H. D. CORNELIUS.

CEMENT STEP FORM.

APPLICATION FILED JAN. 31, 1910

1,106,627.

Patented Aug. 11, 1914.

2 SHEETS—SHEET 1.

Fig. 1.

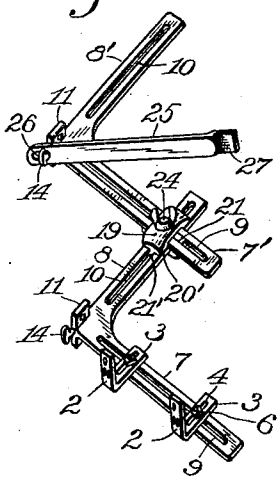


Fig. 2.

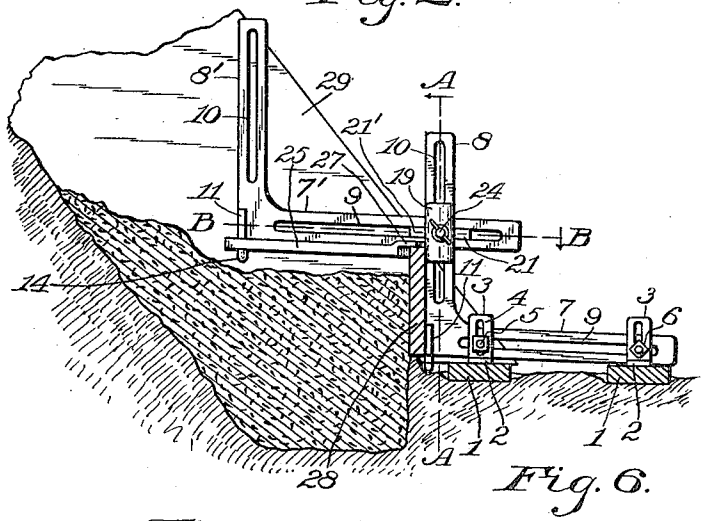


Fig. 6.

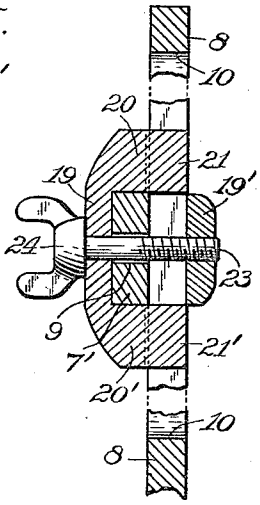


Fig. 3.

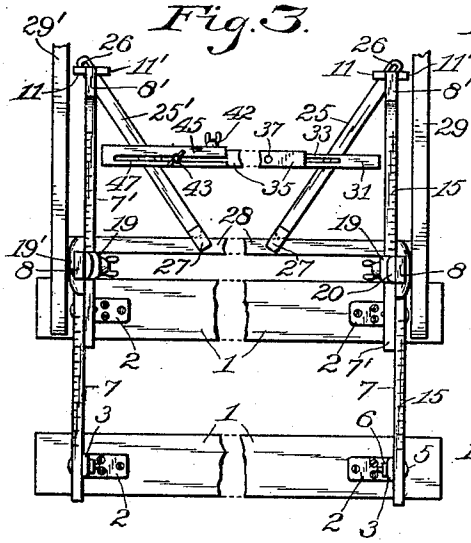


Fig. 4.

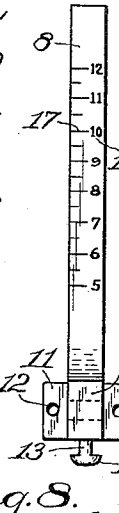


Fig. 5.

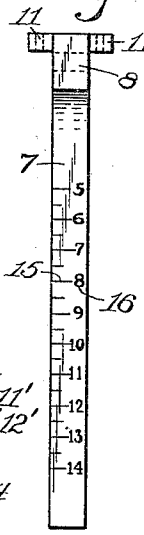


Fig. 7.

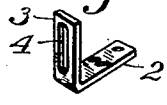


Fig. 8.

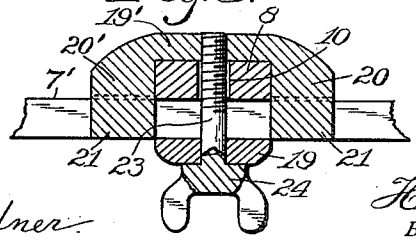
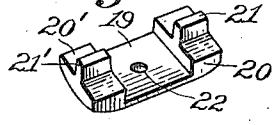


Fig. 9.



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Fig. 10.

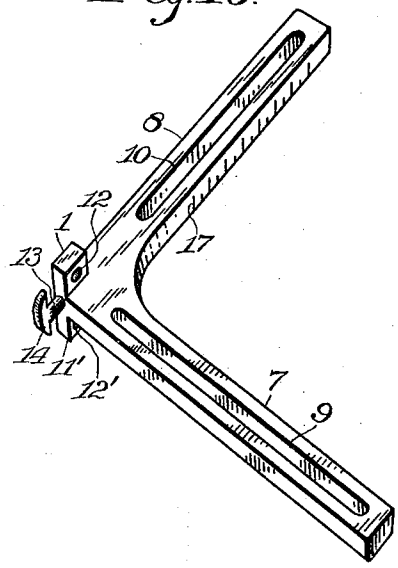


Fig. 11.

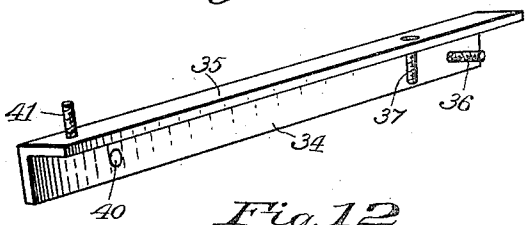


Fig. 12.

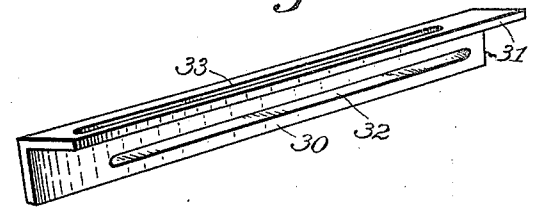


Fig. 13.

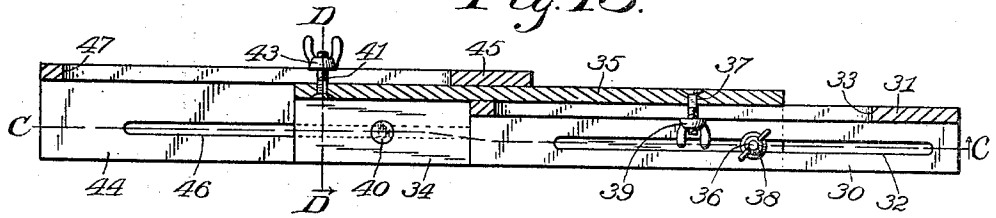


Fig. 14.

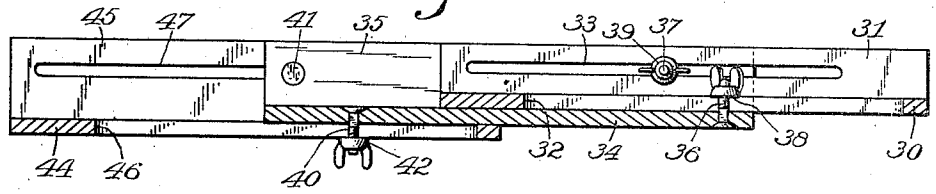
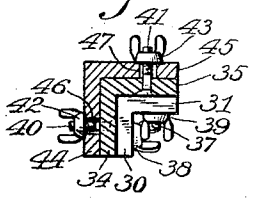


Fig. 15.



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CEMENT-STEP FORM.

1,106,627. Specification of Letters Patent. Patented Aug. 11, 1914.

Application filed January 31, 1910. Serial No. 541,048.

To all whom it may concern:

Be it known that I, HENRY D. CORNELIUS, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Cement-Step Forms; and I do declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to forms for constructing steps of cement or plastic material and has reference more particularly to adjustable gages whereby the steps may be made accurately and symmetrically in uniform proportions.

The object of the invention is to provide means that may be quickly and accurately adjusted and readily supported in position for molding plastic material, so as to constitute steps, a further object being to provide cement step forms that may be cheaply produced and be adapted for general use for shaping the fronts and tops of concrete work not only in constructing the steps, but in forming base stones for fencing or in making curbing, to the end that concrete work of the above-mentioned character may be produced cheaply without entailing the necessity for using various measuring tools, and cutting and fitting timber which in many cases is lost because of being of undesirable proportions for subsequent work that may be required.

The invention comprises essentially a plurality of step gages, each of which has two approximately right angled limbs and clamping devices whereby one limb may be adjustably secured to a limb of either of the other step gages to gage the height and width of the steps, means for anchoring one of the limbs of each of a plurality of the step gages to support the others, means for shaping the fronts of the steps, and means for shaping the tops of the steps; and the invention consists further in the parts, and combinations and arrangements of parts, as hereinafter particularly described and then defined in the accompanying claims.

Referring to the drawings Figure 1 is a perspective view of a pair of the step gages to which is connected a guide to be used in striking off the surplus material from the top of a step when formed; Fig. 2, a fragmentary sectional view showing a cement step in the course of construction by the use of the improved forms; Fig. 3, a top plan of the improved forms partially broken away; Fig. 4, a front elevation and Fig. 5, a top plan of one of the step gages; Fig. 6, a fragmentary vertical section on the line A A in Fig. 2; Fig. 7, a perspective view of one of the anchoring devices for adjustably supporting the step gages; Fig. 8, a fragmentary horizontal section on the line B B in Fig. 2; Fig. 9, a perspective view of one of the clamp plates for securing the step gages together; Fig. 10, a perspective view of one of the step gages; Fig. 11, a perspective view of one part of an improved adjustable planer adapted to be used between the planes of the step gages and adjustable thereto for evening plastic material on the tops of the steps; Fig. 12, a perspective view of another part of the planer; Fig. 13, a longitudinal sectional view of the adjustable planer; Fig. 14, a longitudinal section of the planer on the line C C in Fig. 13; and Fig. 15, a transverse sectional view of the planer on the line D D in Fig. 13.

Similar reference characters throughout the drawings indicate like parts or features of construction herein referred to.

The gages whereby the dimensions of the steps are determined are preferably all made alike, so as to be interchangeable and as a matter of convenience in connecting them together without confusion, as any required number may be connected together, dependent upon the number of steps to be constructed, and they may be anchored by various means, the step forms preferably comprising one or more base timbers or plates 1 which are to be placed so as to form a foundation and may be suitably secured on the surface of the ground, a suitable number of identical supporting braces being provided, each comprising a base or foot-plate 2 adapted to be secured removably by nails or otherwise on the timber or timbers and a standard 3 formed integral with the base plate and having a vertical slot 4 therein to receive a carriage bolt 5 provided with a nut 6. Each step gage comprises preferably two integral limbs 7 and 8 or 7′ and 8′ of identical construction, the limbs being approximately at right angles, but preferably at slightly obtuse angles, and have longitudinal slots 9 and 10 therein respectively, the limb 7 being designed to be used in approximately horizontal position, and the limb 8 in upright position. The lower portion of the rear-

ward part of the limb 8 or 8′ has a pair of lateral ears 11 and 11′ on opposite sides thereof in which are apertures 12 and 12′ respectively to receive screws or nails, and beneath the limb is an integral pivot 13 having a T-head 14 extending under the ears. The upper side of the limb 7 or 7′ has a gage 15 thereon comprising marks corresponding to inches and fractions thereof, and numerals 16 indicating inches from the rearward end of the limb corresponding to the rearward edge of the other limb 8 or 8′, the front of the latter having a similar gage 17 and numerals 18 thereon indicating inches upward from the under side of the limb 7 or 7′. Two bolts 5 extend through the slot 9 of one limb and also through the slots 4 in two of the standards 3 whereby the limb is adjustably secured removably to the standards.

Two clamp plates 19 and 19′ are employed for adjustably securing two of the step gages together, each plate having guide blocks 20 and 20′ on one side of opposite end portions thereof and guide tongues 21 and 21′ extending from the guide blocks, each clamp plate having a central bolt hole 22 therein to receive a clamp bolt, the clamp plate 19 being placed against the limb 7′ of one step gage and the guide tongues thereof extending into the slot 10 of the limb 8 of another step gage whereby to guide the limb 7′ and support it rigidly, the clamp plate 19′ being placed against the upright limb 8 and the tongues thereof extending into the slot 9 to assist in guiding the limb 7′, and a screw bolt 23 is placed in the apertures 22 of the clamp plate and extends through the slots 9 and 10 into the aperture of the clamp plate 19′ which is suitably screw-threaded, the screw-bolt having a wing-head 24 thereon engaging the outer side of the clamp plate 19, whereby all the connected parts may be rigidly secured together when adjusted, it being designed that the arm 7′ be adjusted with respect to the gage 17 to determine the height of the step and also adjusted horizontally with respect to the limb 8 and the gage 15 to determine and govern the width of the top or tread of the step. It will be understood that the angles of the clamp plates are preferably designed so that when the limb 8 is perpendicular the under side of the limb 7′ connected thereto will extend in a slightly inclined plane while the limb 8′ will be vertical, so that the tread of the step shall be slightly inclined in order to freely shed water.

The step forms comprise also a pair of identical planer guides 25, 25′, each having a slot 26 in one end portion thereof to receive the T-head 14 and be held thereby against the under side of the limb 7′ when turned on the pivot 13, the opposite end of each guide hoving an off-set lip 27 thereon, the under side of which coincides with the plane of the top of the guide, the lips being adapted to rest upon the top of a form-plate or board 28 which is provided to form the fronts of the steps, and it will be understood that the form plate may be adapted to give any desired configuration to the surface of the front of the step. The upper side of the form plate constitutes a straight edge to determine the positions of the guides, so that their upper sides shall coincide with the plane of the under sides of the limbs 7′. A pair of end forms 29 and 29′ are provided for shaping the ends of the steps when the latter are not built against a wall.

The adjustable planer is composed of sections of relatively thin stiff sheet iron or bar iron and are L-shaped in cross-section, each planer preferably being composed of three sections that are adjustable lengthwise so as to be extensible and contractible. One section comprises two integral right angle plates 30 and 31 having longitudinal slots 32 and 33 respectively therein, another section comprising two right angle plates 34 and 35 having flush headed bolts 36 and 37 connected thereto respectively in an end portion thereof, so as to be removable, the bolts preferably being of the type known as stove bolts and squared under the heads to prevent turning when being tightened, the bolts extending through the slots 32 and 33 and having wing-nuts 38 and 39 thereon respectively whereby the two sections are connected together adjustably, the plates 34 and 35 having the same width on their inner sides as the plates 30 and 31 at their outer sides, so that the free edges of the plates are flush one section with the other. In some cases two sections alone may constitute a planer of sufficient length, but preferably each planer comprises also one or more other detachable sections substantially like that shown in Fig. 12, in which case the other end portions of the plates 34 and 35 are provided with bolts 40 and 41 respectively on which are wing-nuts 42 and 43, and the additional section comprises two integral right angle plates 44 and 45 having slots 46 and 47 respectively to receive the bolts, the inner sides of the plates being of the same width as the outer sides of the plates 34 and 35, so that the free edges of the plates 30, 34 and 44 shall lie in one and the same plane and the edges of the other plates 31, 35 and 45 in another plane, thus permitting the workmen to use either one of the two edges on the guides 25 and 25′ for planing or striking off the plastic material.

In practical use the limbs 7 of two or more step gages are connected to base timbers or plates and arranged approximately in the desired position, and then with the nuts

6 slackened are accurately adjusted so that the limbs 8 shall be perpendicular, after which the nuts must be tightened, and then a form plate 28 is placed behind the limbs 8, after which the limbs 7′ of other step gages are connected to the limbs 8 and adjusted to the desired height and then secured by tightening the bolts 23, it being understood that the step gages are arranged so as to be at or near the ends of the steps. The form plate 28 should then be brought up against the arms 7′ and suitably held in the desired position, which may be done by driving nails into it through the apertures 12 or 12′, or otherwise. The plastic material may then be placed in position on a suitable foundation behind the form plate 28 and when brought up nearly to the required height the guides 25 and 25′ should be connected to the pivots 13 and the lips 27 placed on the top of the form plate, after which the required amount of material may be added and then struck off by sliding the planer along the tops of the guides, which will determine the general contour of the tread of the step. Then the guides may be removed from the pivots and the places they occupied may be filled by means of a trowel and brought up to the general surface. If another step is to be built another form plate 28 should then be placed behind the limbs 8′, and the limbs 7′ of other step gages should be connected and adjusted to the limbs 8′ and the work proceed as above described, additional step gages being employed if other steps are required. When the steps are completed as to form, the uppermost step gages and form plates are first removed and then the uppermost steps are given their finishing coats and troweled as usual, the finishing operations proceeding downward and the lowermost forms removed last.

It will be apparent from the foregoing that the forms may be readily readjusted to build or construct steps of other dimensions, so that one set of the forms only may be required, for a great variety of work.

Having thus described the invention, what is claimed as new, is—

1. A cement step form including a member comprising two approximately right-angled and longitudinally slotted limbs rigidly connected together and having an apertured ear thereon near the junction of the two limbs for securing the member to a riser forming member the ear extending transversely to the plane of the two limbs on the plane of the outer edge of one of the limbs, and means for fixedly supporting the remaining one of the limbs in approximately horizontal position to hold the ear on a vertical plane, said means extending through the slot of the limb.

2. A cement step form including a member comprising two integral approximately right-angled limbs and having a T-headed pivot at the junction of the limbs, an upright support horizontally supporting one of the limbs with the pivot extending downward, a form-plate standing against the support, and a guide having a slot receiving the pivot, the guide being supported by the top of the form-plate and also by the T-head of the pivot.

3. A cement step form including two members each comprising two limbs integrally connected at one end at approximately right angles, one limb of each member being normally supported in approximately horizontal position and supporting the remaining limb in upright position, the upright limbs of the two members having graduated markings thereon respectively, and a form plate set up against the outer edge of the two upright limbs with its top coinciding with two of the markings on the two limbs respectively.

4. A form for molding steps comprising laterally spaced series of end members, the members of the respective series being connected in stepped relation and adjustable relative to one another in the direction of their length to project at their rear end beyond the corresponding end of the member below, according to the width of the step treads, and riser forming members mounted against the aforesaid rear ends of the end members.

5. In a concrete step form, a plurality of identical interchangeable members comprising each an approximately horizontal limb having a longitudinal slot extending substantially throughout its length, and an approximately vertical limb having a longitudinal slot adjacent one end, the two limbs being integrally connected at one end, the slot in each horizontal limb being adapted to receive either a single securing bolt between its ends or two securing bolts adjacent its ends, a clamp plate engaging the slotted portions of the vertical and horizontal limbs of two of the said members respectively and holding them at approximately right angles to each other, and a bolt extending through the slots of said limb portions and through the clamp plate and securing the limbs together.

6. In a concrete step form, the combination of a plurality of identically formed members, each member comprising two limbs integrally connected at one end at approximately right angles, each limb having a longitudinal slot extending approximately throughout its length, one of the two limbs normally being horizontal and the other vertical, a plurality of anchoring devices comprising each a normally horizontal base plate and a vertical standard thereon having a vertical slot therein, a plurality of bolts

in the slot of one of the horizontal limbs and extending through the slots of two of the standards, a plurality of bolts in the slot of the remaining one of the horizontal limbs and extending through the slots of two others of the standards, and nuts on the bolts respectively for adjustably securing the limbs each to two of the standards.

7. In a cement step form, the combination of a form plate supported in a vertical plane, two members comprising each a limb fixedly supported in horizontal position and extending across the top of the form plate in contact therewith, each limb having a pivot on the under side of the farther end thereof, and two guides connected respectively at one end to the pivot of the two limbs and extending convergently therefrom to the form plate, the opposite end of each guide being supported at its upper edge upon the top of the form plate.

8. In a cement step form, the combination of a plurality of identically formed members, each member comprising two limbs integrally connected at one end at approximately right-angles, one limb of each member being normally arranged horizontally and the other vertically, an anchoring device connected to the horizontally arranged limb of one of the members and adjustable transversely and longitudinally of the limb, and means securing the horizontally arranged limb of another of the members to the vertically arranged limb of a companion member and permitting vertical and horizontally longitudinal adjustment of the horizontally arranged limb relative to the vertical limb.

9. In a cement step form, the combination of a member comprising two limbs integrally connected at one end at approximately right-angles, one limb being supported in approximately horizontal position and supporting the remaining limb in upright position, the lower portion of the upright limb having two apertured ears on opposite sides facing on the plane of the outer edge of the limb, the inner edge of the limb having graduated markings thereon, and a form plate set up against said outer edge and secured to said ears with its top coinciding with one of said markings.

10. In a cement step form, the combination of two limbs arranged transversely each to the other and face to face, each limb having a longitudinal slot therein, one of the limbs being provided with an anchoring device adapted for uprightly supporting the limb, two clamp plates engaging the two limbs respectively, each plate having two guide blocks on one side of opposite end portions thereof that embrace one of the limbs, the plate having also a bolt hole therein intermediately of the blocks, each block having a tongue on its end that extends into the slot of the companion limb, said plates being arranged transversely each to the other and enabling the upright limb to fixedly hold the remaining limb in extended horizontal position, and a screw bolt extending through the slots and the bolt holes and clamping said limbs together and the plates to the limbs.

11. In a cement step form, a device comprising a straight limb having a longitudinal slot therein adjacent to one end portion thereof for receiving a connecting device, a T-headed pivot on the opposite end of the limb extending longitudinally relatively to the limb, the limb being adapted to normally stand vertically, a second limb extending integrally from one edge of the first described limb at a point adjacent to the pivot and having a longitudinal slot therein adjacent to the end thereof for receiving a supporting device for the limb, two apertured ears extending integrally from the opposite edge of the first described limb at right angles to the plane of the two limbs, graduated markings on the edge of the first described limb adjacent to the slot therein, and graduated markings on the second described limb adjacent to the slot therein.

12. In a cement step form, the combination of a plurality of series of guide supporting members, all the members being identically alike, each member comprising two approximately right angled limbs, one limb of one of the members of each of the series being provided with adjustable anchoring devices for fixedly holding the remaining limb of the member in vertical position, the upper portions of the vertical limbs adjustably supporting the end portion of one limb of other members for fixedly holding the remaining limbs of the members in vertical position distant from the supporting vertical limbs, a form plate set up at the outer side of two of the vertical limbs, two guides pivotally connected detachably to two of the members respectively of two of the series and extending convergently therefrom to the form plate and supported thereby, and a planer adapted to be longitudinally contracted between the two series of members and slide between them upon said guides.

In testimony whereof, I affix my signature in presence of two witnesses.

HENRY D. CORNELIUS.

Witnesses:
HARRY D. PIERSON,
E. T. SILVIUS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."