The invention here disclosed is a die-set for the manufacture of wire nails.

Up to the present time nails have been manufactured on machines especially designed for the purpose, consisting of a variety of cranks, cams and eccentrics for operating the several required mechanisms. These have been laid out in generally horizontal arrangement, taking up considerable space.

Further, because of the work required of them, these machines have had to be of a heavy, massive nature and quite expensive.

The principal objects of this invention are to utilize the power and strength of existing machines, heavy enough for the purpose, and to provide nail making dies which can be used in these machines to accomplish practical, efficient and economical nail production.

More specifically it is a purpose of the invention to provide a nail producing die-set which will go into an ordinary punch press and enable such a machine to be operated for the manufacture of nails.

Special objects of the invention are to provide die mechanism which will operate with what may be considered the relatively short stroke of a punch press and in which forces will be balanced, so far as possible, to avoid strain on parts and enable continuous, high-speed production.

Further special objects of the invention are to speed up production by accomplishing manufacture of two or more nails with each stroke of the press and to gain this without unduly loading the action of the press.

Further important objects of the invention are to provide die mechanism attachable as indicated to an ordinary punch press and which will be of relatively simple, inexpensive construction and of small size, adapting it for use in machines of this character.

Other desirable objects and the novel features of construction, combination and relation of parts through which all purposes of the invention are attained are set forth or will appear in the course of the following specification.

The drawings accompanying and forming part of the specification illustrate a present commercial embodiment of the invention. Structure, however, may be modified and changed, all within the true intent and broad scope of the invention as will appear from the following specification defining and broadly covering the invention.

Fig. 1 in the drawings is a front elevation of a punch press, showing a double action embodiment of the invention applied to and incorporated therein;

Fig. 2 is an enlarged broken front view of the right-hand header shown in Fig. 1;

Fig. 3 is a cross sectional view of the header as on substantially the plane of line 3—3 of Fig. 2;

Fig. 4 is a broken, part sectional end view looking in the direction of the arrow 4 in Fig. 2;

Fig. 5 is a broken and part sectional plan view of the complete die assembly.

To adapt the dies required for cutting off, point, gripping and heading the wire stock, they are made up and combined in a unit assembly which can be mounted as such and connected with the companion ram and bolster elements of the press.

In the illustration there is shown a punch press of conventional design having cooperating ram and bolster elements 1 and 8.

Wire feeders and straighteners are shown at 9, 10, at opposite ends of the press. These may be of an usual or special form suited to feeding the wire stock 11 in at the opposite ends of the press.

The several die mechanisms are mounted on a base plate 12 adapted to be bolted on the bed or bolster of the press.

For a double action die producing two nails with each punch stroke, the parts are duplicated at each end of the base plate and the two oppositely facing headers 13 at the center are actuated in opposite directions by a single, double-faced wedge cam 14.

The header blocks 13 are carried by slides 15, Fig. 3, operating in longitudinal guides 16 and pressed toward the wedge cam 14 by springs 17.

The grippers 16, 18, operate laterally or transversely in guideways 28 on the base plate and have companion overlapping wire centering dies 21, 22, at their inner ends, as indicated in Fig. 5. Springs 23 retract these dies and cams 24, dependent from the ram over the outer ends of these slides, confine them to their outer extent of movement and through the companion inclined faces 25, 26, apply the necessary gripping, holding and supporting action.

The duplicate cut-off and pointing dies 27 are shown carried by slides 28 operating in transverse guides 29 on the base plate, thrust open by springs 30 and closed by inwardly inclined cams 31 on the ram over standing the outer ends of these slides.

The headers carry heading dies 32 projecting through guide openings 33 into cooperative relation with the companion gripper and head forming dies 10, 11.

Inclined spacer chutes 34 below and between the companion dies serve to direct the finished nails 35 downwardly, outwardly and away from the coacting die elements.

The several inclined cams 14, 24 and 31 for actuating the header, gripper and cut-off and
pointing slides are shown carried by a top plate 38 bolted to the ram.

While the top plate carrying the longitudinally and transversely acting cams and the bottom plate carrying the longitudinally and transversely operating slides may be separable units independently secured as to the ram and to the bolster, they may be suitably connected together, particularly for instance, by means of guide posts such as used in many die-sets for assuring proper rectilinear alignment and coaction of the dies.

The wire feeding devices may be operated from the punch head or be independently actuated and, if desired, automatic controls may be provided, for example, to stop the press when no wire is present, or if dies fail to act or the like.

The complete unit is particularly compact and small and of such a character as to be readily mounted in and be removed from an ordinary punch press. The dies can be made heavy enough for nail manufacture and they are sufficiently reinforced by the punch press structure to be able to carry on heavy nail producing operations.

While preferable to mount the cams and dies on top and bottom plates as illustrated, there may be conditions such as lack of room, requiring the mounting of the cams and the guides for the slides directly on the ram and on the bolster.

To provide for proper timing, the cams may be adjustably mounted substantially as indicated at 31. Downwardly and outwardly inclined delivery chutes 38 are shown below and in line with the spacer chutes 34 to deliver the nails into holes of the container.

Wire centering guides 21, 22, similar to those on the gripper slides, are shown provided on the cutting and pointing dies 27. These dies are shown as mounted in easily removable relation on the slides so that they may be quickly replaced. The cams may be adjusted vertically to vary the timing or similar results may be accomplished by inclining these cams in proper relation to the slides.

While in the present machine two nails are produced at each stroke by feeding in two wires from opposite ends of the press two or more nails may be produced by feeding in two or more wires, one above the other, into multiple cavity dies constructed to operate on such number of wires.

What is claimed is:

1. A nail producing die-set for use in a punch press, comprising companion top and bottom plates attachable, respectively, to the ram and bolster of a punch press to assume the cooperative action of the same, opposed, cooperative, laterally operating wire cutting and pointing dies at the end of the bottom plate, cooperative, laterally acting grippers on the bottom plate in advance of said cutting and pointing dies, a longitudinally operating header on the bottom plate in cooperative relation to said grippers, laterally inclined cams on top plate for operating said dies and grippers and a longitudinally angled cam on the bottom plate for actuating said header, said dies, grippers and header being duplicated at the opposite ends of the press and duplicate wire feeding-in means at said opposite ends of the press.

3. A nail producing die-set for use on a punch press or the like, comprising top and bottom plates attachable, respectively, to the ram and bolster elements of a punch press or the like, a wire feeder at one end of the bottom plate, opposed cooperative laterally operating wire cutting and pointing dies adjoining said wire feeder, cooperative, laterally acting wire grippers on the bottom plate spaced longitudinally in advance of said cutting and pointing dies, a longitudinally operating header on the bottom plate in cooperative relation to said grippers and means on said top plate for imparting lateral movement to said dies and grippers and longitudinal movement to said header on each stroke of said companion top and bottom plates.

4. A nail producing die-set for use on a punch press or the like, comprising top and bottom plates attachable, respectively, to the ram and bolster elements of a punch press or the like, a wire feeder at one end of the bottom plate, opposed cooperative laterally operating wire cutting and pointing dies adjoining said wire feeder, cooperative, laterally acting wire grippers on the bottom plate spaced longitudinally in advance of said cutting and pointing dies, a longitudinally operating header on the bottom plate in cooperative relation to said grippers and means on said top plate for imparting lateral movement to said dies and grippers and longitudinal movement to said header on each stroke of said companion top and bottom plates.

5. A nail producing die-set for use on a punch press or the like, comprising top and bottom plates attachable, respectively, to the ram and bolster elements of a punch press or the like, a wire feeder at one end of the bottom plate, opposed cooperative laterally operating wire cutting and pointing dies adjoining said wire feeder, cooperative, laterally acting wire grippers on the bottom plate spaced longitudinally in advance of said cutting and pointing dies, a longitudinally operating header on the bottom plate in cooperative relation to said grippers and means on said top plate for imparting lateral movement to said dies and grippers and longitudinal movement to said header on each stroke of said companion top and bottom plates.

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