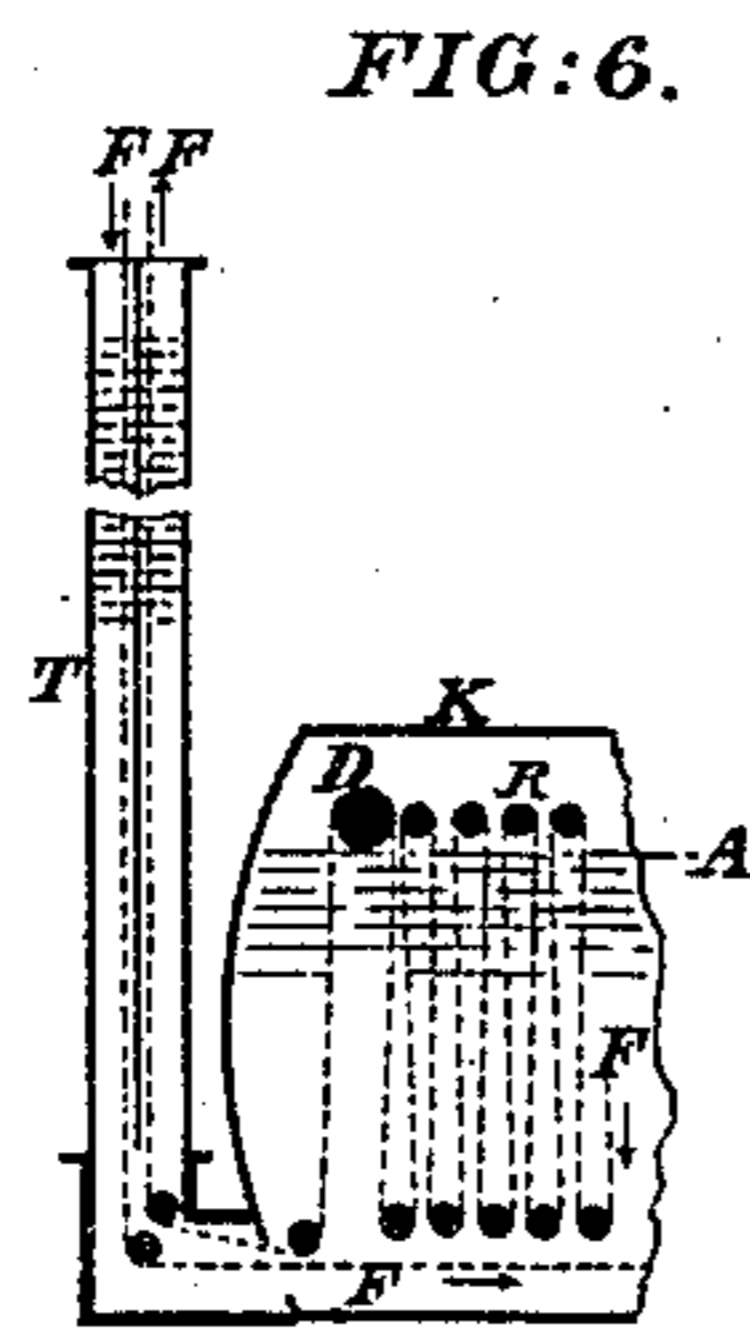
2 Sheets—Sheet 2.

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Witnesses.
James F. Tobin
Harry Drury

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UNITED STATES PATENT OFFICE.

WILLIAM BIRCH, OF SALFORD, COUNTY OF LANCASTER, ENGLAND.

APPARATUS FOR BLEACHING WOVEN FABRICS, &c.

SPECIFICATION forming part of Letters Patent No. 256,957, dated April 25, 1882.

Application filed February 6, 1882. (No model.) Patented in England November 10, 1880.

To all whom it may concern:

Be it known that I, WILLIAM BIRCH, a subject of the Queen of Great Britain and Ireland, and residing at Salford, in the county of Lancaster, England, have invented Improvements in Keirs or Apparatus for Bleaching and otherwise Treating Woven Fabrics and Yarn Continuously, (for which I have obtained a patent in Great Britain, No. 4,610, dated November 10, 1880,) of which the following is a specification.

The keiring of woven fabrics and yarn has hitherto been performed intermittently by placing the goods in bulk into the keir provided with the desired liquor, and then closing the keir up and turning on the steam, special means being sometimes adopted for the circulation of the liquor among the goods, and then when the process has been going on for a period sufficiently long the keir is opened and the goods are removed therefrom.

The object of the improvements is the construction of apparatus for the non-intermittent or continuous treatment—such as bleaching, dyeing, dunging, soaping, washing, steaming, and the like—of woven fabrics and yarn under steam-pressure—that is to say, apparatus into which the goods are continuously being introduced and taken out, and in which the goods are consequently, at any time during the working of the apparatus, in all stages of maturity. For this purpose I attach to the water-space of the keir or other vessel used an upright tube of suitable shape and capacity, and of such length as to balance by the column of liquid contained therein the pressure of the steam employed in the keir. This tube is filled with liquor, through which the goods are drawn into the keir over guide or friction rollers and out again through the same or another tube. The tube or tubes may be of segmental, circular, or other section, and may be with or without a mid-feather, and the goods treated may be open or in rope form. I prefer treating open, and employ the angular guide and governor described in the specifications of Letters Patent granted to me in Great Britain, Nos. 2,610 of 1870 and 84 and 4,368 of 1877, to keep them open and central.

The pressure in the keir or other vessel used, and also the supply of liquor, may or may not be regulated automatically by means of floats

connected by suitable levers and connections with the valves regulating the admission.

To regulate the pressure I connect a cistern at or near the top of the tube, which cistern contains a float suitably connected with the steam-valve, and when an excess of pressure in the keir forces the liquor up the tube and in the cistern the float rises and shuts off or reduces the supply of steam. For the regulation of the level of the liquor I place a float or floats in the keir, which floats are suitably connected with the liquor pump or valve. Besides friction-rollers the keir or other vessel may also be fitted with beaters, agitators, and with draw-rollers, if desired, to relieve strain on the goods.

Instead of one large keir, a number of keirs may be connected together, and the goods may pass from one into the other; or the goods may successively pass from one keir or apparatus containing liquor or a medium of a certain description into another keir, keirs, or apparatus containing liquors or mediums of a different nature, according to the requirements of each particular case.

The apparatus may also be adapted for working under vacuum instead of pressure, the inlet and outlet tube or tubes being in this case turned downward and up again in the shape of siphons. When used for the purpose of steaming the apparatus takes a similar form, having a short siphon or merely a lute.

It will be seen that the length of the inlet tube or tubes depends on the pressure or vacuum to be used, about thirty-three feet being allowed for each fifteen pounds pressure on the square inch.

The tubes may be attached in any manner most suitable, according to the requirements of each individual case.

In order to further elucidate my invention, I illustrate an arrangement of a bleaching-keir more or less complete, omitting minor details and those of ordinary construction; and I also show some modifications in skeleton. In each case both details and general arrangement may be considerably varied without departing from the general character of the invention. Thus the keirs or vessels may be upright, and the fabric may in any case run either vertically or horizontally. The cylindrical form of vessel is adopted as being the strongest; but any

form of vessel may be used, especially for low pressures.

In the drawings, Sheet 1 shows a bleaching-keir in sectional plan, longitudinal and cross section, and end view in Figures 1, 2, 3, and 4 respectively. Fig. 5 is a section of the tube or funnel for the inlet and outlet of the goods.

The keir K is a cylindrical vessel with segmental ends; T, the tube or funnel with mid-feather, *m*, attached to the top of the keir.

R are friction-rollers. D are draw-rollers, driven by bevel-wheels W from a shaft, S, running along the keir, supported on brackets B, and carrying a cone, C, by which the speed may be regulated at will. The centers E of the draw-rollers D run through stuffing-boxes or glands X. The friction and draw rollers R and D are supported on a frame, L M N. The partition P separates the water-space, acting similar to a trap. G are angular guides to keep the fabric open and central on the rollers, and Y are tension-regulators, which are applied to prevent excessive slackness or strain on the goods. The fabric F is drawn over the friction-roller R', down the tube T, over the series of friction and draw rollers R and D and the guides G, and through the tube T again on the other side of the mid-feather over the pair of draw and press rollers D' and D² to the next machine or apparatus or elsewhere. The liquor-level in the keir is indicated by the line A, the floats *f* on the levers *l* sinking with the level, and through the rods *r r'* on the levers *l' l''* open the valve or cock *v* to admit a further supply of liquor. If the pressure in the keir is unduly increased, the liquor will be forced up the tube T into the box or cistern H, raising the float *f*², which, through the levers *l*³

and *l*⁴ and the rod *r*², partly or wholly closes the steam-valve V, thereby reducing the supply of steam which enters the keir through the pipe *p*, the nozzle Z, and the perforated pipe *p'* at the bottom of the keir.

Z' is a nozzle for a draw-off cock, and O is a man-hole. S' and S² are shafts to give motion to the overhead draw-rollers D' by the bevel-wheels W', W², W³, W⁴, W⁵, and W⁶.

The keir may be furnished in the ordinary way with pressure-gage, water-gages, and safety-valve.

Fig. 6, Sheet 2, shows another mode of attaching the tube T. Fig. 7 represents the keir placed upright. Fig. 8 is the outline of a vessel prepared to work with a vacuum.

I claim as my invention—

1. A closed bleaching-keir provided with guide-rollers and a tube forming a seal-joint, arranged for the passage of the fabric or material to be treated to and from the keir through said tube, which has suitable feed and guide rollers, substantially as described.

2. A closed bleaching-keir provided with guide-rollers and a tube forming a seal-joint and containing a mid-feather, *m*, and arranged for the passage of the fabric or material to and from the keir on opposite sides of the feather through said tube, which has suitable feed and guide rollers, substantially as described.

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

WILLIAM BIRCH.

Witnesses:

GEORGE DAVIES,
CHARLES DAVIES.