E. S. HARRIS.

MACHINE FOR FORMING TOY CONSTRUCTION MATERIALS.

APPLICATION FILED APR. 10, 1915.

1,174,066.

Patented Mar. 7, 1916.

2 SHEETS—SHEET 1.

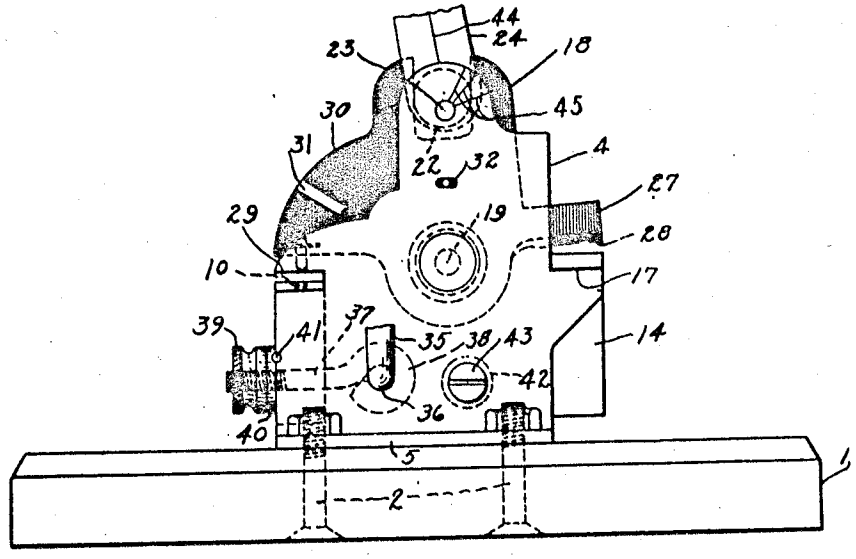


FIG. 1.

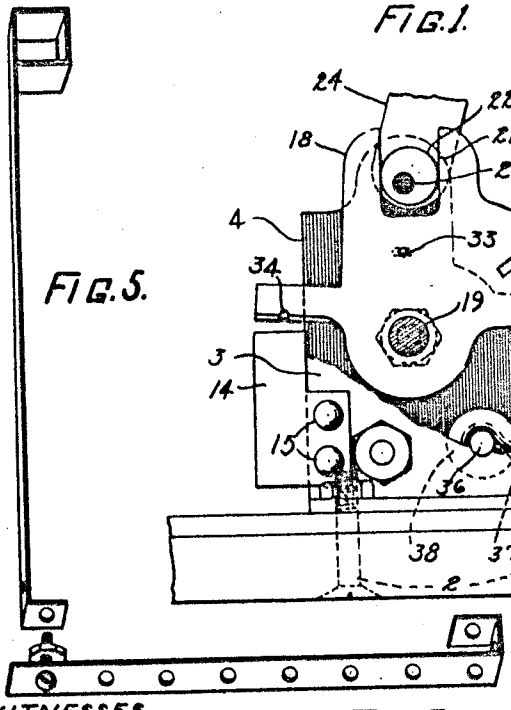


FIG. 5.

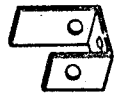


FIG. 6.

FIG. 2.

FIG. 7.

WITNESSES.

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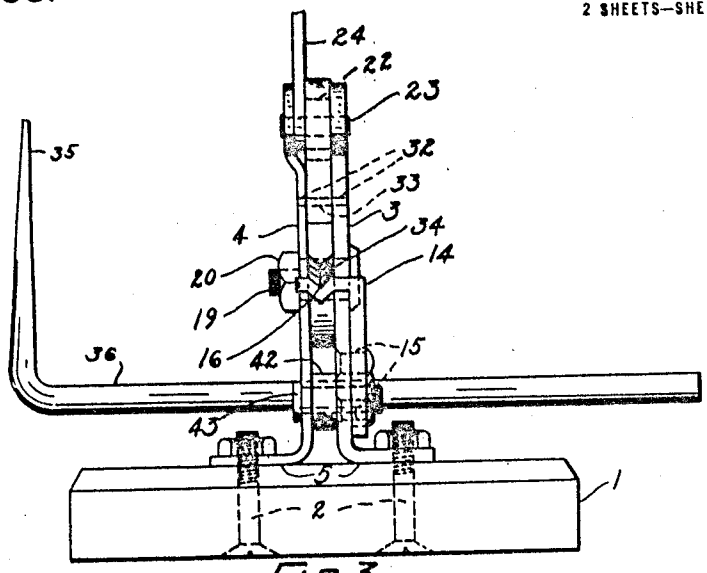


FIG. 3.

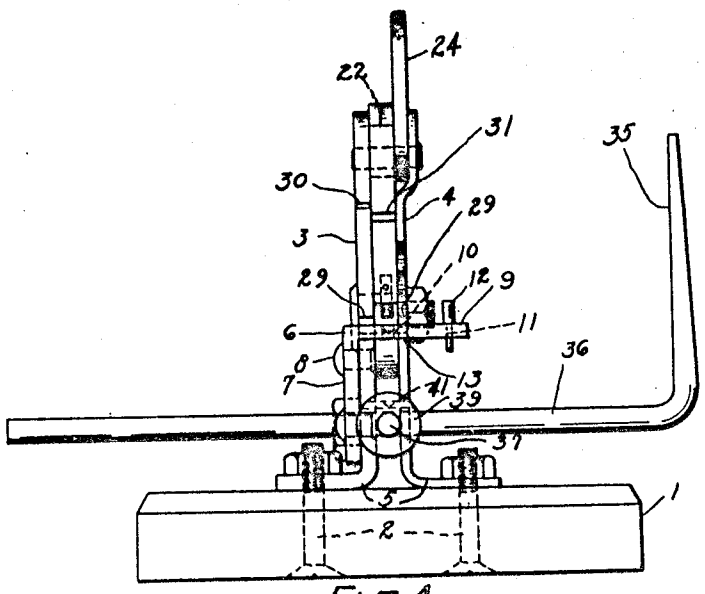


FIG. 4.

WITNESSES

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UNITED STATES PATENT OFFICE.

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MACHINE FOR FORMING TOY CONSTRUCTION MATERIALS.

1,174,066. Specification of Letters Patent. Patented Mar. 7, 1916.

Application filed April 10, 1915. Serial No. 20,557.

To all whom it may concern:

Be it known that I, EDWARD S. HARRIS, a citizen of the United States, and resident of Melrose, county of Middlesex, Commonwealth of Massachusetts, have invented an Improvement in Machines for Forming Toy Construction Materials, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts in each of the several views.

This invention relates to apparatus for producing and forming structural toy material of the kind wherefrom toy buildings and other toy constructions are adapted to be erected or constructed. Structural toy building material of this kind is now commonly supplied in the form of outfits composed of numerous metallic strips made as thin but stiff bands of soft steel with a line of bolt receiving holes at frequent intervals along the length thereof, suitable angle pieces, securing bolts, etc.

The prime object of the present invention is to provide a unitary organized mechanism specially designed and adapted to handle and operate on a metallic strip of a single standard width and thickness to punch holes therein as required, to bend the same either at right angles or any other required angle and to cut off the stock into desired lengths; also to bend, cut off, and thread lengths of wire or small rod stock to constitute the structural toy bolts.

In accordance with my invention a small, compact and simple, but very powerful mechanism is provided having stock receiving openings formed to gage and accurately position for operation thereon a single standard size of structural toy stock, *i. e.*, the kind of stock comprising a part of the outfit with which the machine is furnished.

The foregoing and other objects and features of the invention will be better understood from the following detailed description taken in connection with the accompanying drawings and will be thereafter pointed out in the appended claims.

Referring to the drawings: Figure 1 is a side elevation of a machine constructed in accordance with my invention, the major portion of a handle and of a gage member being broken away; Fig. 2 is a side view from the side opposite to Fig. 1 with part of a cheek frame plate broken away; Fig. 3 is an end view of the machine looking at the end where the bending is performed; Fig. 4 is a similar view looking at the other end of the machine where the punching and cutting off is performed; and Figs. 5, 6 and 7 are perspective views showing toy construction material produced by the machine.

The machine as shown has a suitable base 1 to which are fixed as by securing bolts 2, upright supporting frame work members 3, 4, these being shown as bracket plates parallel and spaced apart to receive between them the operating means, and having horizontally bent foot portions 5 through which the bolts 2 are passed to clamp them to the base. The bracket plate member 3 is shown as relatively heavy and substantial and it has fixed thereto at its opposite sides anvil or stationary die members against which the movable punch and bending jaw are adapted to act. The anvil or punch block at one side of the plate 3 is indicated at 6 in the form of an angle plate with an upright portion 7 secured to the plate 3 by rivets 8 and a horizontally extending portion 9 which is equipped with a punch hole 10 and at a definitely spaced distance therefrom with another hole 11 to receive a spacing pin 12 which is removably fitted thereto; the pin 12 being thus spaced from the hole 10 and the punch coöperative therewith, a distance corresponding to the spacing of the holes to be produced in the structural toy stock. The horizontal portion 9 of this punch block passes through an opening in the bracket plate 4 and is supported on a ledge 13 at the lower side of such opening. The stationary bending die block 14 is likewise formed as an angle plate riveted as seen at 15 to the bracket plate 3 at the other side thereof from the punch block, this die block having a horizontal portion equipped with a V-shaped recess 16 to constitute a stationary bending die and having an outboard support on the bracket plate 4 which has a lateral extension 17 furnishing a supporting shoulder or ledge for this purpose. The movable die member coöperative with the punch block and stationary bending die thus formed, is shown as a swinging plate block 18 fitted between the frame plates 3, 4, and journaled on a stout pivot bolt 19 fitted and held in the plates 3 and 4, a nut 20 being fitted to this pivot bolt for clamping the parts in operative position. For moving the

plate block 18 in either direction to effect a punching or bending or cutting off operation as presently described, it has at its top a vertical slot 21 with parallel sides in which operates an eccentric 22 fixed on a shaft 23 journaled at the top of the plates 3, 4, this eccentric and shaft also having fixed thereto and rigid therewith an operating handle 24 which may be extended far enough to give the required leverage. It will be noted that the operation of the eccentric 22 upon the upward extension of the plate block 18 in conjunction with the leverage obtained by the extended handle 24 is adapted to give a very powerful operative impulse to the plate block 18 and hence to the operating tools including the punch and bending die carried by or formed therewith.

The punch element is indicated at 25 removably fitted to the plate block 18 at one side thereof as by a cotter pin 26, and in position to coöperate with the hole 10 in the punch block 6. The movable bending die coöperative with the die block 16 is indicated at 27 as a jaw extending from the plate block 18 at the side thereof opposite the punch 25, this jaw being equipped with a V-shaped projection 28 to coöperate with the V-recess of fixed die 16. The frame plates 3, 4, are formed with portions 29 overhanging the punch block and spaced thereover just far enough to permit the standard thickness of stock for which the machine is designed, to be inserted to punching position, thus preventing the machine from being used for other purposes foreign to that intended which might place too great a strain on the working parts.

For cutting off the strip material I form a slot 30 in the plate 3 and a slot 31 in the plate block 18 to coöperate therewith for constituting a shears. The slot 30 is of a width just great enough to permit the standard stock supplied with the machine to be inserted therein, so that stock foreign to the outfit and which might be too heavy to be cut off by the machine cannot be inserted. For cutting off wire stock to form the bolts of the structural toy outfit, the bracket plates 3, 4, are formed with registering apertures 32 to receive such stock, and the plate block 18 is formed with a similar hole 33 whereby a wire cutting shears is provided. To locate the wire stock for bending the same in the bending dies when required, the bending jaw 27 preferably has a notch 34 extending transversely thereacross and formed to seat the wire therein to be bent against the stationary bending die. For spacing the lengths of stock as it is to be cut off I provide a gage member 35 bent laterally to extend upright, from a rod 36 which is fitted to slide through openings therefor in the frame plates 3, 4, this rod being of a length sufficient to permit adjustment thereof for cutting off the different lengths of stock that may be required. For clamping this gage member in operative position means is provided, shown as consisting of an eye bolt 37 extending inward between the plates 3, 4, the rod 36 being passed through the eye 38 thereof, and the outer threaded end of this bolt having a knurled nut 39 fitted thereto which may react against a washer 40 engaging with the adjacent sides of the plates 3, 4. Thus by turning up this nut the gage rod 36 is securely clamped for holding lengths of wire stock to operate on the same, *e. g.*, as for threading. I may provide a positioning notch or aperture 41 either in the washer 40, or in the adjacent edges of the plates 3, 4, or both, the size of this aperture being such that while it serves to position the wire therein, it is not sufficient to entirely receive the wire, so that as the nut 31 is set up, the wire will be clamped between the washer 40 and the adjacent edges of the plates. One or more suitable spacing blocks and clamping bolts may be provided for holding the frame plates 3, 4, securely assembled, one such spacing block being indicated at 42 with a clamp bolt 43 passed therethrough and through the frame plates.

It will be observed that I thus provide a simple and inexpensive but complete and powerful machine adapted for performing all the requisite operations on toy structural material stock, to cut off, punch and bend the strip stock and also the wire or rod stock for the securing bolts in the required manner to produce the various elements required for building toy structures; further that the several operative portions of the machine are specially formed and designed to handle a single standard size and gage of stock and that only, this being the size supplied with the machine and forming a part of the structural toy outfit, and the several operative portions of the machine being adapted to correctly position and gage this one standard size of stock so that when inserted in any of the operative apertures, it is automatically positioned and correctly located therein. For this purpose, in addition to the structural provision already described, the frame plates 3, 4 are cut away to receive the punch block 6 and the bending die block 14, just far enough back so that when the standard width of strip stock for which the machine is designed is inserted in operative position and pushed back against the upright shoulder formed on the plates, 3, 4, it is correctly positioned for operation, thus when under the punch 25 being located so that the holes are punched transversely central of the stock, and when under the bending die 27, it is correctly positioned for the bending thereof to the degree indicated by suitable graduations which may be placed

on the operating means and on the frame work adjacent thereto. Thus a single indicator line 44 may be placed on the handle 24, and a series of properly spaced marks 45 placed adjacent thereto on the frame plate 4, the first or upper one of these marks being positioned so that when the line 44 coincides therewith a certain degree of bend in the stock strip on the bending die 14 will be indicated, for example, thirty degrees, while when the line 44 coincides with the succeeding lower marks on the frame plate, further predetermined degrees of bend, *e. g.*, forty-five degrees and seventy degrees will be indicated, while the pressing of the bending jaw 27 down to its limiting position will effect a ninety degree bend. In this way, it will be noted that the frame work plate members 3, 4, and the relatively stationary operative parts carried thereby are coöperatively arranged and mutually intergaged with the movable plate block 18 and the operative instrumentalities carried thereby, for operating on the single standard size and gage of stock only, that is supplied with the outfit, thus making the outfit suitable for use by one totally inexperienced in mechanical work, as a young child, and capable of both educational and amusing use by children.

I am aware that the invention may be embodied in other specific forms as to its various details of construction and I therefore desire the present embodiment to be considered in all respects as illustrative and not restrictive, reference being had to the appended claims rather than to the foregoing description to indicate the scope of the invention.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A machine for forming toy construction material, comprising a supporting framework, and operating mechanism mounted thereon, including means for bending strip material, and means for punching strip material, said mechanism and said framework being coöperatively arranged and mutually intergaged to receive and operate on, in definitely gaged position, a single standard size of material only.

2. A machine for forming toy construction material, comprising a supporting framework, and operating mechanism mounted thereon, including means for cutting off strip material, means for bending strip material, and means for punching strip material, said framework and the several means of said operating mechanism being coöperatively arranged and mutually intergaged to receive and operate on, in definitely gaged position, a single standard size of material only.

3. A machine for forming toy construction material, comprising coacting bending jaws mounted for relative movement one with respect to the other, operating means therefor and indicia arranged for coöperation with said operating means to indicate the angle of bend imparted to a single standard size of stock at different points in the movement of said operating means.

4. A machine for forming toy construction material, comprising spaced apart framework plates mounted in parallelism, a plate block mounted to operate between said plates and equipped with operating means pivotally mounted on said framework plates, said framework plates and said plate block having coöperative means mutually intergaged for punching a single standard size only of strip material in definitely gaged position, and having also means for operating on a single standard size only of rod stock adapted to fit the holes as punched in said strip material by said punching means.

5. A machine for forming toy construction material, comprising a supporting framework, operating means thereon for punching strip material, said framework and said operating means being mutually intergaged and coöperatively arranged to receive and operate on in definitely gaged position a single standard size only of material, and said framework and operating means having also provision for operating on in definitely gaged relation, a single standard size only of rod material to fit the holes as punched in said strip material.

6. A machine for forming toy construction material, comprising spaced apart framework plates mounted in parallelism, a plate block operative therebetween and equipped with operating means pivotally mounted on said framework plates, said framework plates and said plate block having coöperative mechanism mutually intergaged for punching and bending a single standard size only of strip material in definitely gaged position.

7. A machine for forming a toy construction material, comprising spaced apart framework plates mounted in parallelism, a plate block pivotally mounted therebetween, and equipped with operating means, said framework plates and said plate block having coöperative mechanism mutually intergaged for cutting off, punching and bending a single standard size only of strip material in definitely gaged position.

8. A machine for forming toy construction material, comprising spaced apart framework plates mounted in parallelism, a plate block pivoted therebetween, and equipped with operating means, said framework plates and said plate block having coöperative mechanism at opposite sides of said plate block mutually intergaged for punch-

ing and bending a single standard size only of strip material in definitely gaged position.

9. A machine for forming toy construction material, comprising a stationary framework, a die formed as a plate block pivotally mounted thereon, and equipped with operating means, said framework and said die being coöperatively formed to receive and operate on a single standard size of strip material for punching and bending the same in definitely gaged position, and being also equipped to operatively handle a single standard size only of rod material adapted to fit the holes as punched in said strip material.

10. A machine for forming toy construction material, comprising an upright framework plate, a punch block formed as an angle plate secured at one side thereof, a bending die block formed as an angle plate secured at an opposite side thereof, and a plate block pivotally mounted with respect to said framework plate having at one side a punch coöperative with said punch block, and at its other side a bending die coöperative with said bending die block, said framework plate and said plate block being cooperatively arranged and mutually intergaged to receive and act on in definitely gaged position, a single standard size only of strip material.

11. A machine for forming toy construction material, comprising a fixed framework, means coöperative therewith for operating on material, a gage for such material adjustably fitted to said framework, and means for clamping said gage in adjusted position, said clamping means and said framework having a coöperatively arranged recess to receive rod stock to be clamped thereby.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

EDWARD S. HARRIS.

Witnesses:
CLYDE L. ROGERS,
LOUISE A. JORDAN.

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