

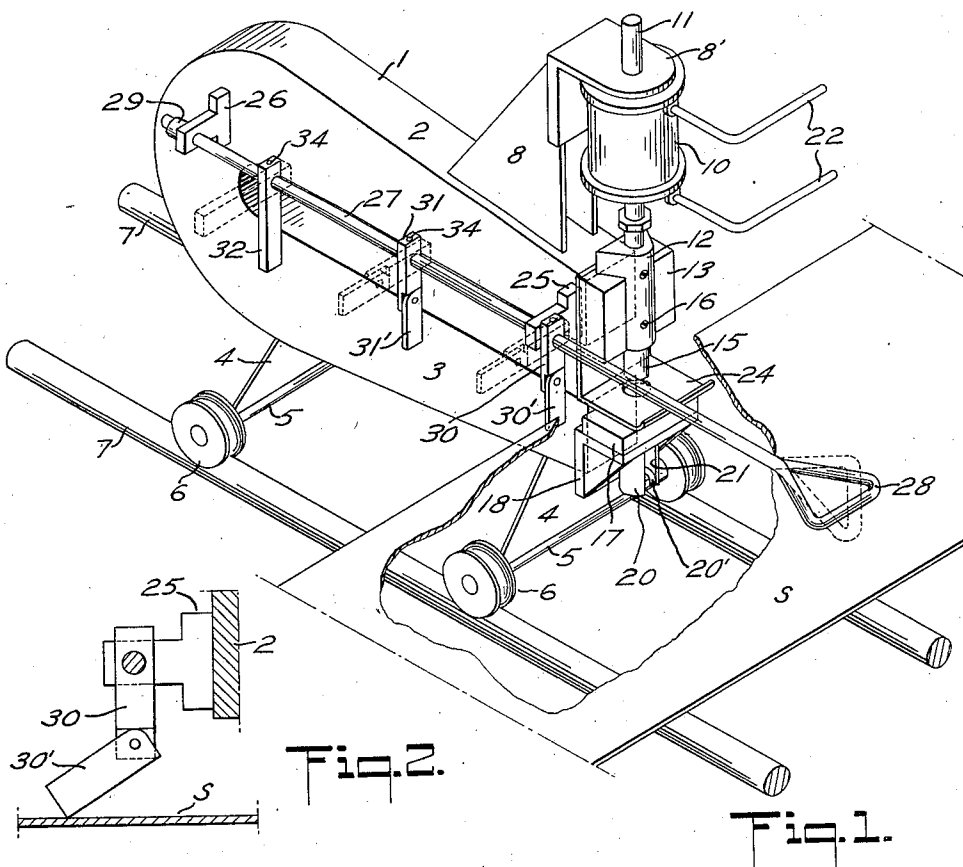
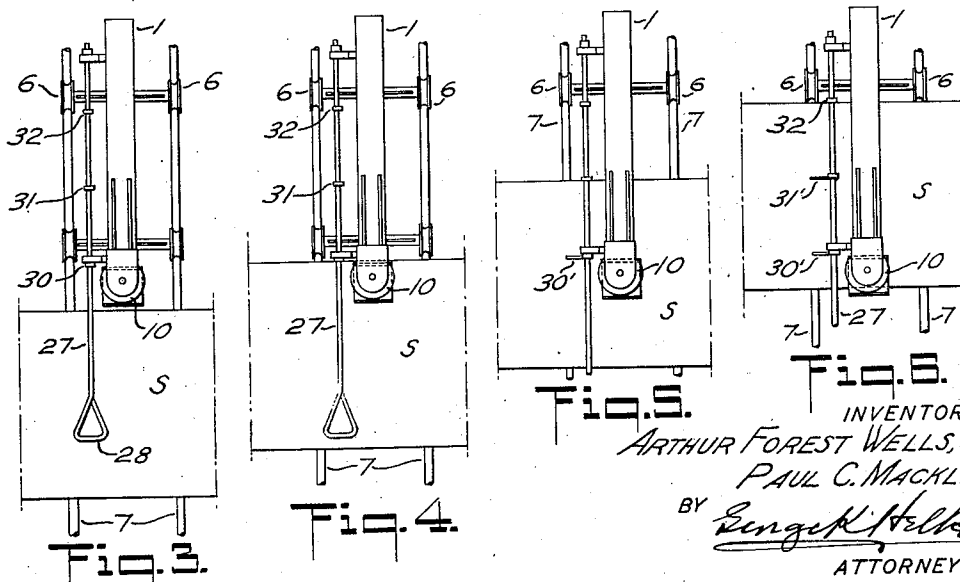
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A. F. WELLS, JR., ET AL

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APPARATUS FOR FORMING TEST SAMPLES OF ELECTROLYTIC TIN PLATE

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APPARATUS FOR FORMING TEST SAMPLES
OF ELECTROLYTIC TIN PLATEArthur Forest Wells, Jr., and Paul C. Mackley,
Gary, Ind.

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Electrolytic tin plate is produced very rapidly in a strip of indefinite length and usually approximating 28" in width, which after the plating and any subsequent finishing operations is led to and then formed into coils on a coiling machine from which the coils are removed consecutively when they reach the desired size. In order to insure the tin coating is of proper weight and for other reasons it is customary to take samples from the strip from time to time and subject them to suitable laboratory tests, and to obtain these samples, usually disks of an area of 4 sq. in., it has been the practice to remove a piece about 8" wide from the end of the strip whenever a new coil is being formed and then cut it at the laboratory into test samples of the required size. But this practice is open to the objection, among others, that the coating adjacent the ends of an electrolytic tin strip, which is normally many feet in length, is ordinarily not representative of the coating more remote from the ends and so samples taken from near the latter when subjected subsequently to tests often give a false indication of the character of the coating of the major part of the strip; the results obtained from tests made from samples cut from the ends of the strips are consequently unsatisfactory. Moreover it sometimes happens that the coating varies in thickness between the edges of the strip so it is customary for each test to use three samples, two of which are respectively taken from near the opposite edges of the strip and the third from its center. It follows that any apparatus designed for procuring test samples of electrolytically tinned strip should be capable of taking for each test a series of samples at like transversely spaced intervals at any desired point in the length of the strip and preferably remote from its ends.

It is therefore an object of our invention to provide an apparatus capable of satisfactorily fulfilling these conditions, which is of simple design and construction, readily operable by unskilled labor, adapted for installation at any desired location in the path traveled by the strip to the coiler and which may be used in existing strip lines without requiring modification or rearrangement of their operating units.

Other objects and novel features of design, construction and arrangement comprehended by our invention are hereinafter more particularly pointed out or will be apparent to those skilled in the art from the following description of one embodiment thereof as shown in the accompanying drawing in which:

Fig. 1 is a fragmentary perspective view show-

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ing the apparatus in association with an electrolytic tin strip, a portion of which is broken away for the sake of clearness;

Fig. 2 is a fragmentary detail enlarged elevation showing the relation of one of the hinged gauge stops to the strip when it is above the latter and in contact therewith;

Fig. 3 is a top plan diagrammatic view on a reduced scale showing the relation of the apparatus to the strip when the former is out of use; and

Figs. 4, 5 and 6 are similar diagrammatic views respectively showing the apparatus in position for taking a sample from a point adjacent one edge of the strip, from the center of the strip, and from near the other edge thereof.

Like characters of reference are used to designate the same parts throughout the drawing.

The embodiment of the invention we have chosen to illustrate comprises a U-shaped frame 1 the throat of which is longer than the width of the strip with which the apparatus is to be used so that when its upper and lower arms 2, 3 are disposed above and below the strip the frame can be moved across it for its full width without engaging the proximate edge of the latter. The frame is conveniently made of steel plate welded together and of sufficiently heavy gauge to afford the requisite rigidity, and its lower arm 3 carries a pair of spaced brackets 4 to which are secured axles 5 on the extremities of which are grooved wheels 6 which support the frame on tracks 7 extending transversely to the path of the strip S for a sufficient distance to permit the frame to be pulled forwardly across the strip or pushed rearwardly so as to clear its rear edge for an appropriate distance. The tracks or rails are supported, preferably at their extremities, by a suitable framework or other means (not shown).

Welded or otherwise firmly secured to the top of the upper frame bar 2 is a bracket 8 having a forwardly projecting portion 9 which supports an air cylinder 10 containing a piston connected with a piston rod 11 in turn carrying at its lower end a slide block 12 vertically movable in undercut ways of a guide 13 fixed at the front end of the frame arm so that as the piston reciprocates the block will move vertically in the guide. This block is bored to receive the shank of a punch 15 which may be held in the block by a set screw 16, the punch being circular in cross section and of a diameter to remove from the strip a sample of the desired size. The punch is aligned with a corresponding opening in a die block 17 supported on a bracket 18 fixed to the front end

of the lower arm of the frame below the path of the strip so that when the latter overlies the die and the punch descends, a circular sample will be struck from the strip. For conveniently receiving this sample a tube 20 having an inwardly directed flange 20' at its lower end is mounted below and in alignment with the hole in the die block so that as the sample descends therefrom it will pass into the tube, and to enable it to be conveniently removed therefrom the tube is cut away to provide a slot 21 in its front so the thumb and finger of the operator can be inserted and the sample or samples turned edgewise and drawn out through the slot, or the tube may be arranged in some other manner for ready removal of the samples.

For actuating the piston compressed air or other suitable fluid is conveyed to the respective ends of the cylinder by pipes 22 controlled by a valve or valves (not shown) positioned for convenient access by the operator who normally stands near that edge of the strip opposite that proximate the apparatus when retracted to the non-operative position of Fig. 3 and which for convenience we term the front edge.

It will now be apparent that when the punch is raised the frame can be moved forward on tracks 7 from the position of Fig. 3 so as to enter the rear edge of the strip in its throat and then bring the punch above the strip to any desired point between its edges. To facilitate entry of the strip between the punch and the die block, a forwardly and upwardly curved shield or guide 24 provided with an opening for the passage of the punch is secured to the front end of the upper bar of the frame so as to properly guide the edge of the strip into the throat of the latter.

Since it is desirable that the samples used for making each consecutive test be cut from the strip at the same distance from its edges, means now to be described are provided for effecting this result by insuring the same relative location of the punch with respect to the rear edge of the strip each time that it is operated to form corresponding samples whereby all those taken proximate the rear edge of the strip will be centered on a line parallel thereto, all those from the center of the strip on a line coincident therewith, and all those proximate the front edge on a line likewise parallel to the rear edge. To this end a pair of brackets 25, 26 are fixed to the upper frame arm 2, conveniently to one of its sides, and serve to rotatably support a rod 27 substantially parallel to but extending transversely of the upper surface of the strip. The front end of this rod, which is long enough to extend well across the strip, is formed to provide a convenient handle 28 while a nut 29 on the rod behind bracket 26 is effective to communicate a pull on the rod to the frame to move it forward on the tracks. Additionally means are provided for stopping such forward movement of the frame at consecutive predetermined intervals with respect to the rear edge of the strip so that the initial movement from the position of Fig. 3 will bring the punch a predetermined distance from that edge preparatory to punching out the first sample, the ensuing movement will bring it to the center of the strip, and the final movement to a point relatively close to the front edge thereof; thus after the first sample is punched out the apparatus may be moved to the second position and properly located therein preparatory to punching the center sample and then to the third position preparatory to punching the other edge sample,

after which it may be returned to its initial or non-operative position.

More particularly said locating means comprise a series of spaced gauge stops on rod 27 between brackets 25, 26, corresponding in number to the number of samples to be taken for each set and of such length they normally extend below the path traveled by the strip as it moves toward the coiler. Three of these stops 30, 31, 32 are usually employed but of course if it be desired to take more or fewer samples during a single progressive forward movement of the apparatus across the strip, a correspondingly larger or smaller number are provided. Preferably the stops are adjustably secured on the rod in any convenient way, as by set screws 34, so they will extend generally normal to the plane of handle 28 which normally lies substantially parallel to the path of the strip, the stop 30 being positioned adjacent and in front of bracket 25 so as to transfer a rearward push on the rod thereto and thence to the frame. It will thus be apparent that when the apparatus is pulled forward by means of the handle from the inoperative position of Fig. 3 its progress will be arrested in the position of Fig. 4 by engagement of the lower end of stop 30 with the rear edge of the strip, thus locating the punch for taking the sample from adjacent that edge. The operator then actuates the control means for the piston in cylinder 10 so as to drive the punch down, punch the sample from the strip and return the punch to raised position. He then turns handle 28 in a clockwise direction when viewed as in Fig. 1 so as to correspondingly rotate rod 27 and raise the stops substantially to the dotted line position indicated therein in which they extend above and substantially parallel to the upper face of the strip, and draws the apparatus toward him sufficiently to bring stop 30 above its surface meanwhile turning the handle in counter-clockwise or reverse direction so as to lower stop 31 sufficiently to engage the rear edge of the strip when it reaches it and thus position the punch for taking the second or center sample from the strip (Fig. 5). To enable a full reverse movement of the handle, the lower part 30' of stop 30, and likewise the lower part 31' of stop 31, is hinged to the upper part in such manner that when the lower corner of either stop engages the strip as the handle is being turned back to initial position, the hinged part can swing upwardly and ultimately assume substantially the position of Fig. 2, the hinge being preferably designed to permit the hinged part to turn outwardly but not inwardly with respect to the upper part.

The punch is next operated to form the center sample, the handle again turned clockwise to raise the stops and the apparatus pulled still farther forward while the handle is being returned to initial or horizontal position until stop 32 engages the rear edge of the strip and so locates the punch for taking the third sample from near its forward edge (Fig. 6), the lower parts 30' and 31' of stops 30 and 31 both turning upwardly and outwardly as above explained. Obviously it is unnecessary to hinge the lower part of stop 32, constituting the last in the series, since it is never necessary for it to engage the face of the strip, limiting, as it does, the ultimate essential forward movement of the apparatus.

After the third sample has been formed the apparatus is returned to the initial position by pushing on the handle which is preferably turned in a clockwise direction to lift stops 30, 31 entirely

clear of the strip during this retrograde movement, and at its completion is then turned back to normal position preparatory to taking the next set of samples as and when required.

The apparatus may be located at any point with respect the various mechanisms included in the tinning line though it is preferably disposed between the coiler and the "looper" which in the well known way serves as a magazine for the strip preparatory to its passage to the coiler and enables the coils to be consecutively formed on the latter without slowing up the passage of the strip through the plating tank. The apparatus may then be utilized to form the samples whenever desired while the strip is at rest, as when a coil is being removed from the coiler and the leading end of the uncoiled following part attached thereto for formation of the succeeding coil, and as the manner of its operation will be readily understood from what has already been said, further reference thereto would be superfluous.

Our invention thus provides a conveniently operable apparatus for taking samples from electrolytically tinned strip preparatory to its being coiled but though primarily designed for that purpose will frequently be found of advantage in other industrial applications of generally similar character, and we therefore do not desire or intend to confine or restrict its use to the sampling of such strip.

Moreover while we have herein illustrated and described with considerable particularity a preferred embodiment of the invention which we have found extremely satisfactory under practical conditions of operation, it is to be understood that numerous changes and modifications may be made in its design and details of construction without departing from the spirit and scope of the invention as defined in the appended claims.

Having thus described our invention, we claim and desire to protect by Letters Patent of the United States:

1. Apparatus of the class described comprising a frame having arms adapted to extend above and below a strip, a punch carried by one arm, a die carried by the other, means supporting the frame for movement transversely of the strip, means operable to actuate the punch, and stop means engageable with the edge of the strip and consecutively operable to arrest movement of the frame across the strip at predetermined intervals.

2. Apparatus of the class described comprising a frame having spaced arms adapted to receive a strip between them, means supporting the frame for movement transversely of the strip, a reciprocal punch carried by one arm, a die carried by the other, means operable to actuate the punch, a handle for moving the frame, and means actuated by the handle consecutively operable by engagement with an edge of the strip to arrest movement of the frame across the strip in one direction at predetermined intervals and thereby position the punch at different distances from said edge preparatory to punching the strip.

3. Apparatus of the class described comprising a U-shaped frame providing a throat adapted to receive a strip, means supporting the frame for movement across the strip from a point adjacent one of its edges, a reciprocal punch associated with the end of one of said arms, a die block associated with the end of the other arm, means operable to actuate the punch, an axially rotatable rod carried by the frame providing a handle located outwardly of said ends, and a series of

gauge stops carried by the rod normally respectively adapted to consecutively engage said edge as the frame is drawn forwardly across the strip but movable out of strip engaging position by rotation of the rod to thereby permit further forward movement of the frame.

4. Apparatus of the class described comprising a U-shaped frame having vertically spaced arms of sufficient length to extend substantially across a strip received between them, a reciprocal punch disposed proximate the end of one arm, a die block disposed proximate the end of the other, means operable to actuate the punch, means supporting the frame for movement across the strip from a position adjacent an edge thereof, a non-axially movable but rotatable rod carried by the frame and terminating in a handle disposed outwardly of the frame for reciprocating it over the strip, a series of gauge stops on the rod respectively adapted as the frame is drawn forward to consecutively engage said edge when the stops are in substantially vertical position and thereby limit forward movement of the frame but movable out of said position by rotation of the rod whereby the stops may be respectively employed to locate the punch at predetermined intervals from the edge of the strip.

5. Apparatus of the class described comprising a U-shaped frame having vertically spaced arms of sufficient length to extend substantially across a strip received between them, a reciprocal punch disposed proximate the end of one arm, a die block disposed proximate the end of the other, means operable to actuate the punch, means supporting the frame for movement across the strip from a position adjacent an edge thereof, a non-axially movable but rotatable rod carried by the frame and terminating in a handle disposed outwardly of the frame for reciprocating it over the strip, a series of gauge stops on the rod respectively adapted as the frame is drawn forward to consecutively engage said edge when the stops are in substantially vertical position and thereby limit forward movement of the frame but movable out of said position by rotation of the rod whereby the stops may be respectively employed to locate the punch at predetermined intervals from the edge of the strip, those stops in the series which overlie the strip during any part of the travel of the frame having their lower portions movable with respect to their upper portions to enable the former to assume an angular relation with the surface of the strip when disposed thereabove.

6. Apparatus of the class described comprising a U-shaped frame with its free ends adjacent and above and below the path of a strip, means supporting the frame for movement transversely of a strip disposed in said path, a punch carried by the free end of one arm, a die block carried by the free end of the other, means for actuating the punch, an axially rotatable rod journaled on the frame, extending across the strip and terminating in a handle proximate the edge thereof remote from the frame, and a series of stops disposed at intervals on the rod and normally depending below the plane of the strip whereby the frame may be drawn by the handle across the strip until its movement is arrested by engagement by the first stop in the series with the proximate edge of the strip to thereby position the punch at a predetermined interval from said edge, said stop may then be disengaged from said edge by partial rotation of the rod, the frame again drawn forward and the next stop in the

series placed in stopping position by reverse rotation of the rod during said forward movement to thereby position the punch at a greater predetermined interval from said edge.

7. Apparatus of the class described comprising a U-shaped frame with its free ends adjacent and above and below the path of a strip, means supporting the frame for movement transversely of a strip disposed in said path, a punch carried by the free end of one arm, a die block carried by the free end of the other, means for actuating the punch, an axially rotatable rod journaled on the frame, extending across the strip and terminating in a handle proximate the edge thereof remote from the frame, and a series of stops disposed at intervals on the rod and normally depending below the plane of the strip whereby the frame may be drawn by the handle across the strip until its movement is arrested by engagement by the first stop in the series with the proximate edge of the strip to thereby position the punch at a predetermined interval from said edge, said stop may then be disengaged from said edge by partial rotation of the rod, the frame again drawn forward and the next stop in the series placed in stopping position by reverse rotation of the rod during said forward movement to thereby position the punch at a greater predetermined interval from said edge, at least one of the stops having a hinged lower portion adapted to assume an angular relation with the surface of the strip when brought into engagement therewith.

8. A device of the class described having a frame comprising vertically spaced arms, supporting structure for the frame including wheels engageable with parallel tracks, a punch adjacent the free end of one arm, a die block adjacent the free end of the other arm, means operable to actuate the punch, a rod journaled for rotation on the upper arm, means inhibiting axial and lateral movements of the rod and a series of gauge stops disposed at intervals along said rod and normally depending therefrom below the upper surface of the die block.

9. A device of the class described having a frame comprising vertically spaced arms, supporting structure for the frame including wheels engageable with parallel tracks, a punch adjacent the free end of one arm, a die block adjacent the free end of the other arm, means operable to actuate the punch, a rod journaled for rotation on the upper arm, means inhibiting axial and lateral movements of the rod and a series of gauge stops disposed at intervals along said rod and normally depending therefrom below the surface

of the die block, the lower portion of at least one of the stops being adapted to swing upwardly above the plane of said block.

10. Apparatus of the class described comprising a frame having vertically spaced arms, supporting structure for the frame including wheels adapted for cooperation with parallel tracks, a reciprocal punch associated with one end of one arm, a die block associated with the corresponding end of the other arm, a rod journaled for rotation on the first arm, means inhibiting axial and lateral movements of the rod a plurality of gauge stops disposed at intervals on the rod normally depending below the plane of that face of the die block proximate the punch but movable out of alignment with said plane by rotation of the rod, and a receptacle below the die block for receiving sheet material punched out by cooperation of the punch and block.

11. Apparatus of the class described comprising a frame having vertically spaced arms, supporting structure for the frame including wheels adapted for cooperation with parallel tracks, a reciprocal punch associated with one end of one arm, a die block associated with the corresponding end of the other arm, a rod journaled for rotation on the first arm, means inhibiting axial and lateral movements of the rod a plurality of gauge stops disposed at intervals on the rod normally depending below the plane of that face of the die block proximate the punch but movable out of alignment with said plane by rotation of the rod, and a receptacle below the die block for receiving sheet material punched out by cooperation of the punch and block, the lower portion of at least one of the stops being hinged to swing upwardly above said plane when the upper part of the stop is in normal position.

ARTHUR FOREST WELLS, JR.
PAUL C. MACKLEY.

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