

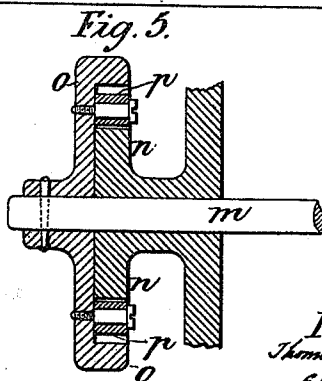
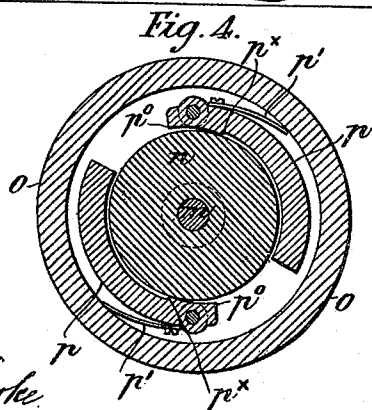
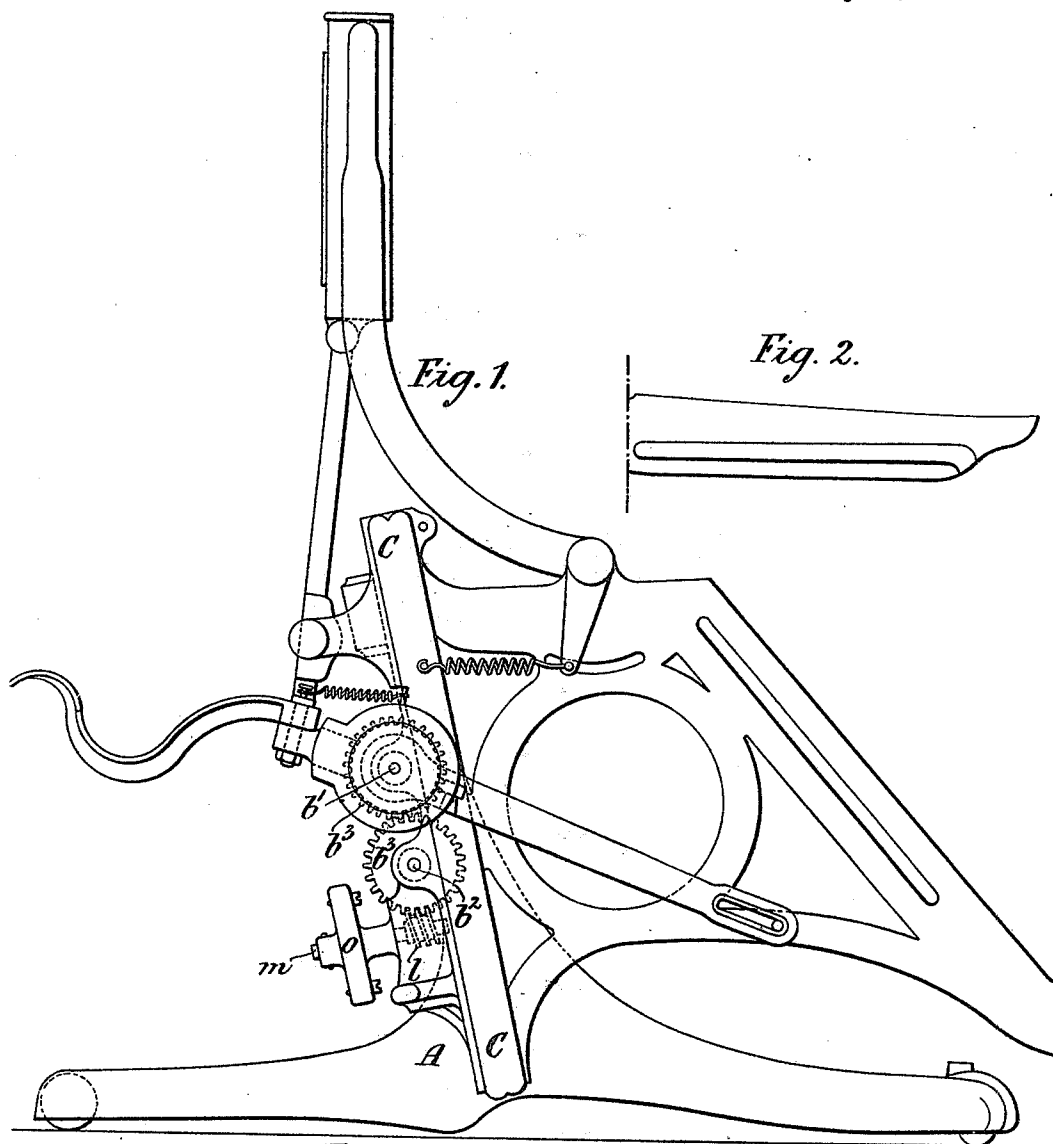
(No Model.)

3 Sheets—Sheet 1.

T. H. & E. GARDNER.
RETAINING OR LOWERING APPARATUS.

No. 519,110.

Patented May 1, 1894.



Witnesses
A. H. Miller
C. W. Brooke

Inventors
Thomas H. Gardner
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Edward Gardner
By their Attorneys
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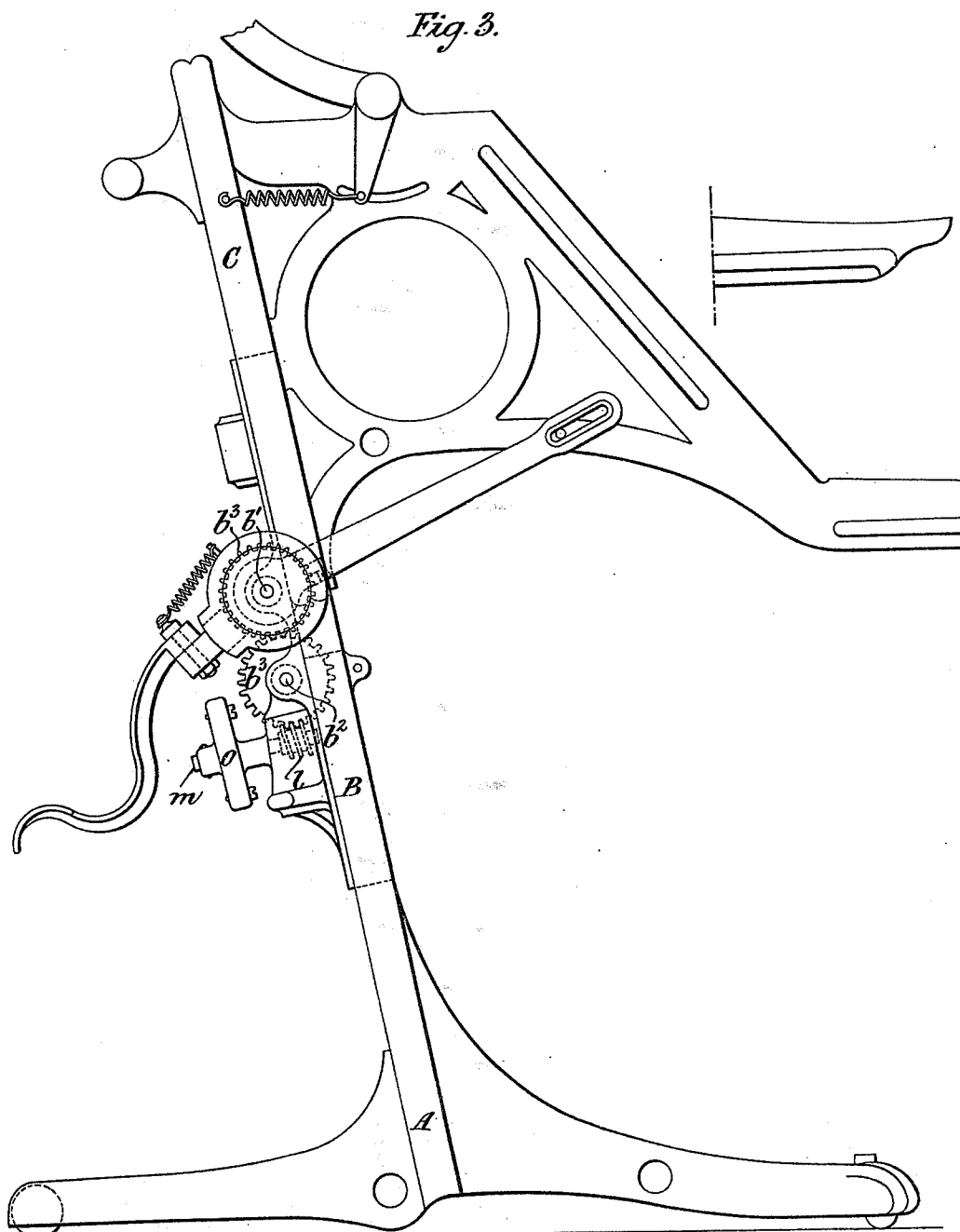
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3 Sheets—Sheet 2.

T. H. & E. GARDNER.
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(No Model.)

3 Sheets—Sheet 3.

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Fig. 7.

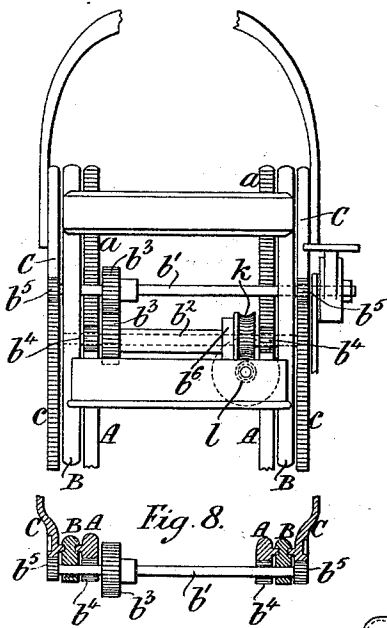


Fig. 6.

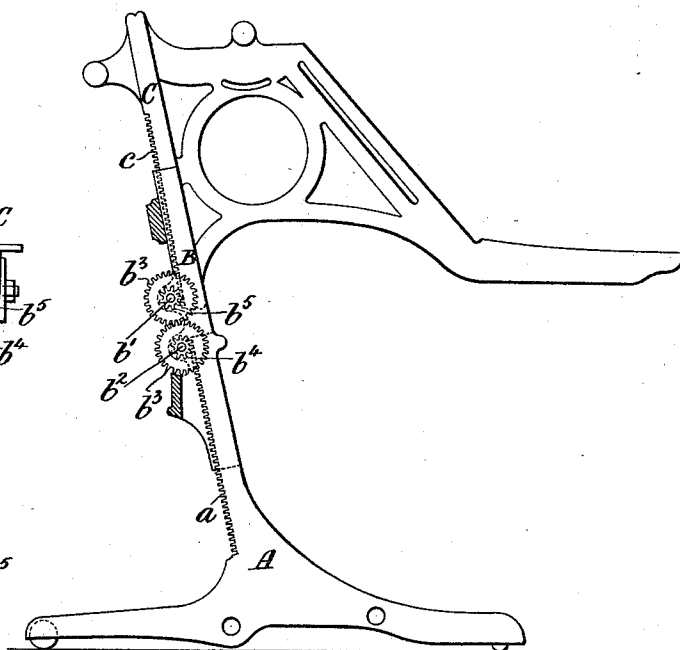


Fig. 8.

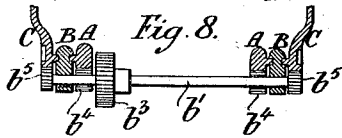
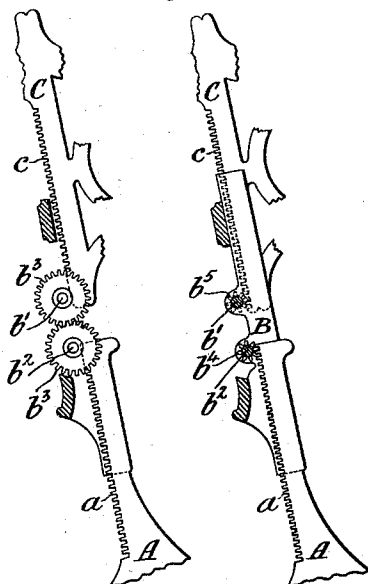


Fig. 9.

Fig. 10.



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UNITED STATES PATENT OFFICE.

THOMAS HARRY GARDNER AND EDWARD GARDNER, OF MANCHESTER,
ENGLAND.

RETAINING OR LOWERING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 519,110, dated May 1, 1894.

Application filed November 20, 1893. Serial No. 491,424. (No model.) Patented in England August 11, 1892, No. 14,508, and in France December 26, 1892, No. 226,674.

To all whom it may concern:

Be it known that we, THOMAS HARRY GARDNER and EDWARD GARDNER, engineers, subjects of the Queen of Great Britain, both residing at Hadfield Street, Cornbrook, Manchester, England, have invented certain new and useful improvements in retaining or lowering apparatus applicable to dental and other chairs and to other uses, (for which we have received Letters Patent in Great Britain, No. 14,508, dated August 11, 1892, and in France, No. 226,674, dated December 26, 1892,) of which the following is a specification.

This invention relates to a dental chair such as is described in the specification of our former patent, dated July 26, 1892, No. 479,415, and has for its object improved mechanism applicable to lowering the chair seat.

In the dental chair to which the invention is applicable there is a fixed chair standard; an intermediate moving part sliding on the fixed standard up and down, and an upper moving part sliding upon the intermediate part and carrying the chair seat. These parts are in all respects as described in our said former patent. On the intermediate part two shafts geared together are provided and on the shafts are toothed wheels. These wheels engage with racks upon the chair standard and upon the upper moving part. The lowering of the chair seat is controlled by a wheel which is geared with the descending parts. On the wheel are frictional locking levers which are held by springs against a stationary cylindrical surface. The friction thus established is sufficient to prevent movement. If however the wheel be rotated by the hand, centrifugal force removes the locking levers from the stationary surface. If the speed of descent tends to become excessive the centrifugal force causes a further movement of the locking levers and this movement brings them again into contact with the cylindrical surface and again friction is caused which checks the descent of the weight. When the rotation of the wheel is checked by the hand, the mechanism comes to rest.

Figure 1 of the annexed drawings is a side elevation of a dental chair constructed in accordance with our invention. The seat in

this figure is represented in its lower position. Fig. 2 is a view of the foot rest. Fig. 3 is a side elevation of the same chair with the seat in its raised position. The back of the chair is not represented in this figure. Figs. 4 and 5 are sectional views of parts of the lowering gear. Figs. 6 to 10 are intended to illustrate, by detail views, the telescopic framing of the chair. Fig. 6 is a sectional elevation. Fig. 7 is a rear elevation. Fig. 8 is a horizontal section; and Figs. 9 and 10 are vertical sections.

A is the fixed chair standard. B is the intermediate standard or moving part sliding on the fixed standard up and down; and C is the upper moving part sliding upon the intermediate part and carrying the chair seat. These three parts are so geared by racks and pinions, that, for every increment of rise given to B, the intermediate part, the upper part C rises a corresponding increment in relation to the intermediate part. Consequently, in relation to the fixed standard, the upper moving part C rises and falls twice as fast as the intermediate moving part B. To this end the part A has rack teeth upon it at *a a* and the part C at *c c*. The intermediate part carries two parallel spindles *b' b²*, which are geared together by the wheels *b³ b³*, and carry pinions *b⁴ b⁴*, *b⁵ b⁵*, engaged with the racks *a* and *c*, respectively.

The descent of the chair seat is prevented by the worm wheel *k*, (Fig. 7,) which engages with and is locked by the screw or worm *l*. The worm wheel *k* is not fast upon the spindle *b²*, but is connected with a clutch *b⁶*, which permits the spindle *b²* to turn without the wheel *k*, as the chair seat rises, but compels the wheel to turn with the spindle while the chair seat descends. The details of this clutch may be of any approved construction, such, for instance, as shown in our patent above referred to. The teeth of the worm wheel and the worm are so inclined that, when left free, the worm will revolve and allow the load to run down. This however is prevented by the mechanism shown by Figs. 4 and 5. *m* is the axis of the worm; it passes through the stationary cylindrical boss *n* and has keyed upon it the hand wheel *o*. Pivoted upon or within the hand wheel are the centrifugal

locking levers p p and springs p' p' fixed to the levers and abutting upon the flange of the wheel, press the locking levers inward so that the shoulders p^x p^x upon the levers bear upon the cylindrical surface of the boss n . The resistance thus offered is sufficient to prevent the wheel o being started from rest by any pressure brought upon the worm through the worm wheel, nevertheless the wheel can readily be turned by hand and then the centrifugal force moves the locking levers outward sufficiently to lift the shoulders p^x p^x from the surface of the boss n ; consequently movement once started continues until the chair is run down or the wheel o is stopped by the hand. If the speed should tend to accelerate unduly, the centrifugal force so far overpowers the springs p' p' that the shoulders p^0 p^0 at the extremities of the locking levers p are brought to bear upon the boss n and to offer a resistance by which the acceleration is checked.

We claim as our invention—

1. The retaining and lowering gear herein described comprising a movable section or part to be raised, a shaft m , a worm upon it gearing into a worm wheel which is geared with the part to be raised or lowered, a wheel fast upon the shaft, weighted brake pieces pivoted upon the wheel, a stationary cylindrical surface for the brake pieces to act against when the wheel is revolved too fast, and springs acting upon the brake pieces to hold them against a stationary cylindrical surface when the wheel is at rest and prevent any movement being given to the shaft through the gearing.

2. The retaining and lowering gear herein described comprising a movable section or part to be raised, a shaft m , a worm upon it gearing into a worm wheel which is geared with the part to be raised or lowered, a wheel fast upon the shaft, weighted brake pieces pivoted upon the wheel, and springs acting

upon the brake pieces to hold them against a stationary cylindrical surface when the wheel is at rest and prevent any movement being given to the shaft through the gearing.

3. The combination of the stationary and movable sections of the chair, a shaft mounted on one of the sections and geared with the other sections, a flanged wheel secured to the shaft, brake pieces pivoted to the wheel, springs operating upon the brake pieces, and a stationary boss having a cylindrical surface with which the brake pieces are adapted to engage both when the wheel is at rest and when it is revolved at too high a speed, substantially as described.

4. The retaining and lowering gear herein described comprising the part to be raised or lowered, a shaft having upon it a worm geared with the part to be raised or lowered, a wheel secured to the shaft, weighted brake pieces pivoted to the wheel, a stationary cylindrical surface for the brake pieces on one side of their pivots to act against when the wheel is revolved too fast, and springs acting upon the brake pieces to cause them to act on the opposite side of their pivots, upon the stationary cylindrical surface when the wheel is at rest.

5. The retaining and lowering gear herein described, comprising the part to be raised or lowered, a shaft geared with the part to be raised or lowered, a wheel secured to the shaft, weighted brake pieces pivoted to the wheel, springs operating upon the brake pieces, a boss having a cylindrical surface with which the brake pieces are adapted to engage on either side of their pivots, substantially as described.

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