

No. 640,786.

Patented Jan. 9, 1900.

A. W. MATHEWSON.

WEIGHT LIFTING DEVICE FOR RAILWAY HEADS OR OTHER FIBER DRAWING MACHINES.

(Application filed June 8, 1899.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

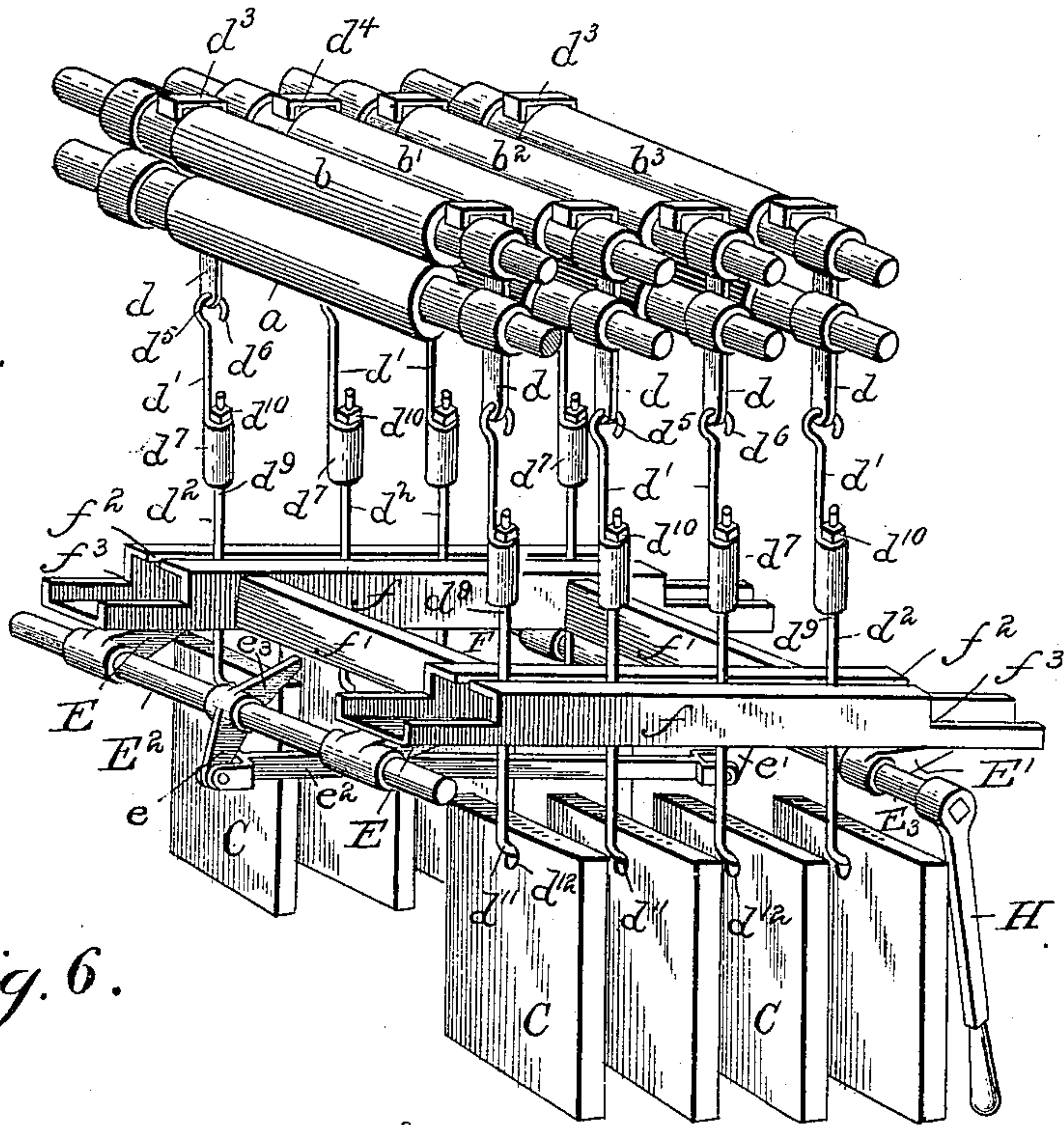


Fig. 6.

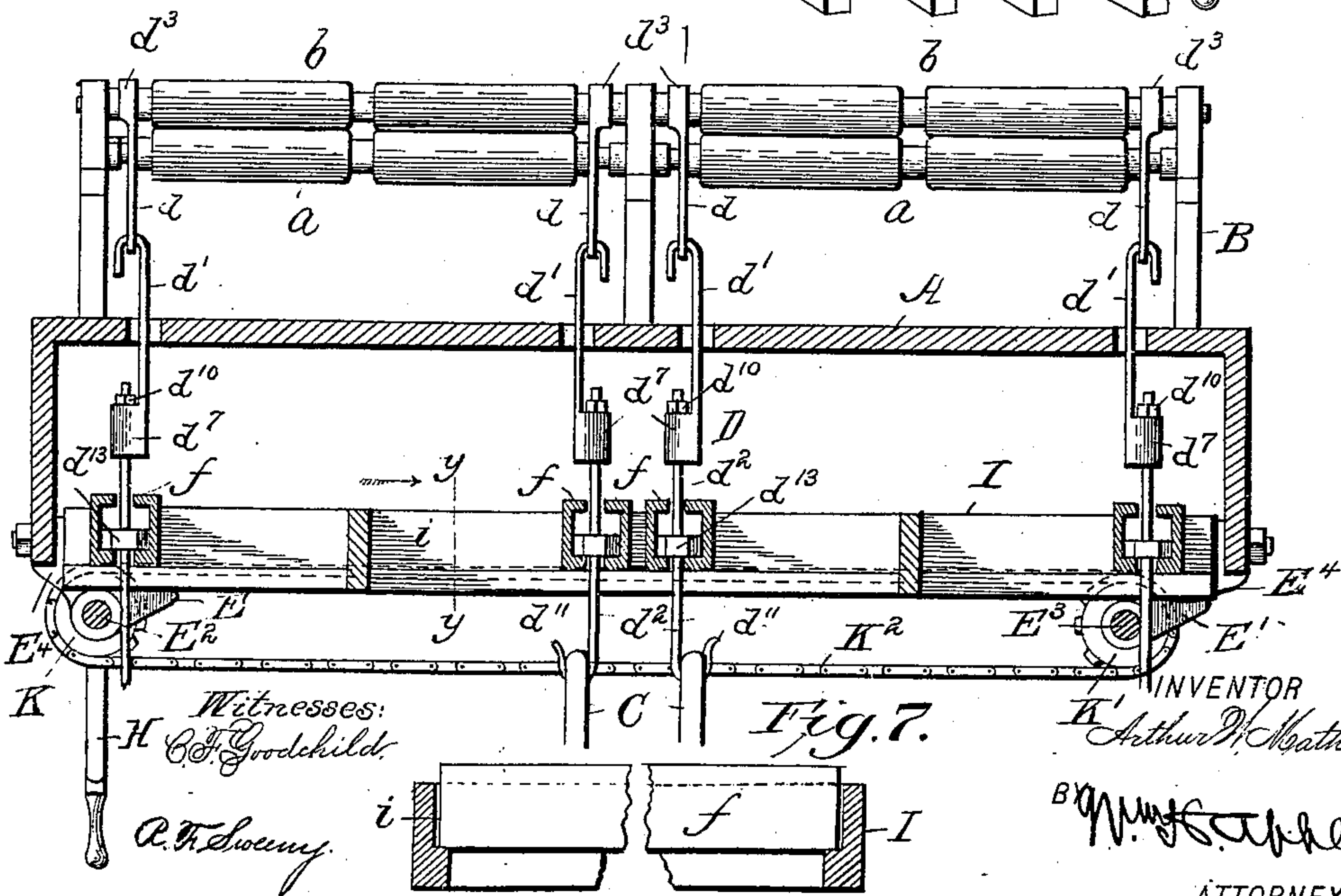


Fig. 7.

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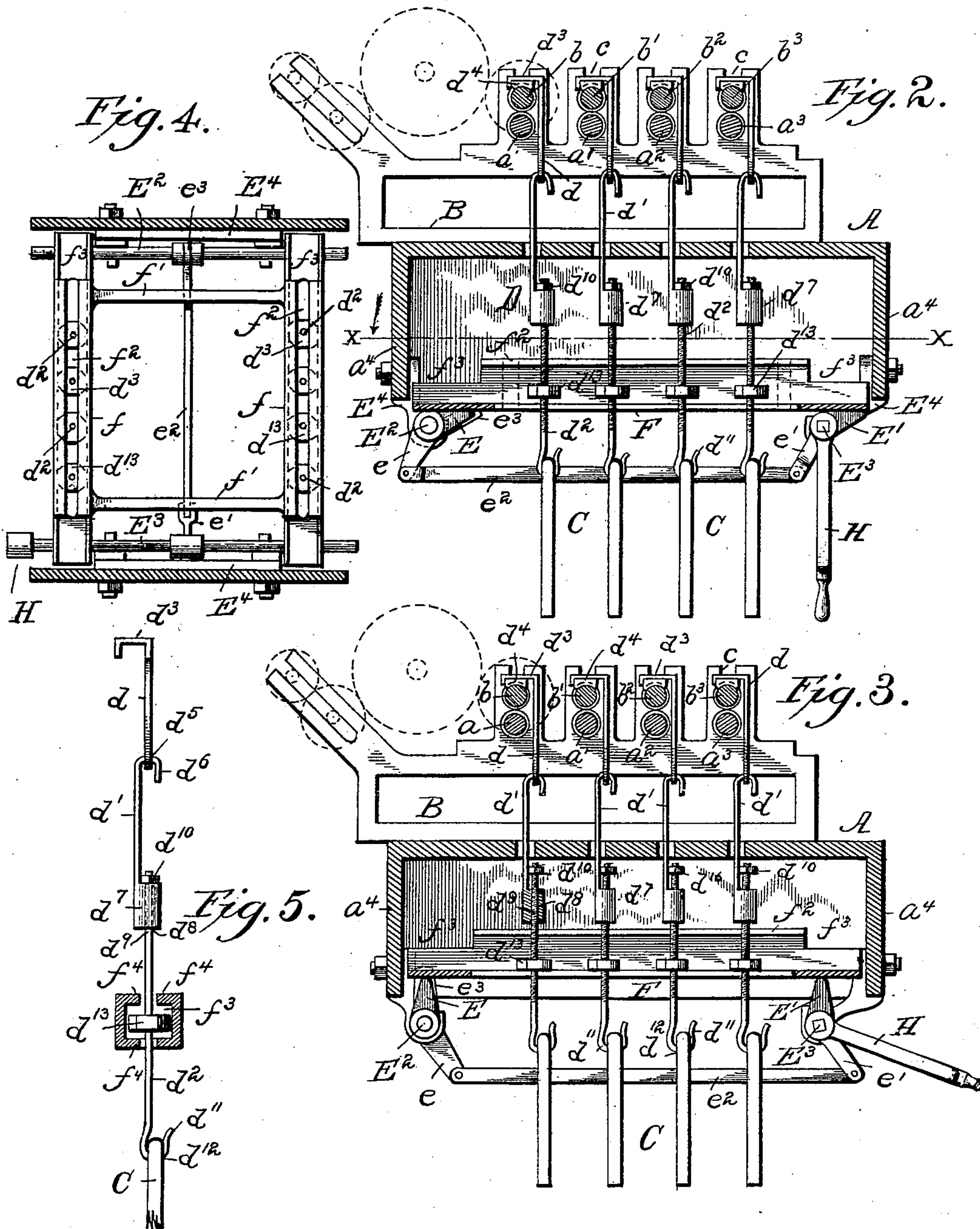
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WEIGHT LIFTING DEVICE FOR RAILWAY HEADS OR OTHER FIBER DRAWING MACHINES.

(Application filed June 6, 1899.)

(No Model.)

2 Sheets—Sheet 2.



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# UNITED STATES PATENT OFFICE

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WEIGHT-LIFTING DEVICE FOR RAILWAY-HEADS OR OTHER FIBER-DRAWING MACHINES.

SPECIFICATION forming part of Letters Patent No. 640,786, dated January 9, 1900.

Application filed June 6, 1899. Serial No. 719,526. (No model.)

*To all whom it may concern:*

Be it known that I, ARTHUR W. MATHEWSON, a citizen of the United States, and a resident of Lewiston, in the county of Androscoggin and State of Maine, have invented certain new and useful Improvements in Weight-Lifting Devices for Railway-Heads or Other Fiber-Drawing Machines, of which the following is a specification.

10 In railway-heads and other machines that are made use of in the transformation of cotton and other fiber into yarn a series of pairs of drawing-rolls are employed, which are severally made up from an underfluted metallic  
15 roll and a cooperating upper fellow roll, which in most instances is covered with leather or other suitable material and in other instances is left uncovered and provided with flutes in substantially the same manner as the under  
20 rolls. As thus arranged, the fiber or other material to be treated is passed through the series between the upper and under rolls of the several pairs, which in order to elongate, and thereby reduce the size of the same to  
25 the requisite degree, are so connected with one another or to their driving mechanism that the several pairs are rotated at a progressively-increasing speed from the rear pair, where the material enters between them, to  
30 the front pair, where it emerges after having been drawn and attenuated thereby. The object and purpose of these rolls being thus to elongate and distend the material, it is obvious that to gain the proper hold upon the latter  
35 it is necessary that the rolls of each pair be pressed together with some considerable pressure, and to this end weights are usually employed, which are caused to exert the force of their gravity upon the upper of such rolls  
40 through appropriate saddles or bearings and suspending-rods, with the consequent effect of pressing the top rolls firmly against the bottom rolls, which to resist such pressure are mounted in fixed and unyielding bearings. In some  
45 instances where these weights are employed and the number required is large it is essential that their size be reduced as much as is possible, and in these cases the action of their gravity upon the rolls is multiplied through  
50 the intermediary of levers, which are interposed between the weights and the suspending-rods that cooperate with the roll saddles

or bearings. In other instances it is found desirable to dispense with these levers and employ weights of the proper size to exert  
55 the required pressure upon the top rolls without the employment of those devices, and this arrangement is especially desirable in railway-heads, drawing-frames, and various of the other machines that are employed to draw  
60 and reduce the size of the material in the earlier stages of its transformation. When, however, this arrangement is employed, the size and gravity of the weights are considerable, and difficulty is experienced in lifting  
65 them, as is necessary when the rolls are to be removed, and which is a necessity that frequently occurs. To provide for raising and lowering these and the other weights under  
70 their different arrangements, various means have been devised; but these, while serving to effect the desired result when in proper adjustment, are extremely liable to become disarranged, and when so disarranged their efficiency becomes impaired and difficulty is  
75 experienced in restoring them to their proper adjustment. To remedy these defects and provide simple and convenient means for raising and lowering the drawing-roll weights of the various classes of machines mentioned  
80 are the objects of my invention; and to these ends the invention consists, first, in the employment, in connection with the weight-suspending rods having nuts or lugs thereon, of a lifting-frame, through which these rods are  
85 passed and which engages with the nuts or lugs thereon, and means whereby this frame may be raised and lowered when required; second, in the peculiarities of construction of the weight-suspending rods, and, third, in  
90 various other constructions and combinations of parts, all of which will be hereinafter more fully described.

Referring to the accompanying drawings, which form a part of this specification, Figure  
95 1 is an isometric projection of the drawing-rolls and weights of a railway-head detached from the machine with my invention applied in connection therewith; Fig. 2, a transverse vertical section of the upper portion of a railway-head with my invention applied thereto  
100 and with the parts in the positions they occupy when the weights are suspended from the rolls; Fig. 3, a similar view of the same



parts, but showing the weights raised to their highest position and the other elements co-operating therewith in the positions they respectively occupy when the weights are thus raised; Fig. 4, a transverse sectional plan thereof, taken in the plane  $x x$  of Fig. 2 and looking downward; Fig. 5, a side and edge elevation, respectively, of one of the weight-suspending rods and of one of the weights with a portion of the lifting-frame which co-operates therewith shown in transverse vertical section; Fig. 6, a vertical longitudinal section of the upper portion of a drawing-frame, showing my invention applied thereto in a slightly-modified form; and Fig. 7, a vertical sectional elevation of certain of the parts shown in Fig. 6, taken in the plane  $y y$  of that figure.

In all the figures like letters of reference are employed to designate corresponding parts.

In Figs. 1, 2, 3, and 4, A indicates the top or table of a railway-head, and  $a a' a^2 a^3$  and  $b b' b^2 b^3$  the bottom and top rolls, respectively, by means of which the material passing through the machine is drawn and attenuated. These rolls are arranged in pairs, with a bottom and top roll in coöperation, and are supported with one pair behind the other upon the top or table A by stands B, which are provided in their upper edges with open-top bearings  $c$  for the reception of the roll-journals, which are arranged therein. In the drawings I have shown only a single one of these stands B; but in practice it is duplicated, whereby to afford a bearing for the rolls at each end thereof, as is well understood. The several pairs of drawing-rolls being thus disposed are rotated at progressively-increasing speeds from the pair between which the material enters the machine to that from which it emerges, and in order to insure of the proper hold being taken upon it by them to effect the required draft or distension thereof the top rolls  $b b'$ , &c., are held pressed against their coöperating bottom rolls  $a a'$ , &c., by weights C, which are suspended therefrom, all as is common to railway-heads as heretofore constructed and require no further description herein. Instead, however, of availing of a rod of the form of that hitherto employed for suspending the weights C from their respective top rolls I make use of a rod D, which is composed of three several sections  $d, d',$  and  $d^2$ , as follows: The first or top section  $d$  is, as is the case with the remaining sections, made from an appropriately-shaped bar or rod of any suitable material, with its upper end  $d^3$  constructed for engagement directly with the journal of the roll or with a saddle or other bearing  $d^4$ , that rests thereon, while its lower end is provided with an eye  $d^5$ , with which engages the hooked or overturned upper end  $d^6$  of the second or intermediate section  $d'$ . The upper end of this latter section being thus provided with a hooked or overturned portion  $d^6$ , its lower end is constructed with

an enlarged or overturned portion  $d^7$ , through which is formed longitudinally of the section an orifice  $d^8$ , in which is received and loosely arranged the upper straight portion  $d^9$  of the third or bottom section  $d^2$ , whereby to be free to rotate therein. As thus disposed the upper extremity of this last-mentioned section is provided with a nut or other enlargement  $d^{10}$ , threaded or otherwise secured thereon, whereby to prevent its withdrawal from the orifice  $d^8$  when in use or otherwise, while its lower end is equipped with a suitable hook  $d^{11}$ , through which to engage with an appropriate eye  $d^{12}$  in the weight C, as shown. The rod D, being constructed as thus described, engages at its upper end with the journal of its appropriate roll, either directly or through the intermediary of a saddle or bearing  $d^4$ , and connects at its lower end with the weight C, thereby suspending the latter from the former, and in consequence of the loose arrangement of the upper end of the section  $d^2$  in the orifice  $d^8$ , which allows of its ready rotation therein, it permits of the detachment of the weight from and its attachment to its respective roll as often as desired without the liability of altering the adjustment of the rod or changing its length. The weights C being suspended as above explained, it is obvious that in order to detach them from and attach them to their appropriate rolls when the latter are to be removed or replaced or otherwise it is necessary that these weights be raised and lowered. When small and light—as, for instance, when designed for use in a spinning-machine—this raising and lowering operation may be effected by hand. On the contrary, when these weights are large and heavy, as when designed for use in a railway-head and various of the other machines made use of in the earlier stages of the transformation of the material, then it is difficult and impracticable to so manipulate them, and mechanism for that purpose becomes necessary.

The mechanism for effecting the raising and lowering of these weights may be of various forms. I prefer, however, to make use of the cams E and E' for the purpose and to communicate the required motion therefrom to the weights through the intermediaries of a frame or spider F and suitable connections. These cams are preferably constructed of the form shown in the drawings, and are carried by the shafts  $E^2$  and  $E^3$ , to which they are respectively secured and which are rotatably supported from the under side of the top or table A at the proper distance apart by hangers  $E^4$ , being operatively connected, whereby to be caused to rotate in unison by arms  $e$  and  $e'$ , with which they are respectively provided, and a suitable connecting-rod  $e^2$ , extending between the extremities of these arms, to which its ends are respectively jointed. The cams E and E', being thus mounted support the frame or spider F, which rests thereon. This frame or spider is composed of the longitudi-



nal bars  $f$  and transverse bars  $f'$ , extending between them. The bars  $f$  are preferably made of a length to extend across over the cams from one of the depending flanges  $a^4$  of the top or table A to the other, whereby to be guided in their vertical movements and held from longitudinal travel thereby, and are severally constructed with a vertical longitudinal slot  $f^2$  for the reception of the suspension-rods D, which pass down through them, being held at the proper distance apart for that purpose by the bars  $f'$ , which are rigidly jointed at their ends thereto or made integral therewith, as desired. As thus constructed a rising-and-falling movement may be imparted to this frame or spider from the cams, upon which its bars  $f$  rest, by imparting to the cams an oscillating motion forward and backward, and in order to communicate this rising-and-falling motion to the weights C, I provide each of the suspension-rods D with an enlargement  $d^{13}$ , with which the frame or spider engages when raised, but from which it is disengaged when lowered below a certain limit. In some instances these enlargements  $d^{13}$  may be made in the form of a collar and be arranged wholly above the bars  $f$ . I prefer, however, to make them in the form of nuts, which are threaded upon their respective rods, whereby to be adjustable up and down thereon, and to arrange them in chambers  $f^3$ , formed by grooving the vertical walls of the slots  $f^2$ , whereby to form flanges  $f^4$  both above and below them. The form of these nuts when employed may be varied to suit the desires of the constructor; but of whatever form constructed they will preferably be made of a size to extend across from one side of the chamber to the other, whereby to be firmly held thereby from turning when the section  $d^2$  of their respective rods D is being rotated to effect the required up or down adjustment of the rod therein. With the sections  $d^2$  of the several suspension-rods D thus equipped and arranged in the slots  $f^2$  of the bars  $f$  the rising and falling movements of the frame or spider F will be communicated thereto, and thus by simply oscillating the cams E and E' first in one direction and then in the other the raising and lowering of the weights C may be effected. The means whereby the oscillation of these cams is effected may be modified in various ways. In my preferred form of construction, however, it consists of an arm H, which is secured to the end of one of the cam-supporting shafts—as, for instance, E<sup>3</sup>.

When the frame or spider F is in its lowest position, the cams E and E' are so turned as to bring the portions thereof which have the least radius beneath the bars  $f$ , and in this position it is free from engagement with the enlargement or nut  $d^{13}$  on the suspension-rods D, and the weights C are then suspended wholly from their respective top rolls, as shown in Fig. 2. When, on the other hand, this frame or spider F is in its highest position,

then these cams are so turned as to bring the portions thereof of greatest radius beneath said bars, and in this position the flange  $f^4$  at the bottom of the chamber  $f^3$  is engaged with the enlargements or nuts  $d^{13}$  on the rods D, with the sections  $d^2$  thereof forced upward through the orifices  $d^8$  in sections  $d'$ , to which positions they have been carried by the upward movement of such frame or spider, and the weights C are suspended wholly therefrom, as illustrated in Fig. 3. In this position the saddle or other bearings at the upper ends of the sections  $d$  may be removed from the top rolls and the latter then removed or replaced, as may be desired, and in order to lock the frame or spider F in its highest position and prevent of its being accidentally lowered therefrom I provide one of the cam-supporting shafts—as, for instance, E<sup>2</sup>—with a projection or arm  $e^3$ , that contacts with one of the depending flanges  $a^4$  of the top or table A or with one of the hangers E<sup>4</sup> when the portions of the cams having the greatest radius have in the rotation of the cams been carried under the bars  $f$  slightly beyond a vertical plane passing through the axis of their supporting-shaft.

In addition to being guided and prevented from undue longitudinal movement over the cams E and E' by the depending flanges  $a^4$  of the top or table A, it is desirable that the frame or spider F be guided and prevented from lateral movement along the same. The means adopted for this purpose may be of various forms. I prefer, however, to make use of the hangers E<sup>4</sup> for the purpose, and to this end I construct them of such a width as permits of their extending downward between the bars  $f$  of the frame or spider F and just contact with their inner sides. By this arrangement the hangers allow of the frame or spider sliding up and down in contact with their edges and of being positively guided thereby from any lateral displacement.

While in the foregoing the description has been confined more or less to the invention as applicable to a railway-head or other machines of a kindred character, in Figs. 6 and 7 I have illustrated it as applied to a drawing-frame, upon which I likewise design to employ it. In these figures the top or table A, the stands B, the bottom drawing-rolls  $a$ , the top drawing-rolls  $b$ , the weights C, the suspending-rods D, composed of the three several sections  $d$   $d'$   $d^2$  and provided with the enlargement or nuts  $d^{13}$ , the cams E and E', the shafts E<sup>2</sup> and E<sup>3</sup>, the bars  $f$ , the hangers E<sup>4</sup>, and the arm H are or may be all the same in construction and operation as the corresponding parts shown in the remaining figures and differ therefrom only in that a number of lengths or sections of the drawing-rolls are shown arranged end to end on the same top or table, with each length or section provided with its appropriate cooperating parts. The bars  $f$  of the frame or spider F, on the



other hand, instead of being joined by transverse bars  $f'$  and resting directly upon the cams  $E$  and  $E'$  are made separate and are supported by a frame  $I$ , which rests thereon and extends throughout the length of the machine, being provided in its upper side with a channel  $i$ , in which the several bars  $f$  are all arranged at the proper distance apart transversely of the same. The same is true respecting the means for operatively connecting the cam-operating shafts  $E^2$  and  $E^3$ , which, instead of involving the arms  $e$  and  $e'$  and the connecting-rod  $e^2$ , includes the sprocket-wheels  $K$  and  $K'$  and a sprocket-chain  $K^2$ , extending over them; but such arms and connecting-rod may be employed in lieu thereof, if desired, as is the case with the sprocket wheels and chain in lieu of the arms and connecting-rod when the invention is applied to a railway-head. By this latter, as with the former, construction the raising and lowering of the weights  $C$  for all of the top rolls of the machine may be effected at the same time by simply oscillating the cams  $E$  and  $E'$  in one and then in the other direction, which may be accomplished through the instrumentality of the arm  $H$ , secured to the shaft  $E^2$ . It will thus be seen that I produce simple and efficient means for not only suspending the weights from the top rolls of a railway-head, drawing-frame, and other kindred machines, but also for raising and lowering them when the removal and replacement of the rolls are required or otherwise.

Although in the foregoing I have described the best means contemplated by me for carrying my invention into practice, I wish it distinctly understood that I do not limit myself strictly thereto, as it is obvious that I may modify the same in various ways without departing from the spirit thereof.

Having now described my invention, and specified certain of the ways in which it is or may be carried into effect, I claim and desire to secure by Letters Patent of the United States—

1. A weight-suspending rod for railway-heads and other fiber-drawing machines composed of a plurality of longitudinal sections of which one of these sections is connected with the adjoining section by a rotatable joint, the elements of which are constructed with free and unobstructed cooperating bearing-surfaces that permit of the one being rotated around the axis of the other when the rod is in place upon its appropriate head or machine, without altering or changing the length of such rod, substantially as described.

2. A weight-suspending rod for railway-heads and other fiber-drawing machines composed of three several sections, of which the top and bottom sections thereof are adapted for connection with the journal of the top roll, and with the weight, respectively, and the bottom section is swiveled in the intermediate section by a rotatable joint, the ele-

ments of which are constructed with free and unobstructed cooperating surfaces that permit of the one being rotated around the axis of the other when the rod is in place upon its appropriate head or machine, without altering or changing the length of such rod; substantially as described.

3. The combination, with the roll-weights of a fiber-drawing machine, and the suspending-rods therefor provided with nuts threaded thereon, of a frame having bars that are provided with longitudinal slots through which the suspending-rods are passed, and with recesses for reception of the nuts, whereby the extent of independent movement of the frame with respect to such nuts may be adjusted, substantially as described.

4. The combination, with the weight-lifting frame, the cams upon which it rests and by which it may be raised and lowered, shafts upon which the cams are mounted, devices through which the shafts are connected whereby to move in unison, and devices by which the appropriate movements may be communicated to such shafts, of the top or table having depending flanges whereby the weight-lifting frame is guided and held from longitudinal travel during the raising and lowering of the latter, and devices for guiding and preventing it from lateral displacement during such vertical movements, substantially as described.

5. The combination, with the roll-weights of a fiber-drawing machine, the suspending-rods therefor provided with enlargements, a frame having bars that are provided with slots through which the suspending-rods are passed and which are adapted to engage with such enlargements, and mechanism through which a raising-and-lowering movement may be imparted to such frame, of the top or table provided with depending flanges, and the hangers for supporting the frame raising and lowering devices, with which flanges and hangers the ends and sides of the bars of the frame respectively cooperate, whereby the raising and lowering of the weights may be effected by the raising and lowering of said frame and the latter guided and held from longitudinal and lateral travel during its vertical movements, substantially as described.

6. The combination, with the top rolls of a railway-head or other fiber-drawing machine, the weights for acting thereon, and the rods through which the latter are suspended from the former composed of sections, one of which in each rod is rotatively connected with its cooperative section whereby to be free to turn therein without changing the length of the rod, of a nut threaded on one of the sections of each of said rods, a frame or spider having bars that are provided with slots through which such rods are passed and with recesses for reception of the nuts, cams upon which the frame or spider rests, shafts upon which the cams are mounted, mechanism through



which the shafts are rotatively connected, and  
a lever for rotating said shafts in one and in  
the other direction whereby the raising and  
lowering of the weights may be effected and  
5 the top rolls removed and replaced without  
lengthening or shortening the weight-sus-  
pending rods, substantially as described.

In testimony whereof I have hereunto set  
my hand this 31st day of May, 1899.

ARTHUR W. MATHEWSON.

Witnesses:

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