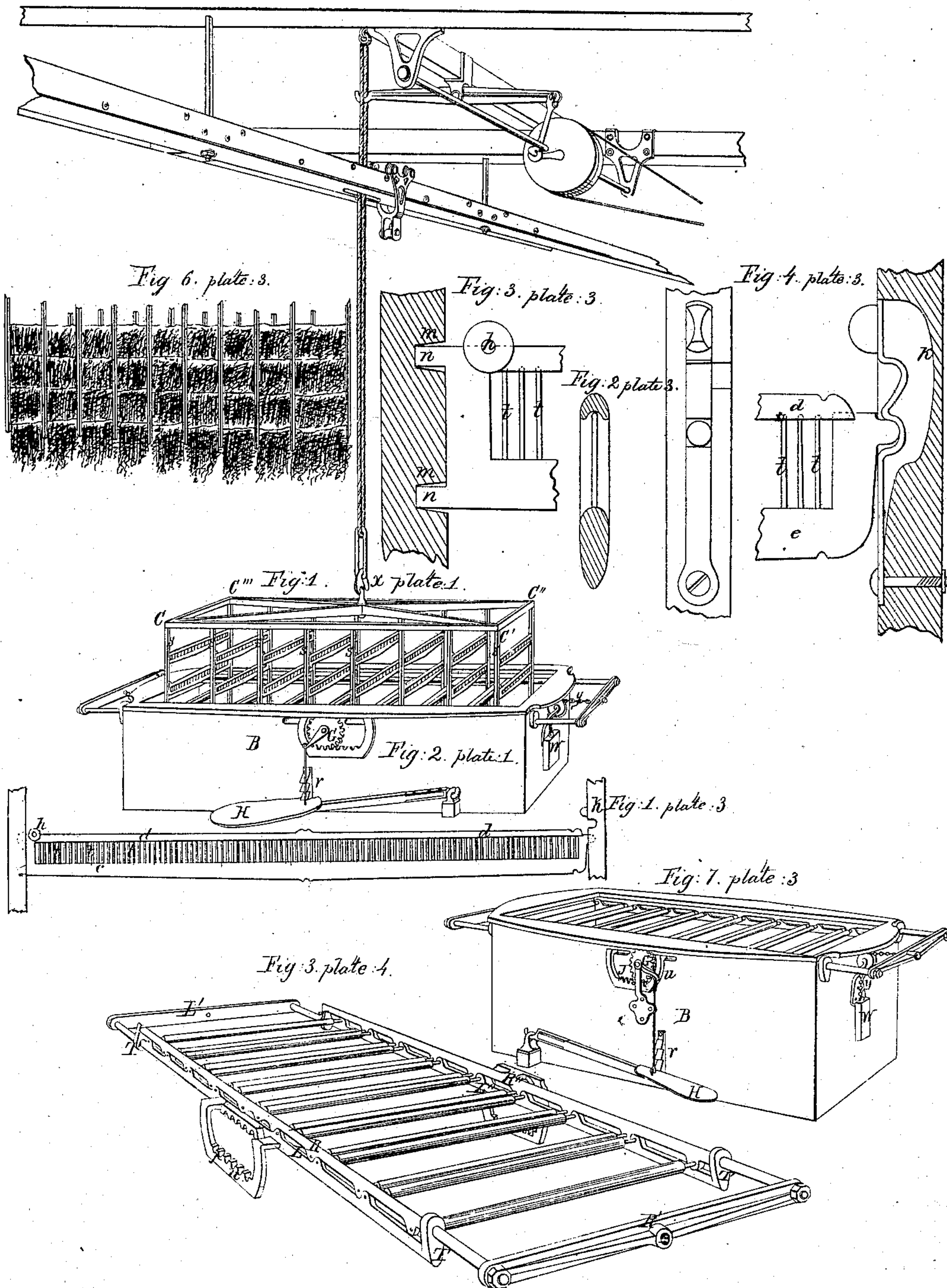


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MACHINE FOR BLEACHING FLAX.

No. 10,780.

Patented Apr. 18, 1854.



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Plate 2.

Fig. 1.

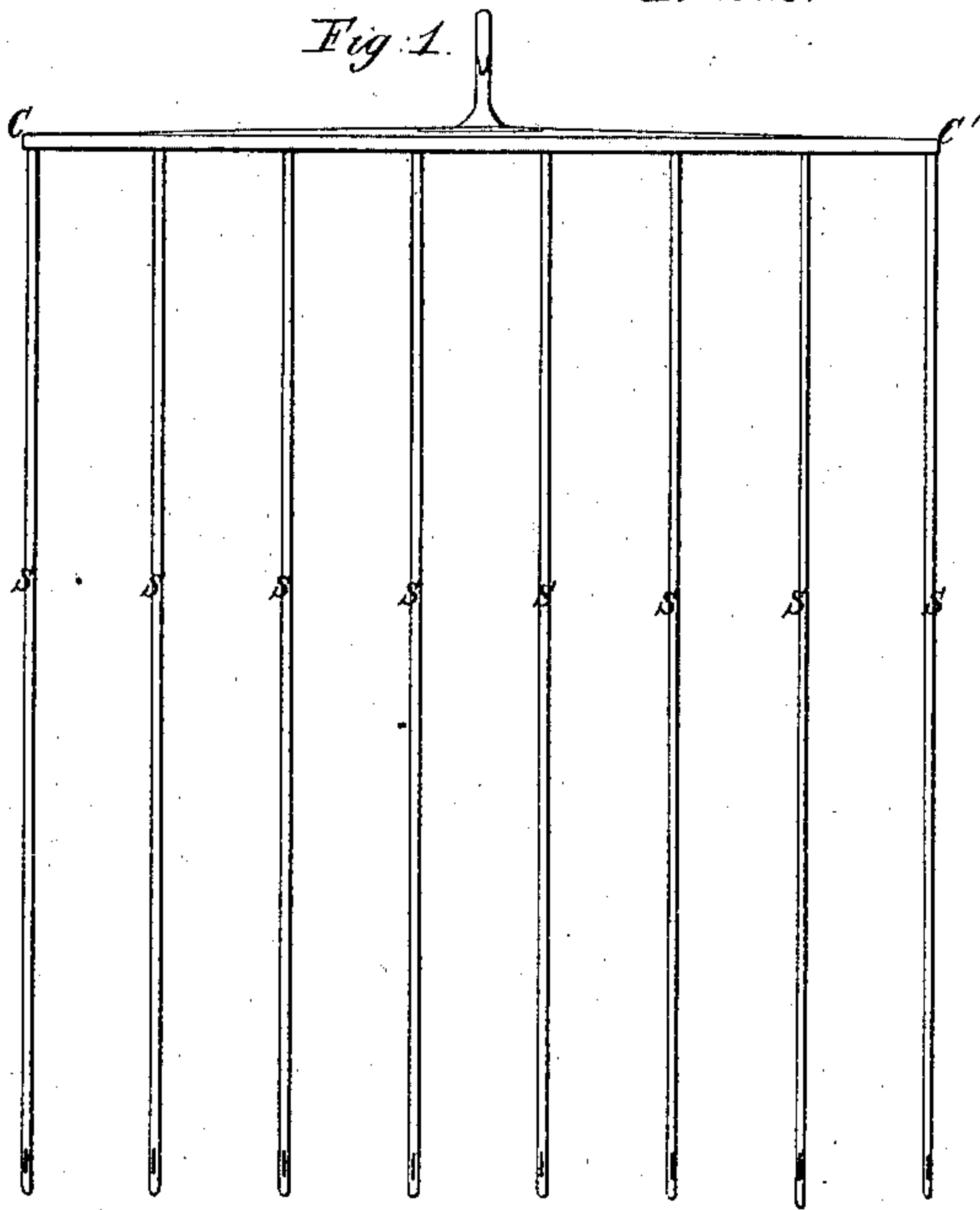


Fig. 2.

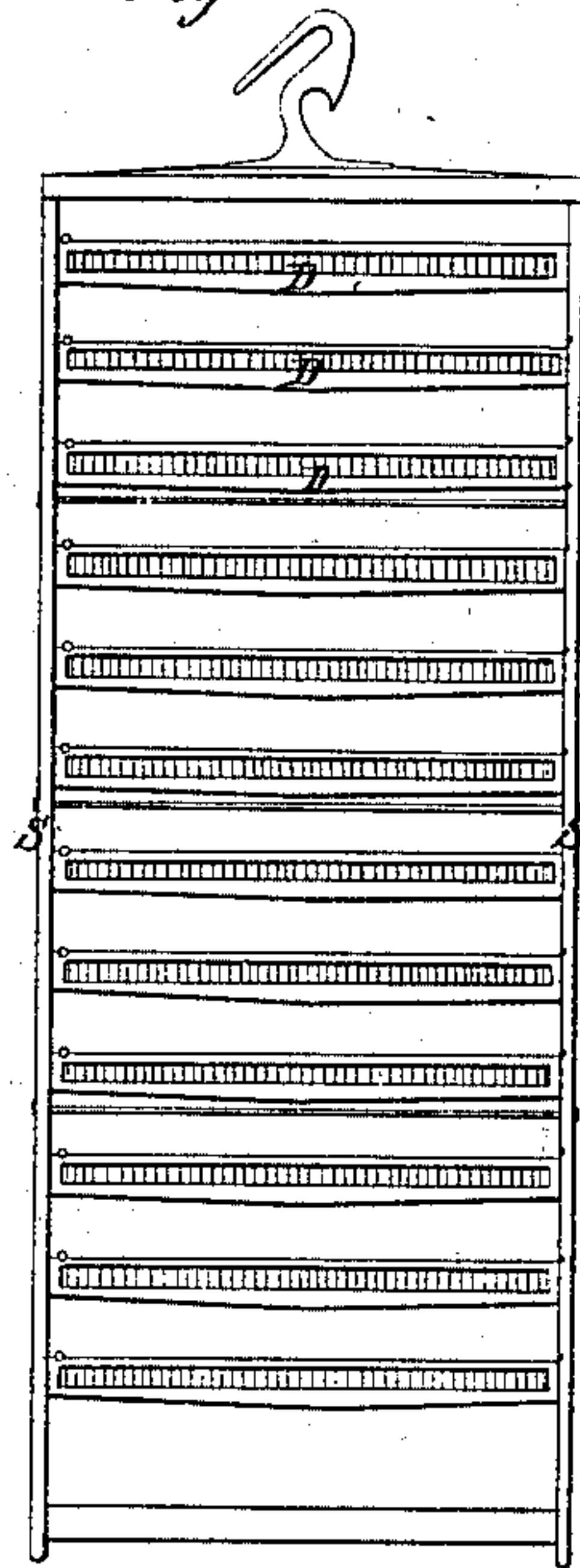


Fig. 3.

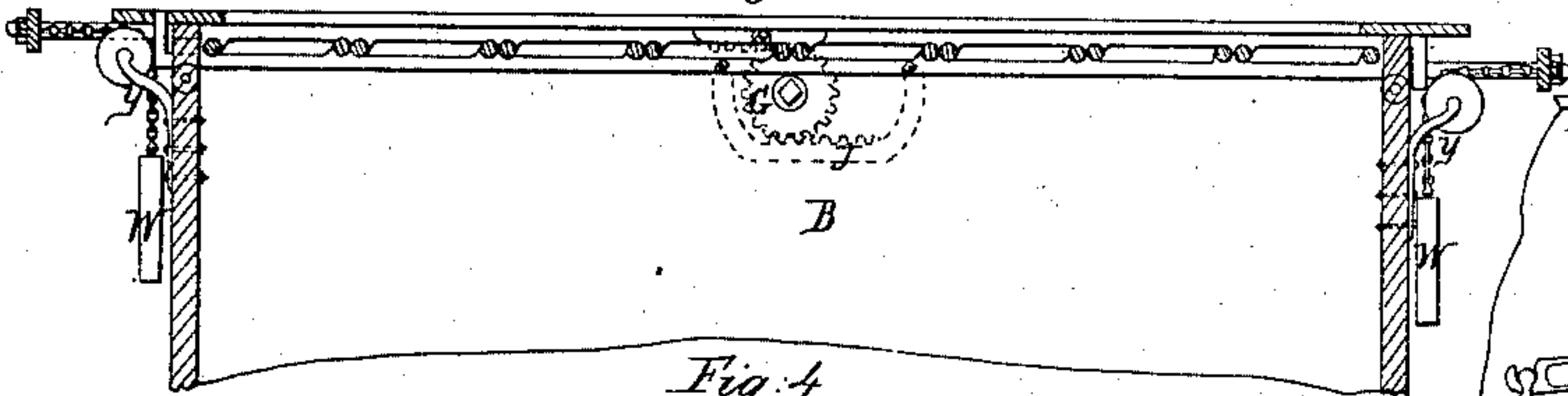


Fig. 5.

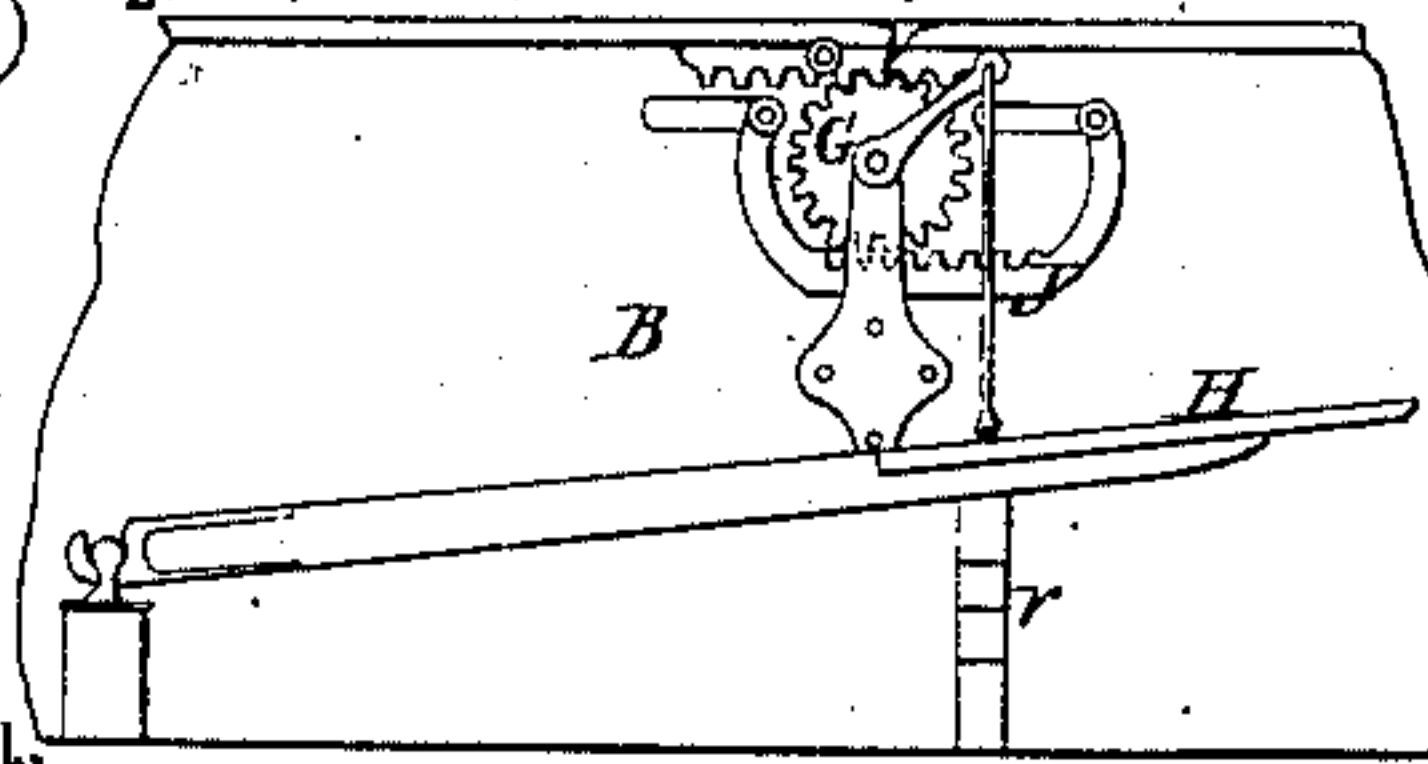


Fig. 4.

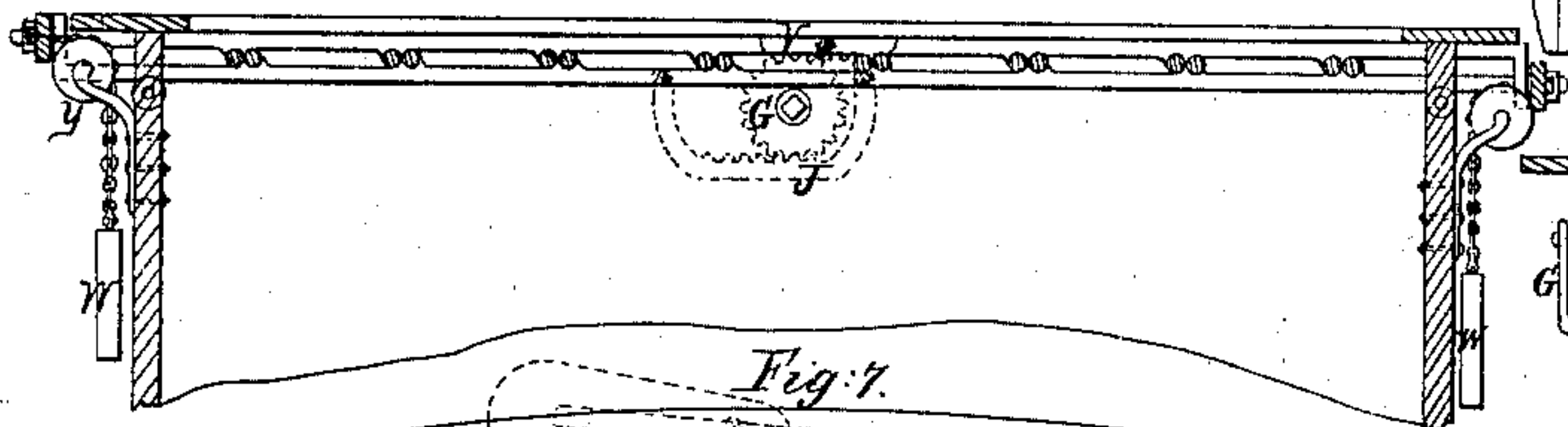


Fig. 6.

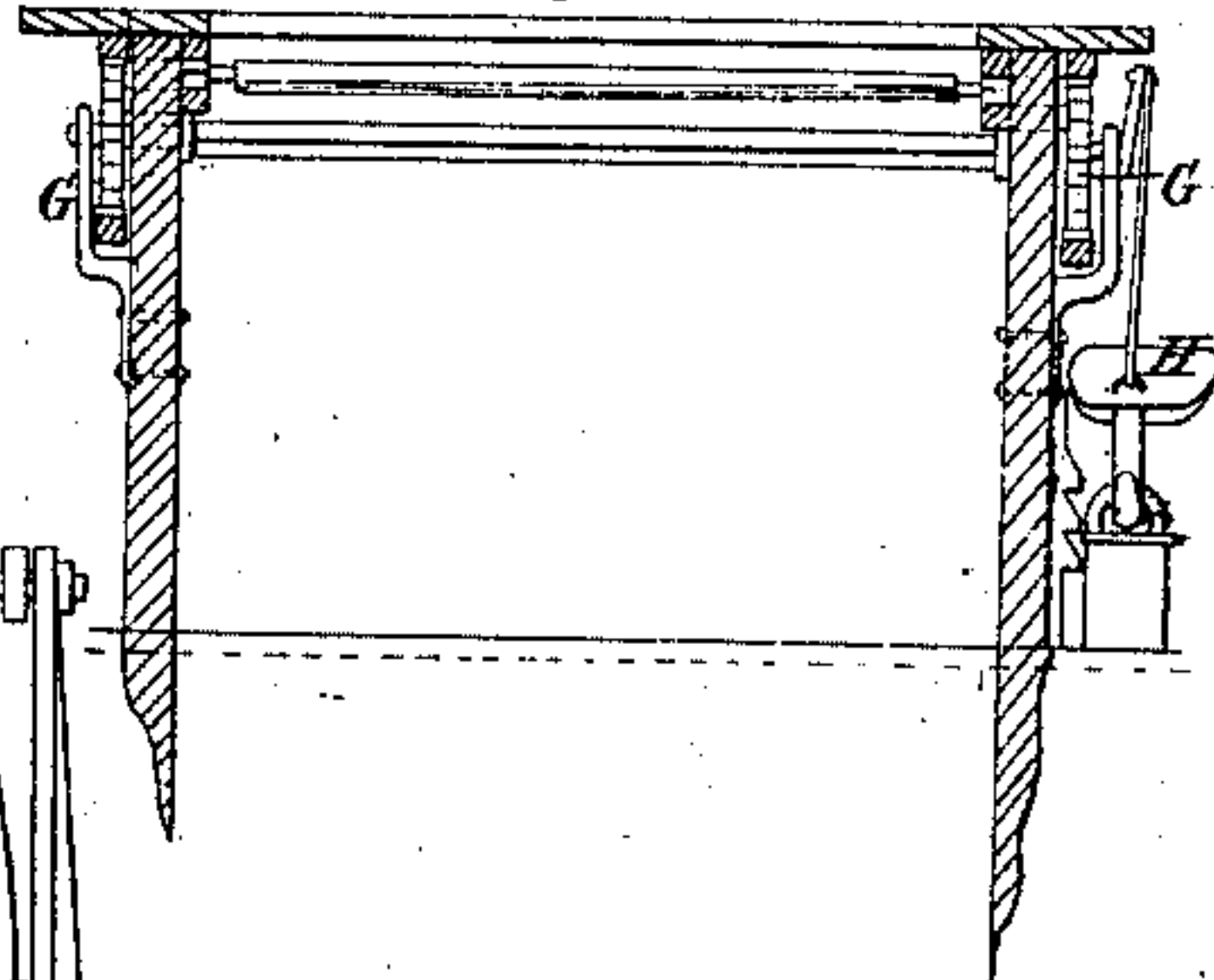
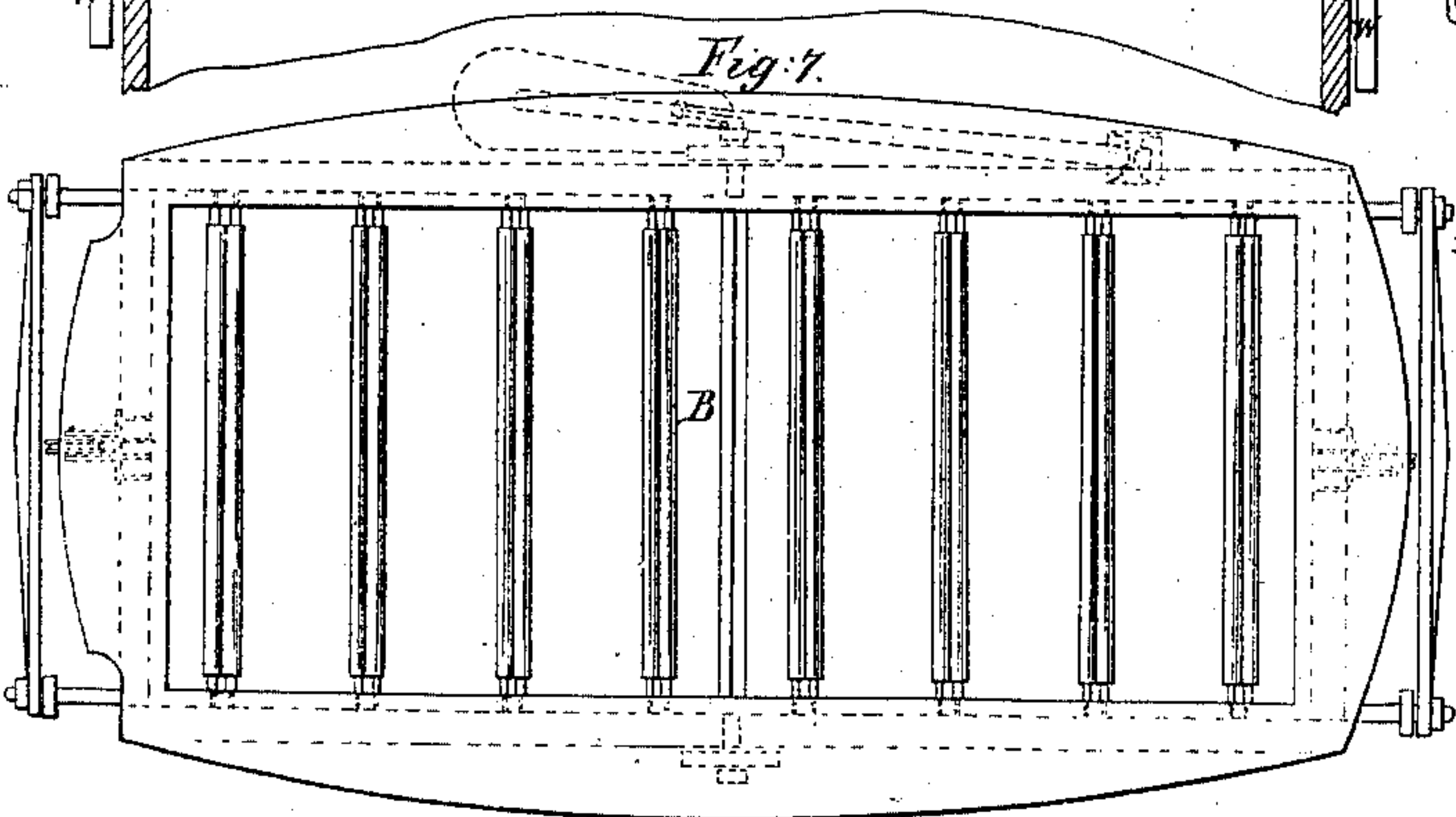


Fig. 7.



UNITED STATES PATENT OFFICE.

J. A. ROTH AND J. LEA, OF PHILADELPHIA COUNTY, PENNSYLVANIA.

MACHINE FOR BLEACHING FLAX.

Specification of Letters Patent No. 10,780, dated April 18, 1854.

To all whom it may concern:

Be it known that we, J. AUGUSTUS ROTH, of the county of Philadelphia and State of Pennsylvania, and JOSEPH LEA, of the same
5 county and State, have discovered a new and useful Mechanical Arrangement for Treating Flax Fiber or Yarn; and we do hereby declare that the following is a full, clear, and exact description thereof, reference be-
10 ing had to the annexed drawings, forming part of this specification, which drawings are hereinafter fully described.

In the manufacture of flax or yarn it has been heretofore customary to bleach the
15 yarn in the woven or manufactured state by boiling the fabric in alkaline solutions and then exposing it successively and for considerable lengths of time to the action of the atmosphere while extended on the grass.
20 This process of bleaching linen goods has been hitherto deemed essential, and been commonly used in the manufacture of flaxen or linen fabrics, and requires numerous boil-
25 ings and repeated washings and handlings and a large area of field or meadow land on which the fabrics may be spread.

Our improvement consists in a mechanical arrangement and process or mode for treat-
30 ing the flax or yarn before it is spun, whereby the flax or yarn fiber may be prepared and bleached while in that state with great economy of time and labor.

In applying our improved mechanical ar-
35 rangement and process, we use the flax or yarn either in the state in which it generally comes to the manufacturer to be spun or in the condition of unrotted fiber, from which the woody parts are first mechanically
40 removed; and we proceed to describe in detail our improved apparatus and the manner or process of using the same so as to enable others skilled in the art to make and use our invention.

Our improvement consists, I, of a series
45 of combs and of a frame to which said combs are attached for the purpose of supporting the flax or yarn and enabling the manufacturer properly to expose the same in an open state to the chemical action of
50 certain solutions; II, of a vat furnished with a series of movable squeeze rollers, arranged and adapted to the frame just mentioned, so that the flax in the fibrous state or the yarn may be exposed to a vibratory motion in said
55 vat and as it is withdrawn be deprived of the

greater portion of the solution absorbed by it.

Plate I, Figure 1, represents the frame and combs forming the first part of our im-
60 provement, being a perspective view of the entire frame. Fig. 1, Plate II, is a longitu-
dinal vertical section of the same and Fig. 6, Plate III, a perspective view of the lower
65 portion of the same frame with the flax or yarn attached. Fig. 2, Plate II, is a trans-
verse vertical section of the same frame. Fig. 1, Plate III, is an enlarged view of one
70 of the combs D, of Fig. 2, Plate II, and Figs. 3 and 4, Plate III, represent a still further enlargement of the several parts of
the combs D of Fig. 2, Plate II.

We construct the first part of our appa-
ratus in the following manner:

C C' C'' C''' (Fig. 1, Plate I) represents
75 a rectangular metal frame—from the opposite sides of which C C' and C'' C''', standards S, S, S, S, extend vertically
downward. These standards extending from one side C, C', are shown in Fig. 1, Plate II. Similar standards extend from C'' C'''. Be-
80 tween each pair of opposite standards, a series of combs D D are placed transversely across, with the teeth pointing upward, as
is shown in Fig. 1, Plate I, and especially in Fig. 2, Plate II, where S S represent a pair
85 of standards and D D D a series of transverse combs. These combs are made of brass, copper or hard wood, and are shaped like
an ordinary straight hair comb. A single
90 comb is shown in an enlarged view at Fig. 1, Plate III.

e represents the back of the comb.

t, t, t, t are a series of metallic or wooden
95 teeth. Upon these teeth the rotted or unrotted flax or yarn is to be suspended by
being bent over at its middle so as to hang with its fibers parallel, straight, and vertical
or nearly so. In front of these teeth a strip
100 *d, d*, is placed working upon a hinge *h*, so as to open and close against the extremities of
the teeth, and thus keep the flax or yarn on the combs after it has been once placed there.

Figs. 3 and 4, Plate III, are vertical sec-
105 tions across two opposite standards and an intermediate comb showing the manner in
which each comb is fixed to the standards; each comb has at one extremity two small
projections *n n* (Fig. 3, Plate III); slots
110 *m m* are made in one of each pair of opposite standards, S. Into these slots the pro-

jections on the end of the comb fit; and on the standard opposite to the slot *m* a spring *k* is placed, which forces the projections of the comb into the slot, and thus each comb is retained in its place. By pressing down the spring, the comb can be readily removed. These combs are placed one above the other at the distance apart of from 2 to 4 inches.

Having thus described the construction of the frame and combs, by which the flax or yarn is supported, we now proceed to describe the manner in which the flax or yarn is to be attached thereto. Each comb is taken from the standards *S, S*; and the strip *d, d*, upon each comb is opened upon its hinge at *h*, and the flax or yarn being bent at its middle, is suspended by the loop thus formed upon the teeth of the comb so that the ends of the flax fiber shall hang down nearly vertical and straight on each side of the teeth. When the combs are thus filled they are replaced in the frame, and the frame and flax or yarn then present the appearance exhibited in Fig. 6, Plate III. The frame is suspended by a hook *x*, to a long cord immediately over the vat, which forms the second part of our improvement. See Figs. 1 and 2, Plate I. The cord is attached above to a hoisting apparatus so that the whole frame can be lowered or raised at pleasure. The object of this first part of our improvement is to obtain a mode of sustaining rotted or unrotted flax or yarn in large quantities so that its fiber may be properly exposed to the action of certain chemical solutions hereafter mentioned without entangling or breaking said fiber. The combs and frame above described have been found by us to attain that end.

The second part of our improvement relates to the construction of the vat into which the flax or yarn when suspended on the combs of the frame is to be immersed. Fig. 2, Plate I, and Fig. 7, Plate III, are perspective views of the vat. Fig. 7, Plate II, is a horizontal top view showing the arrangement of movable squeeze rollers upon the top of the said vat. Fig. 6, Plate II, is a transverse vertical section of the vat. Figs. 3 and 4, Plate II, are longitudinal vertical sections. Fig. 5, Plate II, is an enlarged view of the apparatus for opening and closing the squeeze rollers. This vat is a rectangular trough or box, a little larger in its horizontal section than the corresponding section of the flax or yarn frame above described. It is made of wood and lined with lead or copper so as to be water tight; it is of sufficient depth to allow all the combs of the flax or yarn frame to descend into it, as shown in Figs. 1 and 2, Plate I. At the top or rim of this vat there are two iron sliding frames (shown at Fig. 3, Plate IV) *R R' R''* and *L L' L''*. The two rods or strips *L* and *L''* and the cross piece *L'*

compose one frame, and the rods *R* and *R''* and the cross piece *R'* compose the other frame. On the extremities of the rods *L* and *L''* opposite to the cross piece, sockets *T* and *T'* are formed; through these sockets, the frame *R R' R''* slides; on the extremity of rods *R* and *R''* similar slots are formed, through which the frame *L L' L''* slides. Thus the frames can mutually slide upon each other. To each of these sliding frames a series of transverse rollers is attached so that when the frames are slid together the corresponding rollers on each frame will constitute a series of pairs of squeeze rollers; and when the two frames are slid apart each pair of squeeze rollers will diverge. These rollers turn in small journals placed on their respective frames—they are made of brass, are about one or one and a half inches in diameter, and of sufficient length to extend across the sliding frames. The distance between the pairs of rollers, is made to correspond with the distance between the standards of the flax or yarn frame. These sliding frames with the movable squeeze rollers attached are placed on top of the vat as shown in perspective at Fig. 7, Plate III, and in horizontal top section at Fig. 7, Plate II; and in longitudinal vertical section at Figs. 3 and 4, Plate II. In order conveniently to slide these frames out and in and thus open or shut the squeeze rollers, a chain *Y* is fastened to the cross piece of each sliding frame; each chain passes over a pulley at its end of the vat and is connected to a weight *W*. The operations of these weights is to draw each sliding frame in toward the vat, and thus close the series of squeeze rollers. These frames are slid apart (so as to open the squeeze rollers) by means of a pinion wheel *G* (Plate I, Fig. 2) worked by a lever or treadle *H*, (same figure). This pinion wheel *G* is geared into a straight piece of rack work *V* placed on the under side of one of the sliding frames above mentioned and a similar piece of cog gearing or rack *J* placed on the upper side of an iron loop connected with the other sliding frame as is fully shown in Fig. 5, Plate II. The cog wheel *G* fits into and operates at the same time both the racks *V* and *J*. The cog wheel is rotated by the prolonged arm and the treadle *H*. The effect of the depression of the treadle is to rotate the cog wheel *G* and thus to separate the squeeze rollers of each pair. The treadle *H* fits into a rack or ratchet *v*, so that the sliding frames and the rollers can be retained in any desired position. An enlarged view of the cog gearing and treadle is shown at Fig. 5, Plate II; and a transverse section of the vat, sliding frames, and cog gearing is shown at Fig. 6, Plate II.

In preparing and bleaching rotted or unrotted flax or yarn, we make use of 7 vats

each constructed and arranged like vat B. One of these vats contains an alkaline lye which is kept boiling by the admission of steam at the bottom of the vat; the second
 5 vat contains clean water, kept clean by constant circulation; the third vat contains dilute sulfuric acid; the fourth vat contains chlorid of lime in solution, the fifth vat contains dilute sulfuric acid; the sixth vat
 10 contains a solution which we call antichlorin; the mode of preparing which is fully described in the specification of a patent granted to J. Augustus Roth, October 4, 1853. The seventh vat contains water,
 15 which may be kept warm.

Having described the vat and its arrangement of squeeze rollers, we now describe its mode of operation. The flax or yarn frame with the flax or yarn attached having been
 20 suspended over the vat as before described, the treadle is depressed so as to separate the squeeze rollers—the flax or yarn frame is then caused to descend by the hoisting apparatus so that the combs shall pass down
 25 between the squeeze rollers as shown at Plate I until the flax or yarn is entirely immersed. The frame is then kept moving up and down in the vat in order that the flax or yarn may be brought into more intimate
 30 contact with the solution in the vat and so that the solution may be made to act thoroughly on every part of the fiber. All this time the squeeze rollers are kept separate. When the fiber has been sufficiently
 35 acted upon the frame is entirely withdrawn. As the frame is drawn out, the treadle is released from the rack and the squeeze rollers being forced together by the weights W

the flax or yarn is deprived of the greater part of the solution which it had absorbed. 40
 The flax or yarn frame having been thus withdrawn from the vat B filled with the first of the solutions above specified, is transferred to a second vat precisely like the first, but filled with the clean water as above 45
 specified. It here undergoes the same alternate raising and lowering motion and the same final squeezing and is in turn transferred to the third vat and so on.

Although our improvements above described are intended chiefly for preparing 50
 and bleaching the rotted or unrotted flax or yarn fibers, yet it is obvious they can also be used for dyeing the fibers of any sort, the dyeing solutions in that case being 55
 substituted for the bleaching and chemical solutions.

Having thus described our improvements, what we claim and desire to secure by Letters Patent is— 60

1. The employment of a series of combs for the purpose of sustaining the fibers constructed and arranged in the manner substantially as is herein described.

2. The flax or yarn frame and method of 65
 arranging the combs in combination therewith, substantially as hereinbefore described.

3. The combination of flax or yarn frame and vat substantially as hereinbefore described. 70

J. AUGUSTUS ROTH.
 JOS. LEA.

Witnesses:

JNO. EYRE SHAW,
 CHARLES D. FREEMAN.