Feb. 2, 1926. 1,571,429

A. F. NEY

MEANS FOR ATTACHING HINGED LIDS TO RECTANGULAR METAL BOXES

Filed Oct. 9, 1922 3 Sheets-Sheet 1

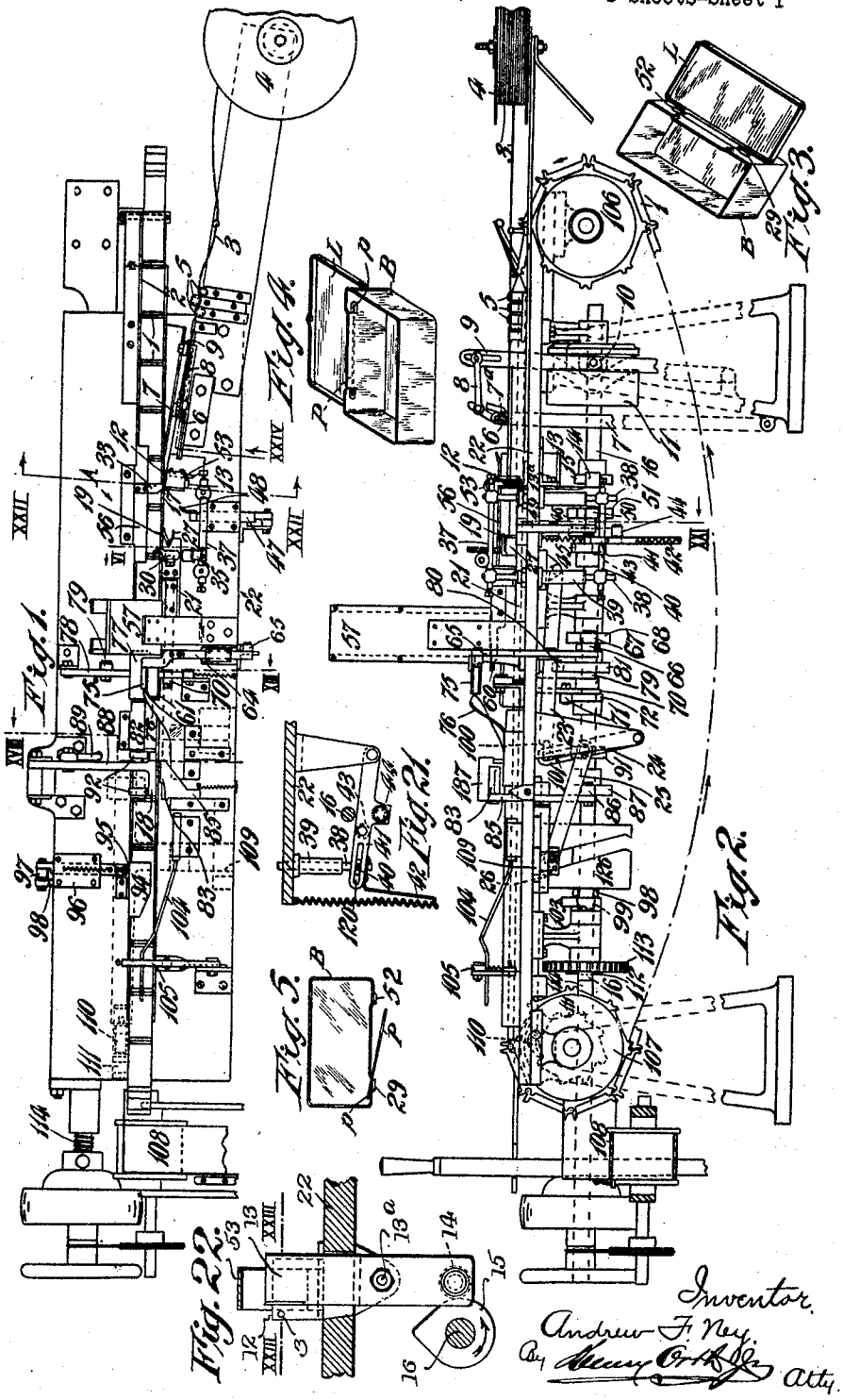


Fig. 1.

Fig. 2.

Fig. 2a.

Fig. 3.

Fig. 4.

Fig. 5.

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MEANS FOR ATTACHING HINGED LIDS TO RECTANGULAR METAL BOXES

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Fig. 6.

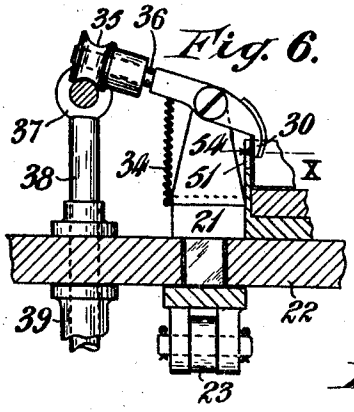


Fig. 7.

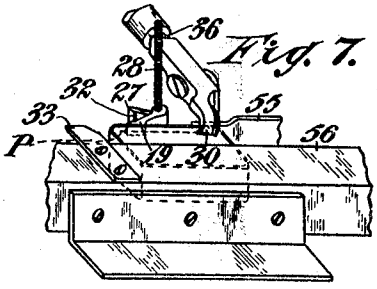


Fig. 8.



Fig. 9.

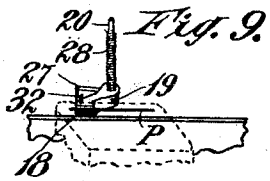


Fig. 11.

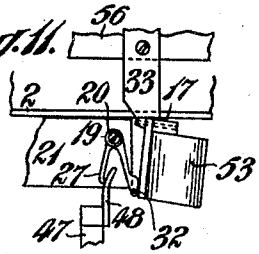


Fig. 10.

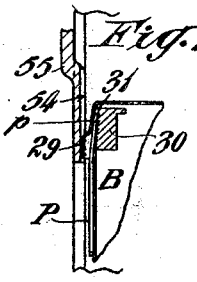
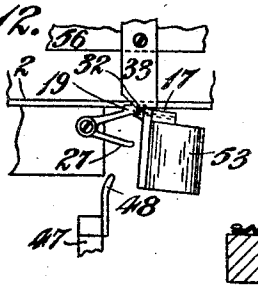


Fig. 12.



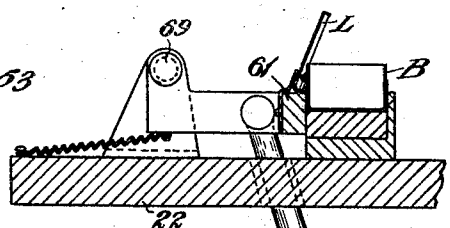


Fig. 25.

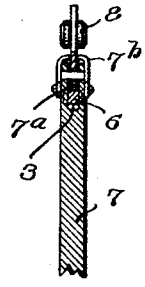


Fig. 14.

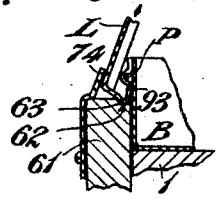
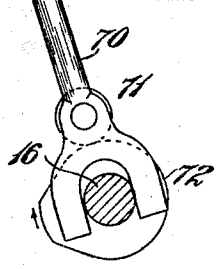


Fig. 13.



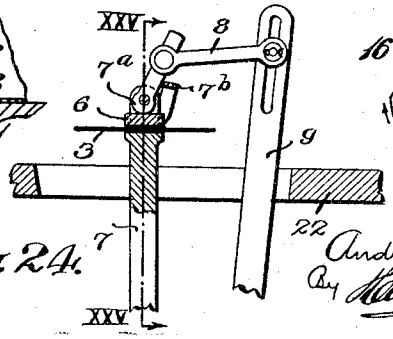


Fig. 24.

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MEANS FOR ATTACHING HINGED LIDS TO RECTANGULAR METAL BOXES

Filed Oct. 9, 1922 3 Sheets-Sheet 3

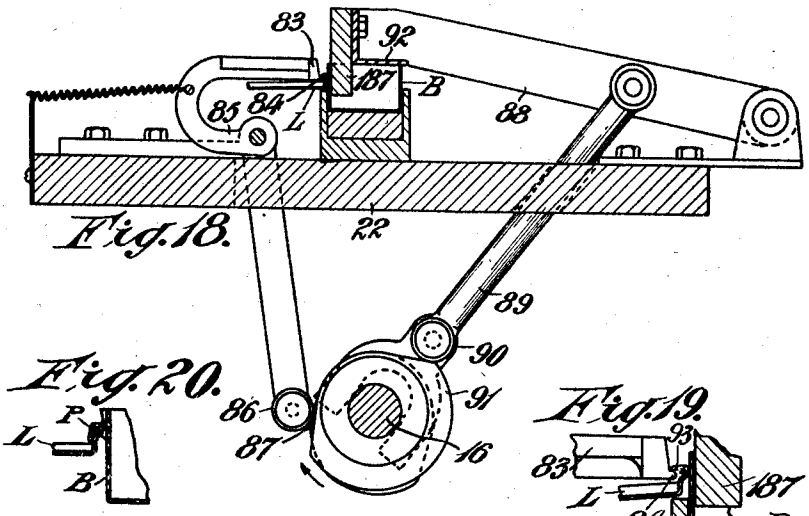


Fig. 18.

Fig. 20.

Fig. 19.

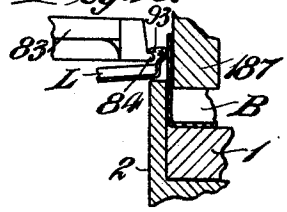


Fig. 15.

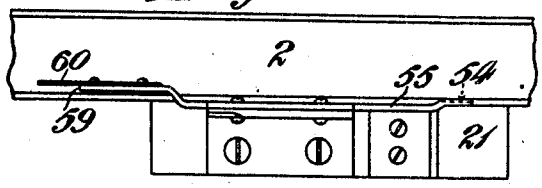


Fig. 16.

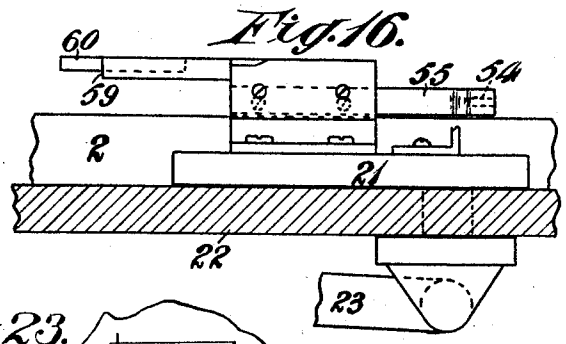


Fig. 17.

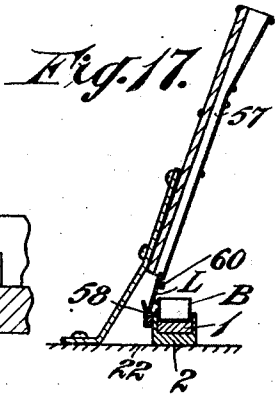
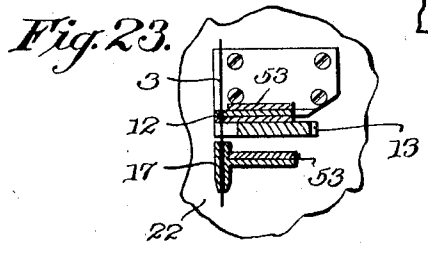


Fig. 23.



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Patented Feb. 2, 1926. 1,571,429

UNITED STATES PATENT OFFICE.

ANDREW FRANCIS NEY, OF EAST KEW, VICTORIA, AUSTRALIA, ASSIGNOR TO BRYANT AND MAY PROPRIETARY LIMITED, OF RICHMOND, VICTORIA, AUSTRALIA.

MEANS FOR ATTACHING HINGED LIDS TO RECTANGULAR METAL BOXES.

Application filed October 9, 1922. Serial No. 593,397.

To all whom it may concern:

Be it known that ANDREW FRANCIS NEY, a subject of the King of Great Britain, residing at "Glenelg," Edward Street, East Kew, in the State of Victoria, Commonwealth of Australia, has invented new and useful Improvements in Means for Attaching Hinged Lids to Rectangular Metal Boxes, of which the following is a specification.

This invention refers to rectangular metal boxes with hinged lids such for instance as are used for containing vestas tobacco or chocolate. Such boxes are punched in one side with a pair of aligned hinge pops into which are respectively inserted the ends of a hinge pin adapted to be engaged by the curved hinge tail of the lid, which hinge tail is clamped to embrace the pin, said operations except that of forming the hinge pops and bending the hinge tail having hitherto been effected by manual labour.

The primary essential features of the invention consists of mechanical means for automatically fitting a hinge pin into the pops of the tin body, feeding the lids to said pins, and bending the tail piece about the same, the pin fitting, and lid feeding and bending operations being effected in sequence by associated means controlled and actuated in tuned relationship.

A further characteristic feature of the invention consists in the association with said primary features of means for feeding from a reel, the wire to form the hinge pins, the straightening and cutting of said wire into hinge pins of uniform length, said operations being followed by the pin fitting and lid attachment operations mentioned and all in conjunction with an intermittent box body feeding means, the whole of the functions being performed in tuned relationship controlled by a single cam shaft.

The accompanying drawings illustrate an apparatus which will perform in a practical manner, all the essential features hereinbefore mentioned.

Referring now to these drawings—

Fig. 1 is a plan and Fig. 2 a side elevation of the machine with parts broken.

Figs. 3 and 4 are perspective views of the box.

Fig. 5 is a plan of the box illustrating the first step in inserting the hinge pin.

Fig. 6 is an enlarged section on line VI of Fig. 1 showing a portion of a box.

Fig. 7 is a perspective detail view as seen from A in Fig. 1.

Fig. 8 is a detail view of part of Fig. 6.

Fig. 9 is a detail of part of Fig. 7.

Fig. 10 a section on line X of Fig. 6.

Figs. 11 and 12 are detail views illustrating the operation of part of the mechanism for inserting the hinge pin in the box.

Fig. 13 is an enlarged detail sectional view on line XIII of Fig. 1 showing the lid hinging mechanism, and

Fig. 14 is an enlarged detail thereof.

Fig. 15 is an enlarged plan, and

Fig. 16 an elevation of parts not clearly seen in Figs. 1 and 2.

Fig. 17 is an enlarged vertical section through the lid chute.

Fig. 18 is an enlarged section on line XVIII of Fig. 1 illustrating the mechanism for bending the hinge tail of the lid around the hinge pin of the box, and

Fig. 19 is an enlarged detail.

Fig. 20 is a fragmentary section through a box with the lid finally hinged thereto.

Fig. 21 is a vertical section of certain parts on line XXI of Fig. 2.

Fig. 22 is an enlarged section on line XXII—XXII of Fig. 1;

Fig. 23 is a section on line XXIII—XXIII of Fig. 22.

Fig. 24 is an enlarged section on line XXIV of Fig. 1, and

Fig. 25 is a section on line XXV—XXV of Fig. 24.

According to this invention the bodies of the boxes B are caused to travel intermittingly by a chain carrier 1 in a channel guide way 2 past the various mechanically operated parts of the machine. The hinge wire 3 is supplied on a reel 4 and drawn from same through straightening pins 5 by means of grippers 6 (Figs. 1, 2, 24 and 25) one part being mounted on pivoted arm 7 and the cam grip 7^a, which opens and closes

on the wire, is connected with an arm 8 operated by pivoted lever 9 having a roller 10 actuated by cam 11 on the main shaft 16. As shown in Figs. 24 and 25, the wire gripper arm 7 is bifurcated and carries the gripper block 6, beneath which the wire 3 is fed. The cam 7^a is operated by the arm 8 and lever 9 to press the block 6 on the wire and the continued forward movement of the lever feeds the wire forward, said arm 7 swinging on a pivot at its lower end as in Fig. 2. 7^b designates a stop for the return movement of the arm of the cam.

The grippers forward the wire through a guide hole in the stationary member 12 of a guillotine device the knife 13 of which is pivoted at 13^a and has at its lower end a roller 14 operated by a cam 15 on shaft 16 so that said knife is reciprocated past the stationary member 12 and shears the wire into the required lengths or pins P.

The wire pin P is fed through a stationary hollow guide 17 (see Fig. 11) inclined towards the box and the box carrier chain 1, and engages a guide groove 18 (Fig. 9) in a clamp 19 while its forward end *p* enters the advance hinge pop 29 of the box (Figs. 3 and 5).

The front end *p* of the pin P (Fig. 5) enters the box and is gripped against the side thereof by means of a gripper 30 having a serrated face (Figs. 6, 7, 8 and 10) said end *p* abutting against a shoulder or abutment 31 on said gripper 30. The latter is provided on the end of an arm 36, pivoted on a bracket on a carrier 21, the latter being reciprocated on the base plate 22 parallel with the boxes by means of levers 23, 24, 25 (see Fig. 2) the latter being fixed to a slide 109 carrying roller 26 engaging slotted cam 126 on shaft 16, said levers 23 and 24 being formed respectively with slots 100, 101. The clamp 19 is mounted on a vertical pivot pin 20 (Figs. 9 and 11) on the carrier 21 has an offset arm 27, and is urged towards the rear end of the pin and the boxes by a spring 28 on the pivot 20, said clamp 19 is also provided on top with a pin 32 adapted to contact with a stop 33 (see Figs. 7, 11 and 12).

Gripper 30 is controlled by a spring 34 (see Fig. 6) and is provided at the end with a concave roller 35 longitudinally slidable on the arm 36 of the gripper and supported on a horizontal rail 37 supported on standards 38 vertically slidable in bearing sleeves 39 (Figs. 2 and 6) on the base plate 22.

These standards are connected together by a horizontal rod 40 (see Figs. 2 and 21) and this rod passes through a slot 120 in a pivoted arm 41 controlled by a spring 42 and carrying two rollers 43, 44 engaging respectively cams 45 and 46 (Fig. 2) on the shaft 16. Cam 45 operates to slightly lower the rail 37 and release the gripper 30 and cam 46 completes this movement.

On the base is a horizontal slide 47 with a projecting stop or finger 48 that is reciprocated by means of a spring controlled pivoted arm 49, having an arm carrying a roller 50 engaging cam 51 on shaft 16 said finger moving in and out of the path of the offset 27 of the clamp 19. The advance hinge pop 29 engages a guide slot 54 formed in a bar 55 (Figs. 6, 7, 15 and 16) on the carrier to ensure said pop being in correct position to receive the end of the hinge pin and the box is kept down in the guide way by the overlying hold down plate 56 (Figs. 1 and 7).

Assuming the parts to be in the position shown in Figs. 1 and 2 i. e. with the pin P in the advance hinge pop 29 and gripped by gripper 30, at the rear end the pin is cut away from the reel by the guillotine knife 13 and clamp 19 with the rear end of the pin in line with the rearmost hinge pop 52. Lever 24 operates to reverse the movement of the carrier 21, but there is a slight idle stroke on account of the slot 100 (Fig. 2) in lever 23. When the carrier starts to move backwards, at which time the box carrier chain is stationary, the shoulder 31 on gripper 30 pushes the pin backwards to engage the hinge pop 52 as in Figs. 3 and 4 and then the gripper swings on its pivot and releases its hold thus permitting the box to advance. The backward movement of the carrier continues and finger 48 advances in the path of offset 27 of the clamp 19 which swings the clamp away from the box till it bears against the frame 53 of the guillotine or other abutment as in Fig. 11. Finger 48 then retires as the carrier again moves forward and when the clamp frees the frame 53 its spring swings it sharply inwards as in Fig. 12 when pin 32 contacts with stop 33 then sliding off same impinges the rear end of the pin *p* against the box and in line with the rearmost pop 52. Prior to this latter movement the gripper 30 has moved into position to receive the front end of the pin against its shoulder 31 and the continued advance of the carrier brings the parts back into the position shown in Figs. 1 and 2.

After the insertion of the hinge pin the boxes advance till opposite the first portion of the lid attaching mechanism. The lids L are fed down an inclined chute 57 overlying the boxes and the lowermost lid comes to rest on a flanged support 58 (see Fig. 17) on the side of the guideway in an angular position overlying the box, and with its lower edge below the hinge pin. The carrier 21 is provided with a pusher 59 projecting therefrom (Figs. 15, 16) formed with an extended finger 60 which supports the inclined lid as it is advanced a short distance by the pusher till it rests on the elevator 61 (Figs. 13, 14) which is recessed as at 62 to receive the curved hinge tail 63 of the lid.

The lid is supported in correct inclined position i. e. leaning towards the box by a flange 74 on the elevator (see Fig. 14) and also by means of a reciprocating hook 75, (Figs. 1 and 2) on an arm 64 controlled by means of lever 65 having an arm 66 provided with a roller 67 engaging cam 68 on shaft 16.

The elevator 61 is spring controlled and pivoted on pivot 69 (Fig. 13) and is reciprocated vertically by means of arm 70 carrying roller 71 engaging cam 72. As the elevator rises the edge 93 of the hinge tail 63 (Figs. 13 and 14) passes upwardly between the hinge pin P and the side of the box after which hook 75 draws the lid back past a vertical plane through the hinge so that it falls and swings into full open position and as the box is advanced, curved arm 76 fixed on the base ensured the lid coming down flat on the edge of the guideway 2. During the operations of connecting the lid to the hinge pin on the box, the latter is prevented from rising by a reciprocating plate 77 on lever 78 operated by arm 79 carrying roller 80 operated by cam 81. Also while the lid is passing the curved arm 76, the box is held down by a plate 82 fixed on the base.

The box with its lid is now advanced to the mechanism for bending the hinge tail around the hinge pin and this mechanism is illustrated in detail in Figs. 18 and 19.

This mechanism consists of a presser foot 83 having a ledge 84 at the bottom and formed on a spring controlled lever 85 with its upper portion bent approximately horizontal and its lower or approximately vertical portion provided with a roller 86 in engagement with a cam 87 on the shaft 16. Operating in conjunction with the presser foot is a reciprocating backing block 187 adapted to descend in the box and bear firmly against the side thereof to which the hinge pin is connected. The block is mounted on a lever 88 connected with an arm 89 having a roller 90 contacting with cam 91 on shaft 16. Fixed to the block 187 are angle plates 92 that hold the box in the channel guide way 2.

As the box advances to this mechanism the edge 93 of the hinge tail of the lid slides along the ledge 84 and when the block 187 is in the box the lever 85 operates and foot 83 descends and by reason of its shape and position of its pivot at the same time moves towards the box thus bending the edge 93 of the hinge tail to enclose the hinge pin P as in Fig. 20.

The box with its hinged lid is advanced another step and passes under a hold down plate 94 and is subjected here to pressure in the side opposite the hinge to ensure that said side will not be bulging out sufficiently to prevent the lid from closing. This means consists of a spring controlled horizontal slide 95 reciprocating in a guide 96 and operated by a lever 97 and an arm 98 having a roller 99 actuated by a cam 103.

When the box proceeds the lid engages the inclined arm 104 which raises said lid and swings it over on its hinge pin till it drops in closed position on the box.

A spring controlled arm 105 bears on arm 104 and permits the latter to yield if necessary.

The chain carrier 1 passes over sprockets 106, 107 and as it turns down over the sprocket 107 the boxes with closed lids are deposited on and carried away by a travelling belt 108.

Slide 109 operated by cam 126 on shaft 16 carries a dog 110 (Fig. 2) engaging a ratchet wheel 111 integral with sprocket wheel 107 thus causing intermittent movement of the carrier chain 1.

Motion is transmitted to shaft 16 by pinions 112 113, the former being fixed on the main drive shaft 114.

From the foregoing it will be appreciated that the steps necessary for the fitting of a hinge pin to a box, the attachment of a lid to said pin the bending of the hinge tail of the lid round saw pin, the closing of the lid and final delivery of the box with closed lid are all performed in regular sequence and the operations can be carried on continuously and with a degree of speed and accuracy unattainable by hand labour. The performance by mechanical means of the said sequence of steps has not so far as is known previously been effected.

I claim:—

1. In means for attaching hinged lids to rectangular metal boxes having a pair of aligned hinge pops, means for feeding the forward end of the hinge pin through one pop in the box, and a reciprocating carrier having a gripper thereon for gripping the forward end of the pin against the inside of the box and an abutment on said gripper against which said end of the pin abuts substantially for the purpose specified.

2. In means for attaching hinged lids to rectangular metal boxes of the type specified, gripping means as specified in claim 1 with means operating after the first rearward movement of the carrier of said gripping means to release the latter.

3. In means for attaching hinged lids to rectangular metal boxes of the type set forth, a gripper mounted upon a reciprocating carrier for gripping the forward end of the pin against the inside of the box, and a clamp on said carrier for holding the other end of the pin against the outside of the box

4. In means for attaching hinged lids to rectangular metal boxes as specified, a gripper on a pivoted spring controlled lever on a reciprocating carrier and adapted to descend into the box and grip the forward

end of the pin, an abutment on said gripper means to raise said gripper and a spring controlled pivoted clamp on said carrier for holding the rear end of the pin against the outside of the box.

5. In means for attaching hinged lids to rectangular metal boxes having a pair of aligned hinge pops, means mounted on a reciprocating carrier for gripping the hinge pin against the inside and the outside of the box, said outer gripping means provided with a groove for the pin, and an offset arm, and a reciprocating finger adapted to cross the path of said offset arm for the purpose specified.

6. The construction as set forth in claim 5 and in which outer gripping means consists of a spring controlled clamp provided with a pin which when the clamp is released abuts temporarily against a stop for the purpose specified.

7. In means for attaching hinged lids to rectangular metal boxes having aligned hinge pops, means for feeding the forward end of the hinge pin through one pop in the box, a reciprocating carrier with a spring controlled lever thereon provided at its outer end with a longitudinally slidable concave roller engaging a vertically reciprocated rail, a gripper on the inner end of said lever for gripping the forward end of the pin an abutment on said gripper a guide for the hinge pops, and a spring controlled clamp on said carrier adapted to grip the rear end of the wire.

8. In means for attaching hinged lids to rectangular metal boxes having a pair of aligned hinge pops, reciprocating carrier with means mounted thereon for inserting the hinge pins in the hinge pops of the box a chute for delivering the lids on to a support into an angular position overlying the box, a pusher on said carrier for advancing the lids and a finger on said pusher for supporting the lids.

9. In means for attaching hinged lids to rectangular metal boxes having a pair of aligned hinge pops, a reciprocating carrier with means mounted thereon for inserting the hinge pins in the hinge pops of the box a chute for delivering the lids on to a support into an angular position overlying the box, means to feed the lids to an elevator supporting the lids in inclined position and means to raise said elevator to insert the hinge tail of the lid between the pin and the box.

10. In means for attaching hinged lids to rectangular metal boxes having a pair of aligned hinge pops, a reciprocating carrier lid feed chute and elevator as specified in claim 9 and a reciprocating hook supporting the lid and adapted to swing same over in open position.

11. In means for attaching hinged lids to rectangular metal boxes having a pair of aligned hinge pops engaged by a hinge pin, a chute for delivering the lid at an angle overlying the boxes, a reciprocating elevator for causing engagement of the hinge tail of a lid with the hinge pin, a reciprocating hook for swinging the lid away into open position, a reciprocating backing block adapted to enter the box and bear against the hinged side thereof, a hold down plate on the block and a presser foot adapted when lowered to bend the hinge tail of the lid around the hinge pin.

12. In means for attaching hinged lids to rectangular metal boxes having a pair of aligned hinge pops engaged by a hinge pin, a chute for delivering the lid at an angle overlying the boxes, a reciprocating elevator for causing engagement of the hinge tail of a lid with the hinge pin, a reciprocating hook for swinging the lid away into open position, a reciprocating backing block adapted to enter the box and bear against the hinged side thereof, a presser foot provided with a ledge and formed on the end of a bent spring controlled lever and means to operate said lever to cause the presser foot to move downwardly and towards the box for the purpose specified.

13. In means for attaching hinged lids to rectangular metal boxes having a pair of aligned hinge pops a wire feeder an inclined guide for the wire a guillotine for cutting off the hinge pins, a reciprocating carrier, a gripper thereon for seizing the pin in the advance pop, a shoulder on a clamp for holding the rear end of the wire against the box opposite the rearmost pop a chute for delivering the lids, a vertically operating elevator for engaging the hinge tail of the lid with the hinge pin, a reciprocating hook, a curved arm a reciprocating backing block with a hold down plate and a reciprocating presser foot with a ledge for the purposes specified.

14. In an apparatus for hinging lids to metal boxes having pairs of alined pops, an intermittently movable support for the boxes, means for feeding one end of a hinge pin through one pop in a box, means to move the other end of the pin into position for insertion into the other pop of the box, means to grip the positioned pin, and means to move the gripping means longitudinally of the box, whereby the positioned end of the pin enters the other pop.

15. In an apparatus for hinging lids to metal boxes, having pairs of alined pops, an intermittently movable support for the boxes, means for feeding one end of a hinge pin through one pop in a box, means to cut the pins, means to move the other end of the cut pin into position for insertion into the other pop of the box, means to grip the positioned pin, and means to move the grip-

ping means longitudinally of the box, whereby the positioned end of the pin enters the other pop.

16. In an apparatus for hinging lids to metal boxes having pairs of alined pops, a movable box support, driving mechanism for intermittently moving the support, means for feeding a hinge wire into the forward pop of a box, means operated by the driving mechanism for severing the hinge wire, means for moving the wire into alinement with the rear pop, a gripper adapted to engage the end of the hinge wire, and means to move the gripper relatively to the box whereby the severed alined end of the hinge wire is inserted into the rear pop.

17. In an apparatus for hinging lids to metal boxes, having pairs of alined pops, a box support, mechanism for intermittently moving the support, a slide, means to reciprocate the latter, means for feeding one end of a hinge pin through one pop in a box, means carried by the slide to move the pin into position for inserting the other end of the pin into the other pop, and means carried by the slide for moving the pin longitudinally of the box and into said other pop.

18. In an apparatus for hinging lids to metal boxes, having pairs of alined pops for the reception of a hinge pin, a box support, means for intermittently moving the support, a wire feeding and guiding mechanism adapted to insert the forward end of the wire into the forward pop on a box, means for severing the inserted wire, means to position the severed wire in alinement with the rear pop, means to grip the inserted end of the wire, a slide carrying the gripping means, and means to reciprocate the slide, whereby the severed wire is inserted into the rear pop.

19. In an apparatus for hinging lids to metal boxes having pairs of alined pops for the reception of a hinge pin, means for inserting a hinge pin into the pops of the box, a support at one side of the box, means for feeding a box lid onto the support, means for elevating the support to bring one edge of the lid into engagement with the hinge pin, and means for bending said edge around the pin.

20. In an apparatus for hinging lids to metal boxes having pairs of alined pops, a box support, mechanism for intermittently moving the support, a wire feed, means to guide one end of a wire into the forward pop of a box, means for severing the inserted wire to form a hinge pin, a spring actuated clamp adapted to move the pin into alinement with the rear pop of the box, a slide carrying the clamp, means to reciprocate the slide, a gripping member carried by the slide adapted to engage the forward end of the pin during the movement of the slide in one direction, means to raise and lower the gripping member, a lid support at one side of the box, means for elevating the lid support to bring one edge of the lid into engagement with the hinge pin, means to move the lid into open position, means to bend the engaged edge of the lid around the pin, and a guide mounted in the path of the lid to fold the latter onto the box.

Dated this 8th day of August 1922.

ANDREW FRANCIS NEY.