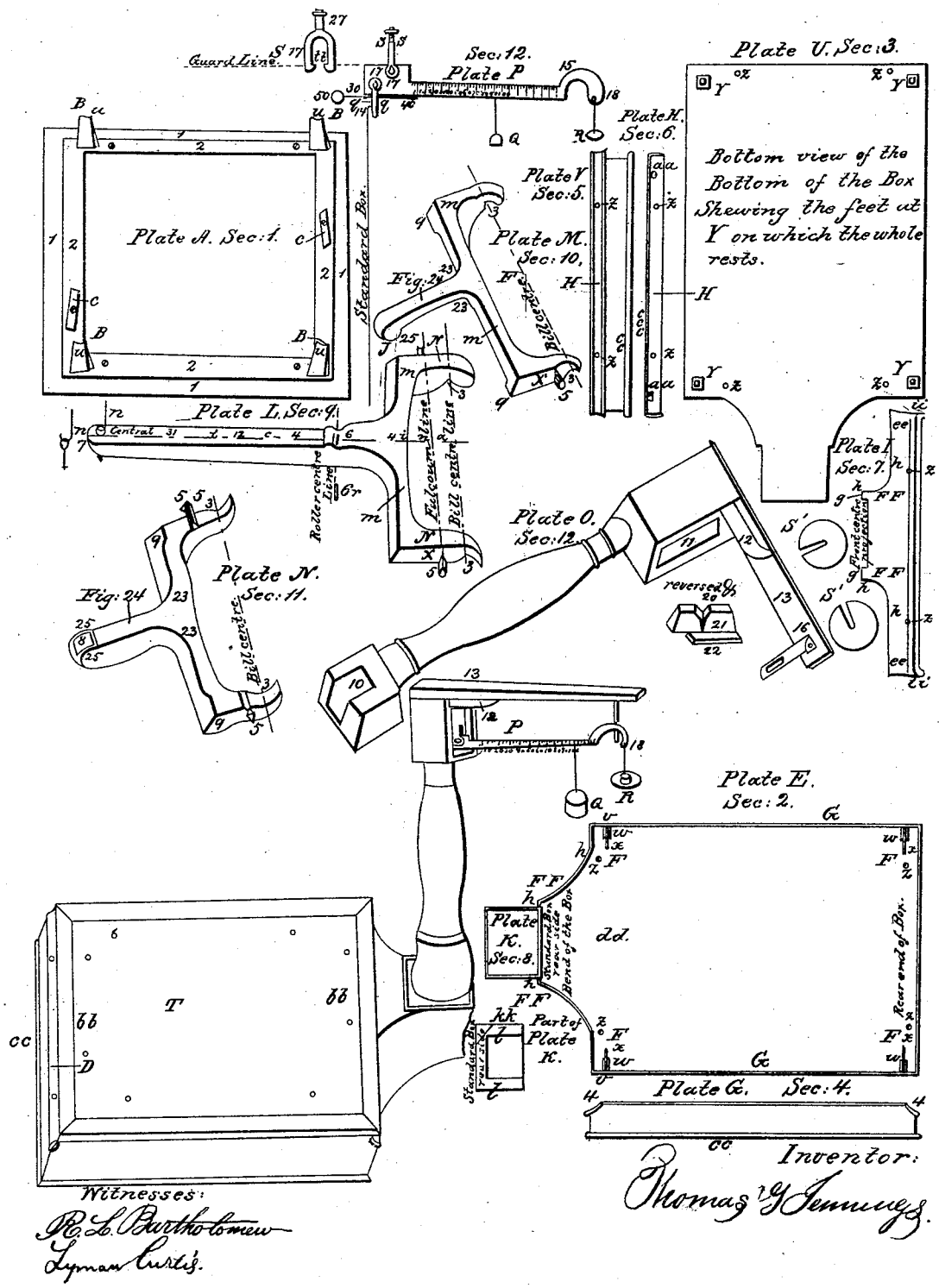
T. Y. JENNINGS.

Balance Scales.

No. 2,339. Patented Nov. 10, 1841.



UNITED STATES PATENT OFFICE.

THOS. Y. JENNINGS, OF GENEVA, OHIO.

PLATFORM-BALANCE.

Specification of Letters Patent No. 2,339, dated November 10, 1841.

To all whom it may concern:

Be it known that I, THOMAS Y. JENNINGS, of Geneva, in the county of Ashtabula and State of Ohio, have invented a new and Improved Method of Weighing Light and Heavy Burdens in the Use of Jennings' Improved Platform-Scale, by Lever Power; and I do hereby declare that the following is a full and exact description.

Plate A, Section 1 is an underside view of the platform or cover of the box. The frame work of the platform is of cast iron, 28 inches long by 22 inches wide and $1\frac{3}{8}$ in. thick in its thickest part, in which rests the wooden part of the platform—see Figure 2.

The rabbet at Fig. 1, is one inch wide, leaving the upper portion of the cover $\frac{1}{2}$ inch thick. A rabbet is made, $1\frac{1}{2}$ inches from the extremes, in the upper part of the cover, one inch deep on the inside, which leaves $\frac{3}{8}$ inch thickness of iron all around, for the plank part of the cover to rest in. The whole width of the under part of the iron frame work, all around, in which is the one inch rabbet, is, $2\frac{3}{4}$ inches—see Figs. 1 and 2.

A strong suitable plank, 25 by 19 inches, fills the frame work of the platform at the top, and rests firmly on the inner projection at Fig. 2, or, the platform may be of cast iron entire—the surface being $\frac{1}{2}$ inch thick. In this case the plank is dispensed with. Many persons prefer the whole of cast iron. For the plank, see principal drawing—Plate T, letters *b b*.

The fulcrum rests or feet marked B—4 in number, commence centrally $2\frac{1}{2}$ in. from the extreme of the cover, near each corner thereof, in the thickest part of the frame work. They are 2 inches wide and $\frac{5}{8}$ inch thick at the base, and about 2 inches long, sloping in width and thickness to their termination hollowed at their bottom or extreme, into a $\frac{3}{8}$ inch groove—see letter *u*. These grooves in the fulcrum rests (properly hardened in casting) enable the platform to rest and act easily on the lever fulcrums, 5. The iron and wooden parts of the platform are attached together by screws, which keep the plank from warping.

The internal machinery may be guarded against intruders, by having screw buttons attached to the thick portion of the frame work, and the cover locked on (before the rear plate marked D, in the principal drawing) is screwed to the bottom, and the cover can be again removed by unscrewing. For screw buttons, see letters, C.

Plate E Sec. 2 is an inside view of the box—the platform and levers being removed. The box is $26\frac{3}{4}$ inches long from corner to corner on the inside, and $19\frac{1}{2}$ inches wide on the inside—of course the platform, Sec. 1, will project over the box No. 2, and prevent the introduction of any small substances between the platform and the box, which, if thus introduced, prevent a correct weight. The extreme length of the bottom of the box is 36 inches, and its width $21\frac{1}{2}$ inches in rear of the standard curve at *v*. The bottom of the box is of cast iron $\frac{1}{2}$ inch thick.

The bearers, letter F, are 2 inches long and 24 inches apart. They are placed at $1\frac{3}{8}$ inches from each corner, measuring from the inside of the corners along the side piece to the center of the bearers (F.) Where these bearers F, touch the side pieces, G, they are $2\frac{1}{4}$ inches high and $\frac{5}{8}$ in. thick at their base, and $\frac{3}{8}$ in. thick at their top, where they are rounded off to the distance of $\frac{3}{4}$ of an inch from the side piece G, to a point in the bearers marked *w*. At the distance of $\frac{3}{4}$ inch from the side piece G, at the point *w*, the bearers F, sink suddenly down with a dull edge, $\frac{1}{2}$ inch, and the dull edge is continued on the rest or balance of the bearer, from the point *w* to the point *x*. This latter or inner part of the bearers, from point *w* to point *x* is only $1\frac{3}{4}$ inches high. The rear bearers from point *w* to point *x* are for the craw or bills of the long lever (at Fig. 3) to rest on. The front bearers, are for the craw or bills of the short lever (at 3) to rest and act on. The dull edge of the bearers is suited for the craw or bills of the levers to play on easily, and the shoulder of the bearers (at point *w*) prevents friction with the sides of the box.

Plate U, Sec. 3 is an underside view of the bottom of the box. The feet, Y, are blocks of iron cast with the box. They are immediately under the bearers, to which, as well as to the whole machine, they serve as a support. These feet (Y) are 2 inches square at their base, projecting out from their bottom $\frac{5}{8}$ of an inch, and are beveled or chamfered down from their base to $1\frac{1}{2}$ inches

square where they rest on the floor. The center of these feet (Y) is 2⅛ inches from the corners of the bottom, measuring from the corners toward the center of the box.

Plate G, Sec. 4, is a view of the sides of the box. The sides of the box are 4¼ inches raised from the inner part of the bottom, ⅜ in. thick at their base and ⅛ in. thick at their top. The sides are depressed with a curve at Fig. 4, two inches from their ends, to admit of the cast plates H and I; H in the rear and I in front. Over these plates the platform A projects without touching. The curved depression, Fig. 4, sinks one inch in the perpendicular, where are exhibited, at Fig. 4, the beaded ends of cast plates H, and I.

Plate V, Sec. 5, is an outer view of the rear end of the box—3¼ inches high, ⅜ in. thick at their base and 3/16 in. thick at the top—20¼ inches long besides the molding. The molding (*c*, *c*,) may be from ¼ to ½ in. all around the box.

Plate H, Sec. 6, is a lower side view. This plate is cast separate. It is 2½ inches wide, and its length is the width of the box, including the bead around the bottom of the box. It is ⅜ in. thick; it is rounded to suit the depression at Fig. 4, on Plate G, and terminating at each end in a ⅜ inch bead, and terminating at its rear edge also in a ⅜ in. bead, which beads drop closely over the ends of Plate G, at Fig. 4, and the whole of the upper edge of Plate V. At *a a* are two knobs, at two inches distance from the end, at such distance forward of the bead *c c c* as to admit the upper edge of Plate V. These knobs, (*a a*) prevent Plate H from slipping off from Plate V. These knobs (*a a*) are ¼ in. thick at their base, ½ inch long, and chamfered from all sides to nearly a point. They jut out from Plate H about ⅜ of an inch. That part of Plate V, Sec. 5 which is marked H, is the upperside view of Plate H, Sec. 6, resting in its proper place. The letter *z* shows the holes through Plates I, and H which are threadcut to admit a ⅜ inch screw bolt. Corresponding holes may be seen in Plates E and U, up through which the bolts pass, securing the bottom and Plates H, and I, firmly together.

Plate I, Sec. 7, is a separate cast iron plate, upper side view. It covers that portion of the box which is from *d d* (2 inches in rear of the front covers) to the standard box. The widest part of I, Sec. 7, (the central part) 4½ inches wide. The ends, *e e*, are 2¼ inches. The rear of this plate is curved like Plate H Sec. 6, to suit the depression at Fig. 4, Plate G. The front central projection of Plate I, is 6 inches between the points F F and F F. At each corner of this projection, the lip or bead (*g*) extends out about ¾ of an inch on each side of the standard box, to steady the plate. These lips or beads are about 4½ inches apart in the clear, to suit the size of the standard box. This front projection of Plate I, covers the bend between the platform and standard box. The object of this bend of the box is to gain length of lever, and remove the standard at such distance from the platform as to be out of the way in weighing bulky articles. The bend therefore between the main and standard boxes, may have a curvature to suit the manufacturer. A bead (⅜ in. projection) commences at the rear of each end of Plate I, (at *i i*) and passing around to the right and left of the plate, terminates (at 5.) This bead is frequently called a hang bead, as it hangs below the body of the work as in this plate. The inner part of this bead is even with the outer part of the box and bend of the box, touching them all around.

Plate K, Sec. 8, is the standard box. This box is 4 or 4¼ inches square, and is to receive and support the standard, the base or square part of the standard, filling it. This standard box, K, is raised to the height of the sides of the main box, G, and is of the same thickness. *k k* is a view of the rear side of the standard box, in which is an opening 2½ inches square, between *l* and *l*, through which opening the long lever L, is introduced into the standard box at its end, Fig. 7. 1⅜ inches of the rear side of the standard box, yet remain, around the opening in *k k* (see *l*, *l*,) which is yet sufficient for the support of the standard. The whole of the Plates E, G, K, V, and U, are but one piece of casting. The plates A, H, and I, are separate castings.

Plate L, Sec. 9, represents the long lever. This lever is 31 inches long, centrally, from the bill center (Fig. 3,) to the center of the eye of the staple (*n*) at ¾ inch from the front end of lever L, at Fig. 7. This lever is 1⅜ in. wide at the front or small end, Fig. 7, and one inch thick. 19½ inches from the center of the staple (*n*) at the roller, (Fig. 6) it enlarges to 1½ in. wide by 1⅜ in. thick. 8 inches in rear of the roller, (Fig. 6) the lever L branches into two parts or legs, marked *m*, which legs extend at right angles with the front of the lever, 8¾ in. each, from center to outside, giving these legs an aggregate extent of 17½ inches. At this point each leg resumes at right angles, the course of the front part of the lever. Two inches from this latter angle, are the fulcrum (5) and guard (*x*), and two inches farther on, are the notches (3) to fit the bearers F, from *w* inward. The feet of the lever, N, terminate one inch from the notches, (3.) It should be remarked that the whole of lever L, curves very slightly upward, from the roller at Fig. 6, to each extreme, and also that said lever is strengthened at its angles, by being enlarged.

The staple, (*n*) is formed of a $\frac{3}{8}$ inch iron rod, curved to an eye at the top sufficiently large to admit a $\frac{3}{8}$ inch hook and leave room for proper play, say, $\frac{1}{2}$ inch diameter. It is affixed into the center of lever L, $\frac{3}{4}$ of an inch from the end of the lever, during the process of casting. In this case the staple should be about 2 inches long, including the eye. Or, it may be affixed into and through the lever L, by drilling through the center of the lever, and securing on a nut on the lower end, in this case making it $2\frac{1}{2}$ inches long, including the eye. It should be placed in the lever so that the eye of the staple opens to the front and rear of the lever. The lower hook of the standard rod enters the eye of this staple (*n*) from the rear. The roller, Fig. 6 *r*, $19\frac{1}{2}$ inches from the center of the staple, (*n*). This roller is $1\frac{1}{8}$ in. long and $\frac{5}{16}$ in. diameter, of iron or steel, well hardened. It rests in a cup or concave on the lever L, $\frac{3}{16}$ of an inch deep and $\frac{1}{2}$ in. wide, extending across the lever at Fig. 6. This roller shows itself in its place in the machine, resting in a concave in the lever at Fig. 6. $9\frac{1}{2}$ inches in rear of the roller center, (Fig. 6,) is the fulcrum line, indicating the location of the fulcrums, Fig. 5. The feet of lever L are marked N. Into the lower part of these feet are cast the fulcrums (5) across each foot, and descending below each foot N, $\frac{1}{2}$ inch. These fulcrums are one inch wide, perpendicular width, and extend across the bottom of the lever feet N, and beyond their outside a full half inch. The fulcrums (5) are cast with a dull edge at their top for the fulcrum rests (B) of the platform, to rest and play on.

The guards (X) are to prevent friction of the fulcrum rests (B) with the sides of the lever feet, N. They are a part of the fulcrum (5) and the continuation and termination of the fulcrum edge, upward; for when the dull edge of the fulcrum is $\frac{3}{16}$ in. from the outer side of the lever foot (N) it takes a quartering upward direction toward the lever foot (N) narrowing gradually until the guard (X) loses itself in the foot of the lever (N) near its top. For further illustration of the fulcrum (5) and guard (X) see &, which is a representation of the chill or hardener used in casting, to harden the edge of the fulcrum (5) and the guard (X).

Fig. 20 shows the pattern of the upper part of the fulcrum, Fig. 21 shows the pattern of the guard in which the fulcrum terminates, and Fig. 22 shows the flange of the chill which shuts upon the top of foot, N, in the process of molding. Fig. 21 shows the notch filed into the chill pattern, to shape the guards (X).

Two inches in rear of the fulcrum (5) is the center of the notch or lever bill, marked 3, so deep into the feet of the lever as to be on a horizontal line with the top of the fulcrums (5) and also on a horizontal line with the center of the roller, marked 6.

The centers of these notches, marked 3, are the point at which the lever rests and acts on the bearers (F) at the point *w*.

Plate M, Sec. 10, is an upperside view of the short lever. In this view we discover that, 8 inches from the center of the oval, at its end (at J) this lever also branches into two legs like lever L, only in lever M the legs sink down on each side of the tongue (Fig. 24) increasing the thickness of the legs (*m*) and rendering their thickness one-half greater than that of the tongue (Fig. 24). The thickness of the tongue (Fig. 24) is about 1 inch and $1\frac{1}{2}$ inches wide. The thickness of the legs (*m*) becomes $1\frac{1}{2}$ inches at Fig. 23, leaving an indentation under the root of the tongue, (between 23 and 23) of $\frac{1}{2}$ inch for the action of lever L. The length of the bar or legs (*m*) into which the tongue (24) is inserted, is $17\frac{1}{2}$ inches, and the bars or legs again sink down at the base of their feet (at Fig. 9) into a heel, producing $1\frac{3}{4}$ inches perpendicular thickness. From the point (9) the feet of lever M are provided with fulcrums (5), guards (X), notches (3) and bills or terminations the same as lever L. The length of the feet of lever M and the distance and position of parts are the same as in lever L. The notches (3) of lever M is the point where the feet of this lever rest on the front bearers F, at *w*, and the point (J) at the oval end of lever M is where the lips of the oval end of the tongue (Fig. 25) close over the roller (at Fig. 6, lever L).

Plate N, Sec. 11, is a view of the under side of the short lever last described. It is intended to exhibit the lower part of the fulcrum at 5, 5, the indentation at the root of the tongue (24) between Figs. 23 and 23 and the part this lever acts upon the roller in its place at Fig. 6, lever L. The tongue (24) of this lever is 1 inch thick, but it terminates in a half round at its end, which adds another half inch to its thickness, in form of a bead, entirely across the end. $1\frac{1}{8}$ inches of this bead is now removed, to the depth of $\frac{1}{4}$ inch, and a smooth flat surface secured (Fig. 8). This leaves a lip (Fig. 25) remaining at each end of the bead of $\frac{3}{16}$ of an inch thickness; and $\frac{1}{4}$ inch of the half-round or bead (yet beyond the lower side of the tongue (24) of the lever) yet untouched. Now turn the lever N over, place the center bills (3) on the bearers F, at *w*, and bring the Fig. 8 (Plate N) to the roller, at Fig. 6, Plate L, and the lips of lever N (at 25) will shut over each end of the roller (Fig. 6) and secure the roller in its concave from escaping in the process of weighing. See Plate Z. The use of this roller is indispensable in the easy and true use of the balance.

Plate O, Sec. 12, is a quarter view of the

standard, square at the base and of suitable size to suit the standard box K. Fig. 10 shows the opening through which the end of lever L passes into the standard. The standard is of wood, 32 inches long, bored through the center with a 1½ or 1¾ inch auger. The top is mortised out 1¾ or 2 inches wide and 5 or 5½ inches long, for the bar and clevies of the scales to act in. The mortise is marked 11. A brace (12) is inserted into the top of the mortise (11). The brace (12) is 1 inch thick by 8 in. long and 3 in. wide. A groove is cut into the upper extreme of the mortise (11) one inch down and ½ inch all around the mortise, and the brace (12) just fills this groove and is even with the upper end of the standard. The brace (12) is attached firmly to the cap (13) by screws. The cap (13) is 2 feet long, and at the standard is 4½ in. wide to project ¼ in. over the standard all around, but tapers from the standard to 3½ inches in width at its termination. The cap is one inch thick. The screw shank of the clevy, S S, passes through the brace (12) and is secured by a nut. A partial mortise must be made in the lower side of the cap (13) for the nut and end of the screw shank to rest in. In this clevy (marked S S at the top) hangs the scale beam P. The iron standard rod (of ⅜ in. diameter and of sufficient length) connects the long lever L, at letter *n*, near Fig. 7, with the lower clevy at Fig. 14, by a hook at each end of the rod.

Plate P, Sec. 12, is a view of the scale bar or beam with the relative position of the sustaining clevies, S, S, above and *q*, *q*, below. The scale beam is of iron, brass, or steel, 19 inches long from end to end, two inches wide at the clevy end, and full ⅜ in. thick. Three inches from the extreme left, the beam is suddenly reduced from the top, to 1⅜ in. width, and from this point gradually tapers, on the top, down to ⅞ or 1 inch wide at the foot of the curve on the right, at Fig. 15. The upper edge of the beam is chamfered gradually down to ⅛ in. thick for notching, and the lower edge diminishes to ¼ inch thickness at the foot of the curve. The curved portion of the beam, at Fig. 15, is about 2½ in. diameter, ⅜ of an inch wide and ¼ inch thick. The highest portion of the curve plays in an oblong opening through a sheet iron or brass stay which is firmly secured to the cap (see Plate O, Fig. 16). The relative position of this oblong opening in the stay, should be such, that the beam will be exactly horizontal when the scales are idle, and the curve of the beam rests on the base of the oblong opening. The play of the beam up and down in this opening, should not be more than ¼ inch. The plan of these scales throughout is such as is best calculated to prevent friction. The clevies play on fulcrums, and are 1¾ in. apart, horizontally, from center to center, and about 2 inches apart in a quartering direction from center to center.

The clevy S, S, is open 1½ in. distance above the upper extreme of the fulcrum holes, and the clevy, (shoulder and screw) extends above this point about 1½ in. more; which with the lip below the fulcrum holes, makes the clevy, S, S, about 3½ inches long.

To prevent friction of the beam with the clevy, the clevies are prepared with guards. An idea of these guards may be gained by casting the eye just below the clevy holes (drawing 27,) on the guard line, at letters *t*, *t*. These guards, *t*, *t*, jut out from the lips of the clevy just above the fulcrum on the lower clevy (*q q*) and below the fulcrum on the upper clevy (S, S,). The guards (*t*, *t*,) as they jut out from the lip of the clevy, just below and above the fulcrum holes, fall gently from a horizontal line as they jut, and when they have extended out from the lip $\frac{3}{32}$ of an inch, they gradually incline downward and lose themselves in the lip of the clevy near its termination. The width of the guards (*t t*) is about ⅛ in. at their base, and they touch the scale beam with a dull edge. The distance from the upper part or dull edge of the fulcrum, in the clevy *q q*, to the hook at the upper end of the standard rod, should be about 2 inches. The wide part of the scale beam P, is for the proper disposition of the clevies, S, S, and *q*, *q*. The clevy fulcrums are of hardened steel, the guards throughout are hardened—for friction is allayed by heightening the temper as well as by polishing the surface of conflicting substances. The feet, B, or fulcrum rests, are cast on chills at *u*. The beams, F, are cast on chills from *w* to *x*. The bill centers (3) of the feet of the levers, are cast on chills. The fulcrums (5) are cast on chills, of which there is the view of a chill pattern reversed, marked &, which also embraces the guards (X). The clevies may be of iron or brass, but their guards should be of hardened steel.

Another method of fixing this machine, is, to dispense with the fulcrum rests (B,) of the platform A, and in their stead hang hardened cast iron rings upon the fulcrums (5) for the platform A to rest on. These rings should be 2 inches diameter, with one inch opening, ⅝ in. thick at the opening and ⅜ in. thick at the edge. The present guards (X) of the fulcrum (5) are not only retained, but another guard or lip is cast on the upper outer edge of the fulcrum (like guard X) to hold the rings to their place. Also, the box E, and beams, F, must be raised one inch above their present height to give room for proper rings. But this method is not preferred, but to return to the plan that is preferred. The weights are: The poise Q which is 1½ in. diameter

and 1½ in. long, tapering some to the top, where, in the center, the eye is fixed. Into this eye is hooked a rod or wire (from 2 to 2½ inches long) by which the poise, Q, hangs on the beam, P, by a hook at the top of the wire or rod. The rod and hook should be so bent that no part of either will touch the beam, excepting the center of the hook. The poise, Q, belongs in the first notch of the beam when the scale is on a balance—the balance weight hanging at the end of the beam. The balance, R, is 2 inches in diameter and ¼ inch thick. A rod, 8 in. long is fastened through the center of the balance, by drilling, which rod has a hook at the upper end, by which it is hung into the extreme right end of the beam at Fig. 18. The weights, S, S, are 3¼ in. diameter, and ⅛ in. thick for 100 lbs., ⅔ of an inch thick for 200 lbs., and one inch thick for 300 lbs., and so on in this proportion. An opening is left in these weights, from the edge to the center, sufficiently wide to admit the wire of the balance weight, and as many such weights may be prepared as the scales may require.

The machine here described is calculated to weigh from one pound to 1200 lbs.—the weights S, S, giving the hundreds, the poise showing the odd pounds. The first notch in the beam is the balance notches, which is the place for the poise when the scales are on a balance. The distance of the notches on the beam is about ⅛ of an inch, and every notch to the right of the balance notch, counts one pound. Halves and quarters of pounds may be weighed by making lesser notches at proper distances between the one pound notches.

The process of balancing the beam P, is—place the poise, Q, in the balance notch, then attach a temporary balance to the end, about the weight of the real balance, then place 100 lbs. on the platform, and move the poise to the right until it balances; if the poise fall short of 100 lbs. on the beam, the poise must be drilled and made lighter until it belongs in the 100 lbs. notch. If it go beyond the 100 lbs. notch it must be leaded until it fit the 100 lbs. notch. The poise is cast with a hole in the bottom which may be drilled larger or leaded as may be required. When the poise is made to stand at the 100 lbs. notch, remove the 100 lbs. substance from the platform, and place the poise back in the balance notch, and if the beam is then balanced, the poise is correct; if not, add or diminish the temporary balance until it is correct; then replace the 100 lbs. on the platform, place the poise in the 100 lbs. notch again and add or diminish the poise until correct and accurate. When the poise is of the right weight, remove the temporary and hang the real balance in its place, and lead or drill the real balance until the scale is accurately balanced—the curve of the beam touching no place in the stay.

Another mode of balancing the beam is, cast two loop holes on the lower edge of the scale beam, one at the corner (30) the other 5 or 6 inches forward of it at (40) with a thread to admit of a ¼ inch screw. A ball, (50) 1¾ in. diameter is cast on the end of an iron rod of ¼ in. diameter, and 8 or 9 inches long, with a screw, on the other end of the rod. Mortise through the standard and insert the rod through the loop (at 30) and screw it forward into the other loop (40) until the beam is accurately balanced.

The weights S, S, are made correct by leading or drilling and trying them by known weights on the platform. These weights S, S, in the process of weighing are placed on the balance.

T, is a quarter view of the machine—perfected and in the act of weighing.

To make floor-scales.—The iron box may be dispensed with, but the iron frame of the platform must be retained, and an iron rim two inches wide placed firmly on bed timbers embracing and supporting the bearers. The principle for floor scales is the same as the foregoing, only the scale is enlarged.

To make hay-scales.—The iron levers may be used or dispensed with and wooden ones used as substitute, by bolting iron bearers to timbers, and irons on wooden levers, for fulcrums, and irons for notches, at Fig. 3. The distance from these notches at Fig. 3, to the fulcrums at Fig. 5, should not exceed 4 inches—other parts as large as may be wanted. Fulcrum steps, of iron, should be bolted to the timbers. The principle for hay scales is the same, only the scale is enlarged.

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

The method of combining the two levers so as to lessen the friction at the point where they come in contact, by employing a roller, 6, in a cup or concavity on the surface of the long lever, upon which the lip or extremity of the short lever closes in such a manner as to work easily upon it, at the same time preventing by the peculiarity of its construction, the escape of the roller, all as set forth.

THOMAS Y. JENNINGS.

Witnesses:
R. L. BARTHOLOMEW,
LYMAN CURTIS.