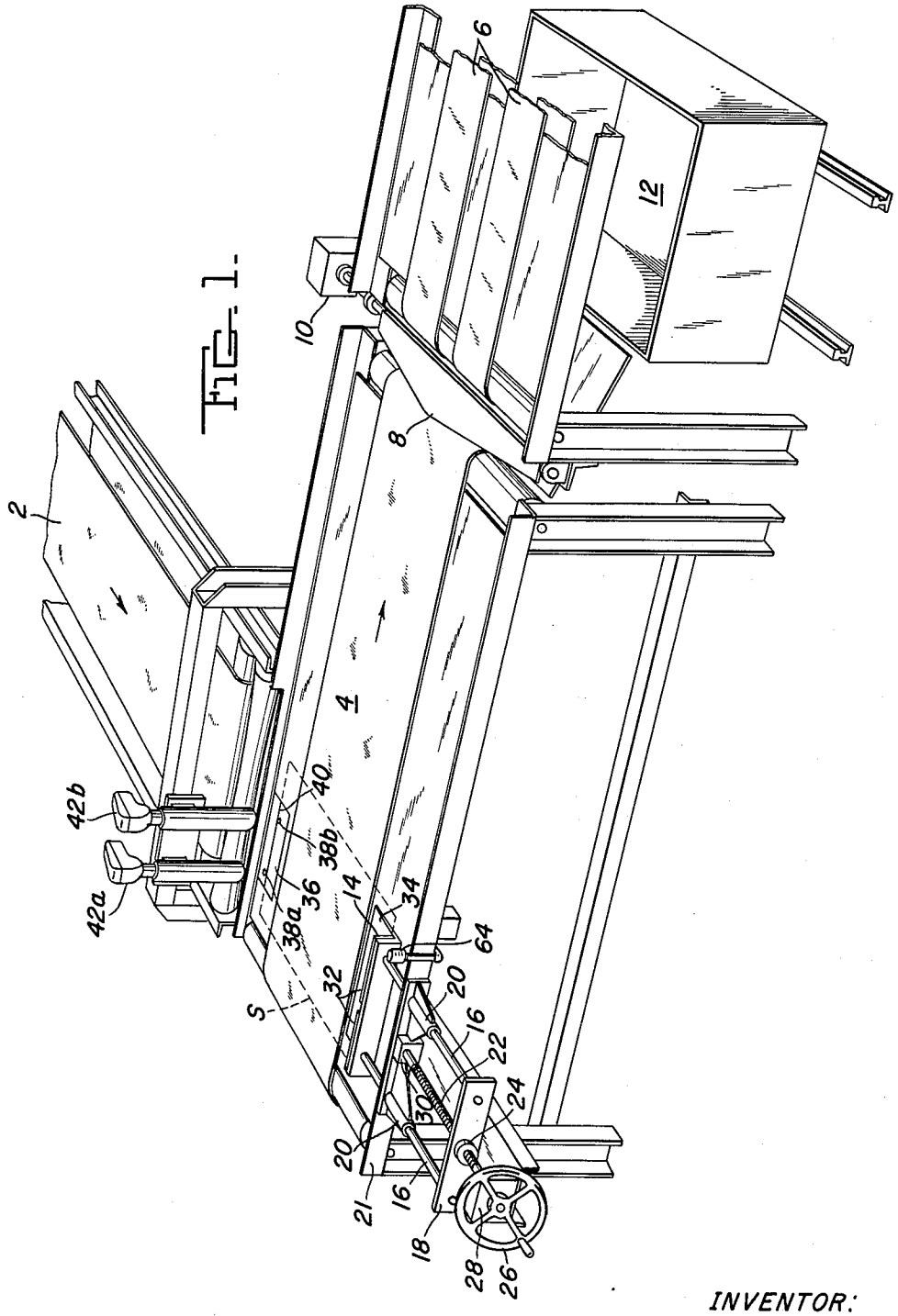
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GAGE

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FIG. 1.



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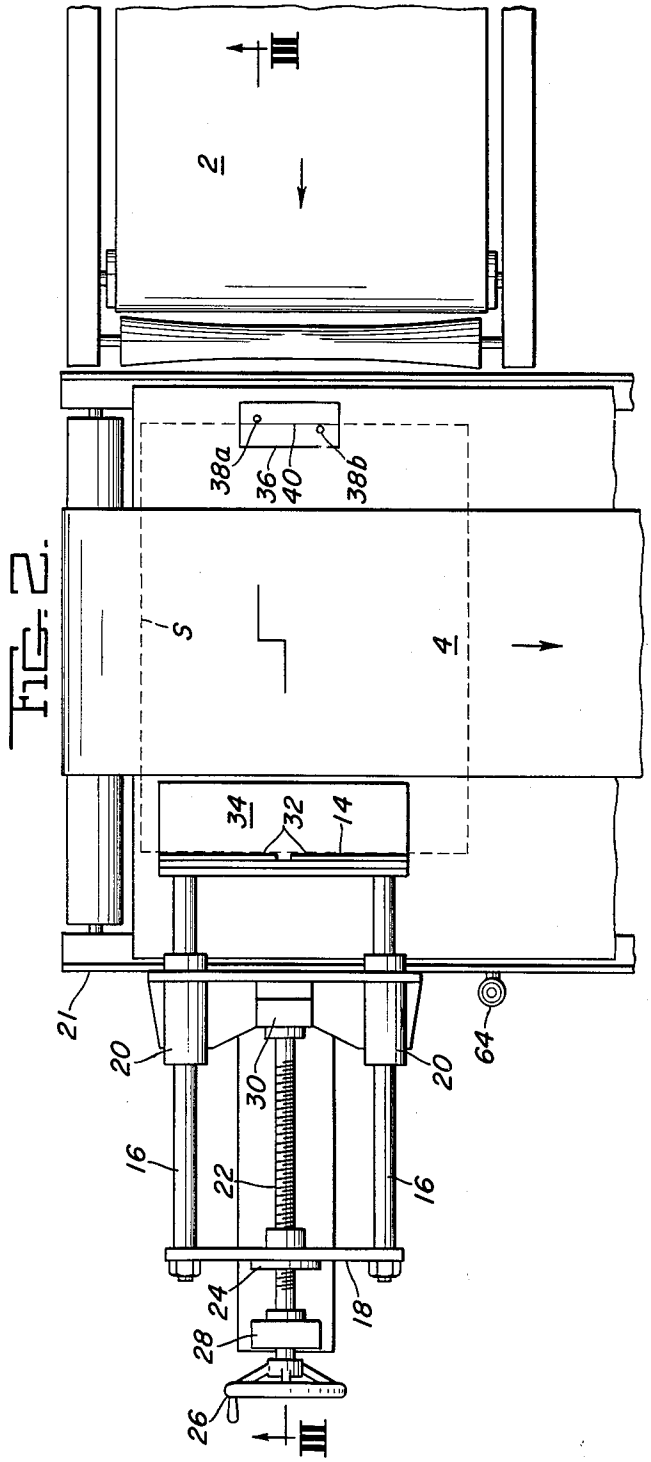


FIG. 2.

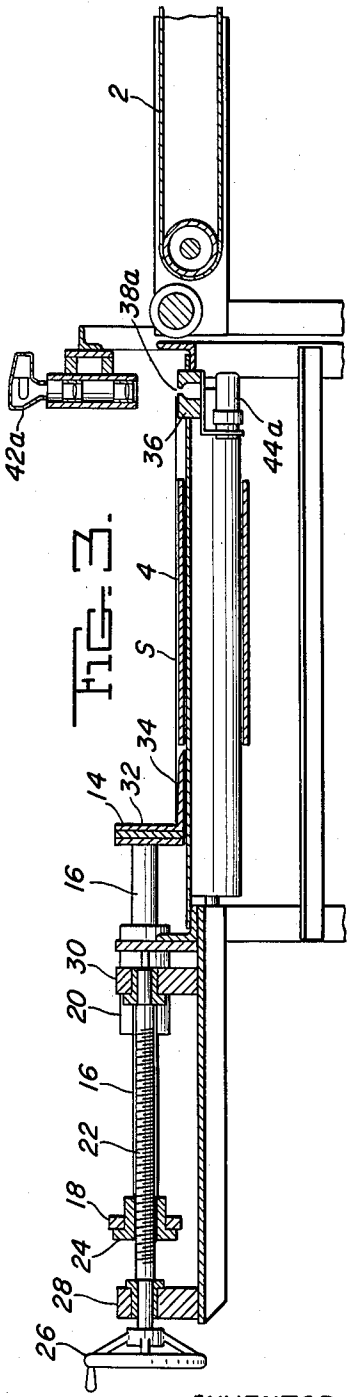


FIG. 3.

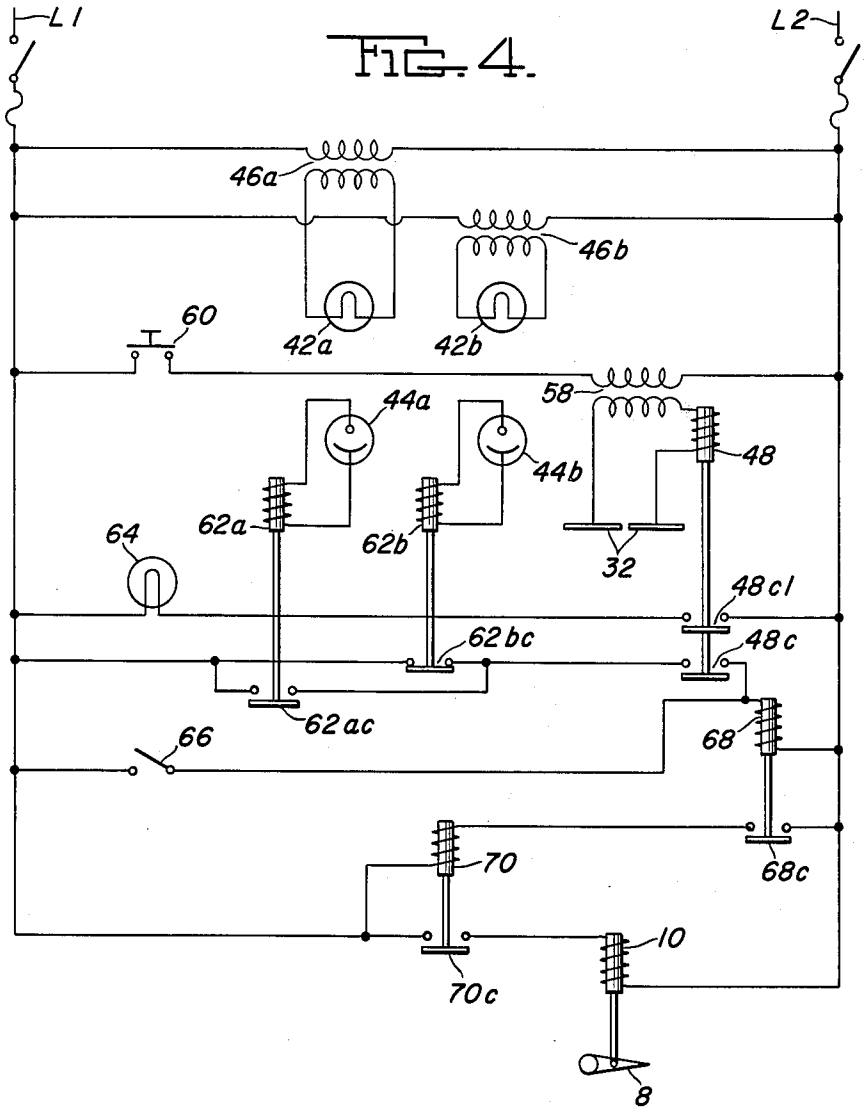
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FIG. 4.



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GAGE

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Application June 25, 1954, Serial No. 439,279

5 Claims. (Cl. 209—82)

This invention relates to a gage and more particularly to a gage for picking out and rejecting tin plate sheets which may have been cut to the wrong dimensions through misadjustment of the shear on the electrolytic tinning line. In the manufacture of tin plate by the electrolytic process, the strip in continuous lengths passes through the tinning line. It is then cut to size by means of a flying shear. Such sheets are sold to the can companies who have automatic can making machines. If the sheet sizes are not within close tolerance they will interfere with the proper functioning of the can making machines. For that reason it is necessary to have the sheets within these close limits. Prior to the present invention when the shear was misadjusted it was necessary to measure the sheets manually in order to determine whether they were within the allowed tolerance. This, in addition to being expensive and time-consuming, depends upon the skill of the workmen for an accurate determination of sheet measurement.

It is therefore an object of my invention to provide a gage and sorting device which permits the automatic sorting of tin plate sheets.

This and other objects will be more apparent after referring to the following specification and attached drawings, in which:

Figure 1 is a schematic perspective view of the gage and sorting apparatus of my invention;

Figure 2 is a top plan view of the gage;

Figure 3 is a view taken on the line III—III of Figure 2; and

Figure 4 is a schematic wiring diagram used in conjunction with my invention.

Referring more particularly to the drawings, reference numeral 2 indicates a belt conveyor which delivers sheets S to be inspected to the gage of my invention. Arranged at right angles to the conveyor 2 is a second belt conveyor 4 which delivers the sheets S to a third belt conveyor 6. Located between the conveyors 4 and 6 is a deflector gate 8 which is normally in horizontal position but which may be raised by means of solenoid 10 to deflect defective sheets to a reject pile 12 located beneath conveyor 6. Mounted above the belt conveyor 4 in close proximity thereto at the entry end thereof is a straight edge 14. A pair of rods 16 are attached to the back of the straight edge 14 and are connected at their rearward end by means of a plate 18. The rods 16 are slidably mounted in brackets 20 attached to the conveyor frame 21. A threaded rod 22 passes through a nut 24 attached to the plate 18 and has a hand wheel 26 attached to its outer end. The rod 22 is supported between brackets 28 and 30. By turning the hand wheel 26 and rod 22 the plate 18 and the straight edge 14 are moved inwardly or outwardly as desired. A pair of brass contact plates 32 are arranged on the inside of straight edge 14. A horizontal plate 34 is attached to the bottom of straight edge 14 with its top side aligned with the top of conveyor 4 for receiving sheets to be gaged. A gage plate 36 is arranged on the opposite side of the conveyor 4 from the

straight edge 14 and is provided with spaced holes 38*a* and 38*b* which are arranged on each side of a line 40 which is parallel to the plates 32 and spaced therefrom a distance corresponding to the desired length of the sheet. Light sources 42*a* and 42*b* are located above the holes 38*a* and 38*b*, respectively, and photoelectric tubes 44*a* and 44*b* are located directly beneath the holes 38*a* and 38*b*, respectively. Power for light sources 42*a* and 42*b* is provided from a 110 volt A. C. power source L1 and L2 through transformers 46*a* and 46*b*, respectively, as shown in Figure 4. A relay coil 48 is connected in series with the conductor plates 32. A circuit through the plates 32 and coil 48 is completed when a sheet S is properly positioned so that one of its edges contacts both of the plates 32. Power for this circuit is provided from power source L1 and L2 through a transformer 58. A push button switch 60 is arranged in series with the primary winding of the transformer 58. Photoelectric tubes 44*a* and 44*b* are connected in series with the relay coils 62*a* and 62*b*, respectively. While the coils are shown as directly connected to the photocells it will be understood that the usual amplifying means may be provided in the circuit. The contact 62*ac* of relay 62*a* is open when light is shining on phototube 44*a* and contact 62*bc* of relay 62*b* is closed when light is shining on photocell 44*b*. The photocells 44*a* and 44*b* and their associated equipment are so arranged that their relays will operate when more than half of the openings 38*a* and 38*b* pass light. The contacts 62*ac* and 62*bc* are connected in parallel with each other and in series with contact 48*c* of relay 48. Relay 48 also is provided with contact 48*cl* which is connected in series with a light 64. A push button switch 66 is connected in parallel with contact 48*c*. A relay coil 68 is connected in series with the contact 48*c* and switch 66. Relay coil 68 has a normally open contact 68*c* which is connected in series with a relay coil 70 which is provided with normally open contact 70*c*. Relay coil 70 and its contact 70*c* constitute time delay means for operating the solenoid 10 after a predetermined time.

The operation of the gage is as follows:

The straight edge 14 is so adjusted that the distance between the brass contact plates 32 and the line 40 is that desired in the sheet S. Assuming that the allowed tolerance is plus or minus 1/16", the openings 38*a* and 38*b* will have their centers located 1/16" on either side of the center line 40. When a sheet S is fed to the gage by the conveyor 2 and positioned by the operator so that one edge contacts both plates 32, a circuit will be completed through relay coil 48 if the switch 60 is in closed position. Energization of coil 48 will close contacts 48*c* and 48*cl*. Closing of contact 48*cl* will light light 64, thus indicating that the sheet S is properly positioned. If the sheet length is within the allowed tolerance there will be sufficient light on photocell 44*a* to keep its contact 62*ac* open but there will not be sufficient light on photocell 44*b* to operate its relay so that contact 62*bc* will open. Thus closing of contact 48*c* will have no effect on the circuits. When the gaging is completed the operator will push the sheet down the conveyor until the conveyor sufficiently engages the sheet to move it along. When the sheet is within the allowed tolerance it will pass over the gate 8 to the conveyor 6 and hence to the prime pile. If the sheet is longer than permitted it will cover more than half of opening 38*a*, thus de-energizing coil 62*a* and causing contact 62*ac* to close. If the sheet is shorter than permitted sufficient light will pass through opening 38*b* to keep relay 62*b* energized so that contact 62*bc* will be closed. In either case a circuit will be completed through relay coil 68, thus closing contact 68*c* and energizing relay coil 70. This in turn closes contact 70*c* and completes the circuit through solenoid 10, thus raising deflector gate

8 and causing the defective sheet S to pass downwardly into reject pile 12.

While one embodiment of my invention has been shown and described it will be apparent that other adaptations and modifications may be made without departing from the scope of the following claims.

I claim:

1. Apparatus for determining a linear dimension of a sheet comprising two aligned conductor plates constituting a straight edge for contacting one edge of a sheet, means for supporting said sheet against said straight edge, sheet receiving means spaced from the straight edge a distance approximately equal to the length of the said linear dimension, said sheet receiving means having two spaced holes therethrough, one of said holes being spaced from said straight edge a distance slightly less than the desired length of said linear dimension and the other of said holes being spaced from said straight edge a distance slightly greater than the desired length of said linear dimension, a light source on one side of each of said holes, a photosensitive device on the other side of each of said holes, and means operative when a sheet contacts both of said conductor plates and responsive to light control of said photosensitive device for indicating whether the said linear dimension is within allowed tolerances.

2. Apparatus for gaging a linear dimension of sheets and sorting the sheets according to the operation of said gage comprising a pair of conveyors arranged in tandem, a deflector gate between said conveyors, means connected to said gate for moving the same to deflect off gage sheets to a reject pile, a straight edge adjacent one edge of the first of said conveyors for contacting one edge of a sheet, means for supporting said sheet against said straight edge, sheet receiving means adjacent the opposite edge of said first conveyor, said sheet receiving means having two spaced holes therethrough, one of said holes being spaced from said straight edge a distance slightly less than the desired length of said linear dimension and the other of said holes being spaced from said straight edge a distance slightly greater than the desired length of said linear dimension, a light source on one side of each of said holes, a photosensitive device on the other side of each of said holes, and means responsive to light control of said photosensitive device for operating said gate moving means when the said linear dimension is outside allowed tolerances.

3. Apparatus for gaging a linear dimension of sheets and sorting the sheets according to the operation of said gage comprising a pair of conveyors arranged in tandem, a deflector gate between said conveyors, means connected to said gate for moving the same to deflect off gage sheets to a reject pile, two aligned conductor plates constituting a straight edge adjacent one edge of the first of said conveyors for contacting one edge of a sheet, means for supporting said sheet against said straight edge, sheet receiving means adjacent the opposite edge of said first conveyor, said sheet receiving means having two spaced holes therethrough, one of said holes being spaced from said straight edge a distance slightly less than the desired length of said linear dimension and the other of said holes being spaced from said straight edge a distance slightly greater than the desired length of said linear dimension, a light source on one side of each of said holes, a photosensitive device on the other side of each of said holes, and means operative when a sheet contacts both of said conductor plates and responsive to light control of said photosensitive devices for operating said gate moving means when the said linear dimension is outside allowed tolerances.

4. Apparatus for determining a linear dimension of a sheet comprising two aligned conductor plates constituting a straight edge for contacting one edge of a sheet, means for supporting said sheet against said straight edge, sheet receiving means spaced from the straight edge a distance approximately equal to the length of the said linear dimension, said sheet receiving means having two spaced holes therethrough, one of said holes being spaced from said straight edge a distance slightly less than the desired length of said linear dimension and the other of said holes being spaced from said straight edge a distance greater than the desired length of said linear dimension, means for moving said straight edge toward and away from said spaced holes in a direction perpendicular to said straight edge, a light source on one side of each of said holes, a photosensitive device on the other side of each of said holes, and means operative when a sheet contacts both of said conductor plates and responsive to light control of said photosensitive device for indicating whether the said linear dimension is within allowed tolerances.

5. Apparatus for determining a linear dimension of a sheet comprising two aligned conductor plates constituting a straight edge for contacting one edge of a sheet, means for supporting said sheet against said straight edge, sheet receiving means spaced from the straight edge a distance approximately equal to the length of the said linear dimension, said sheet receiving means having two spaced holes therethrough, one of said holes being spaced from said straight edge a distance slightly less than the desired length of said linear dimension and the other of said holes being spaced from said straight edge a distance slightly greater than the desired length of said linear dimension, a light source on one side of each of said holes, a photosensitive device on the other side of each of said holes, an electric circuit including said aligned conductor plates and a relay, said electric circuit being completed when a sheet contacts both of said conductor plates, a second electric circuit including a pair of contacts connected in parallel, the contacts of said relay being connected in series with said pair of contacts, and means responsive to light control of said photosensitive devices for operating said pair of contacts.

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