Sept. 29, 1942. A. E. ROWLANDS 2,297,583

MATERIAL HANDLING DEVICE

Filed Aug. 3, 1940 3 Sheets-Sheet 1

Fig. 1.

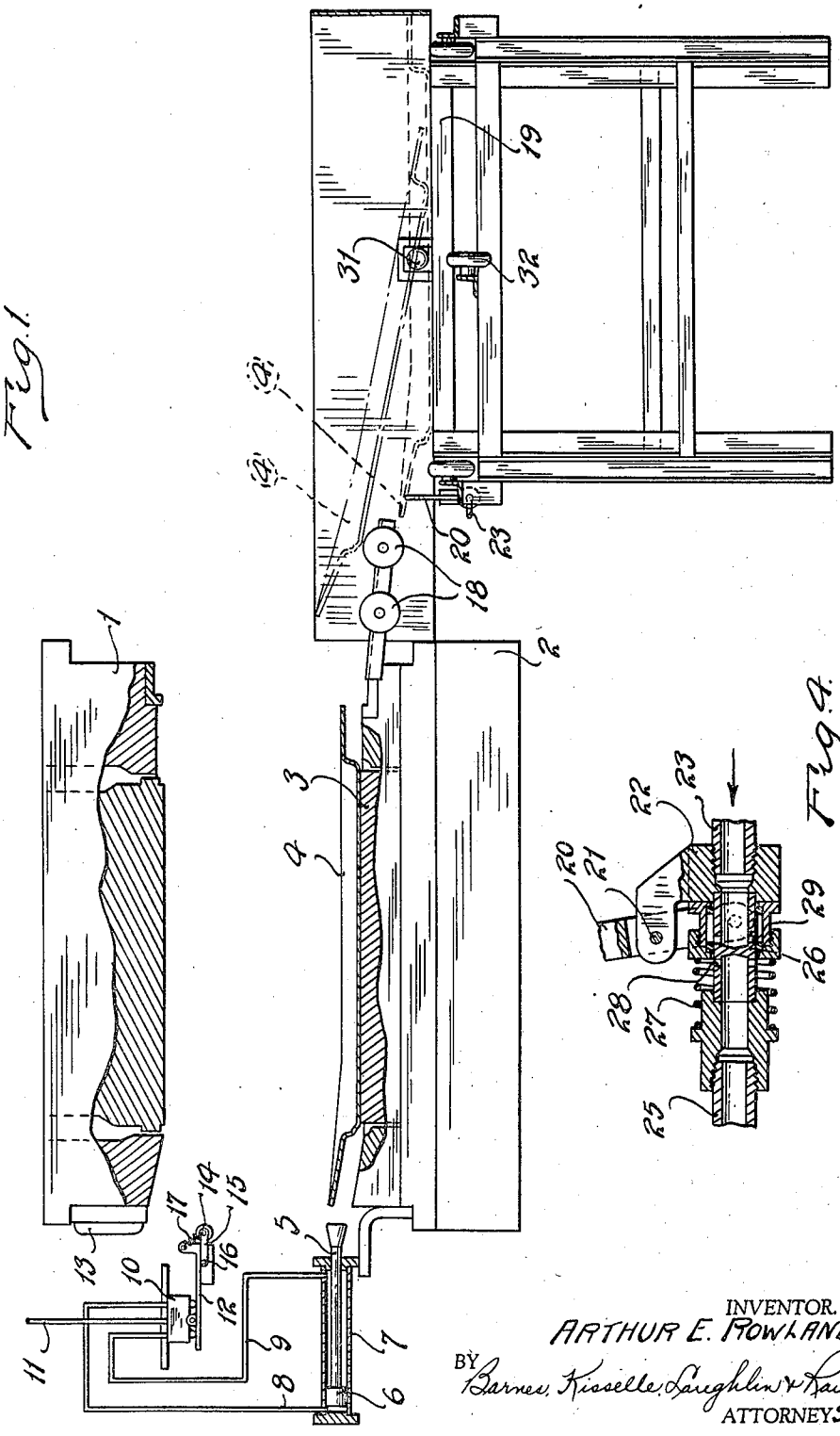


Fig. 4.

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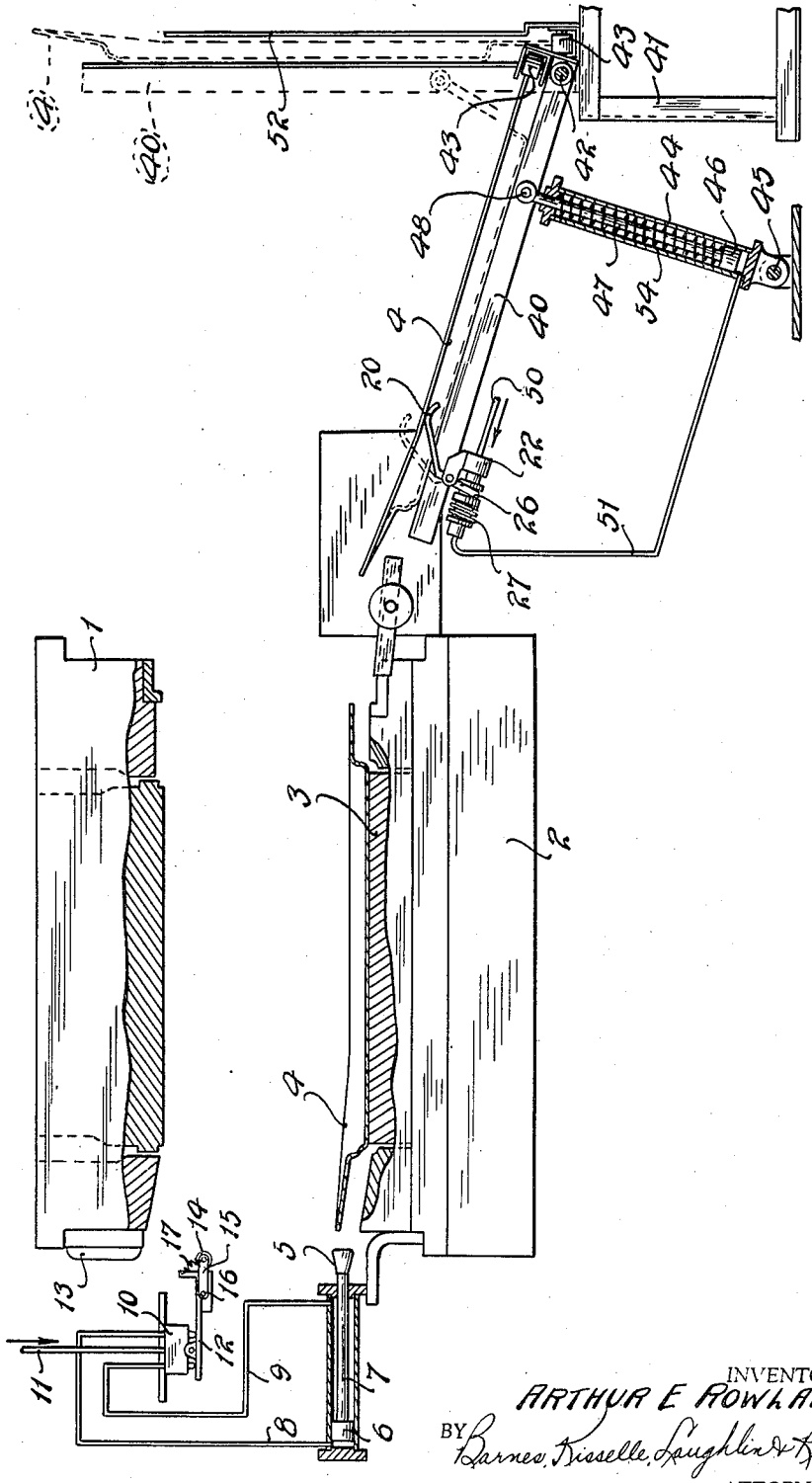
BY Barnes, Kisselle, Raisch & Choate
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Fig. 5.



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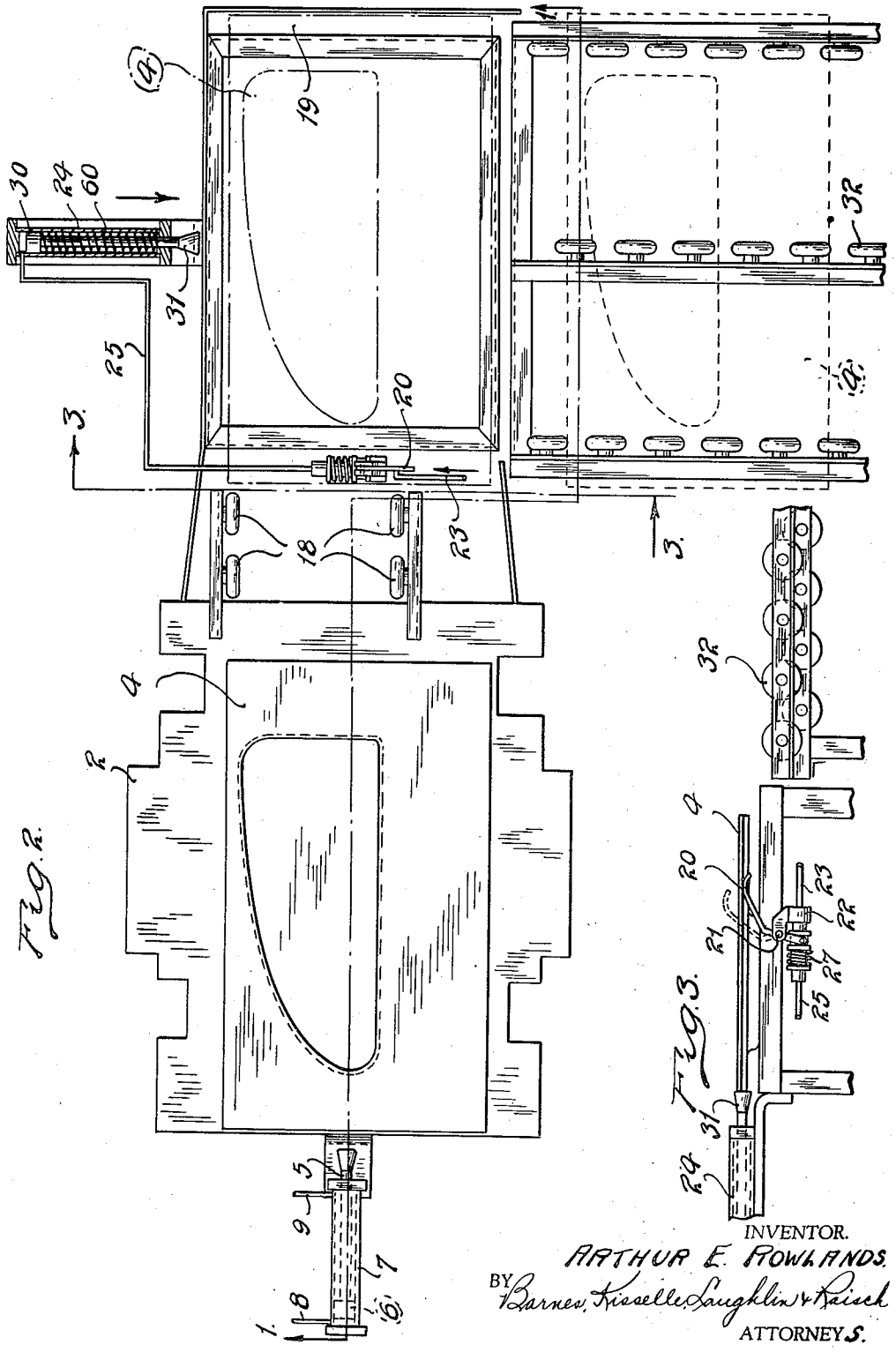


Fig. 2.

Fig. 3.

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2,297,583

UNITED STATES PATENT OFFICE

2,297,583

MATERIAL HANDLING DEVICE

Arthur E. Rowlands, Cleveland, Ohio, assignor to General Motors Corporation, Detroit, Mich., a corporation of Delaware

Application August 3, 1940, Serial No. 350,219

8 Claims. (Cl. 198—21)

This invention relates to a material handling device and more particularly to a device for automatically conveying sheet metal stampings after they have been stamped in a press.

It is the object of this invention to produce a simple device for handling or conveying metal stampings which operates automatically when the stamping is deposited upon the handling device.

This invention also contemplates a material handling device which is cheap to construct, efficient in operation, and which will operate to handle the stampings in a predetermined manner with certainty each time a stamping is presented to the device for handling.

In the drawings:

Fig. 1 is a vertical section along the line 1—1 of Fig. 2 showing the press and material handling device.

Fig. 2 is a plan view showing the lower die of the press and the material handling device.

Fig. 3 is a vertical section along the line 3—3 of Fig. 2.

Fig. 4 is a detail section showing the air valve.

Fig. 5 is a vertical section through a portion of a press and a modified form of the device.

Referring more particularly to the drawings there is a fragmentary showing of a conventional metal stamping press comprising an upper or reciprocating die member 1 and a lower or stationary die member 2 having the usual spring cushion die pad 3. The metal sheet, after the stamping operation, is referenced 4.

The stamping 4 is arranged to be ejected from the press by means of a plunger 5 fixed to piston 6 in the air cylinder 7. Cylinder 7 is connected by lines 8 and 9 with valve 10. Valve 10 is also connected to the main supply line 11 connected to a source of compressed air (not shown). Valve 10 is actuated by the lever arm 12 and the cam 13 mounted on the reciprocating die 1.

On the down stroke of the die 1, cam 13 rides freely by roller 14 carried by lever 15 which is pivotally mounted as at 16 on lever 12 and held in horizontal position by spring 17. In the position shown in Fig. 1, line 8 is open to atmosphere and line 9 is connected with pressure air line 11. After the stamping operation is completed on sheet 4, die 1 moves upwardly thus causing cam 13, upon contacting roller 14, to swing lever 12 counterclockwise. This opens line 9 to exhaust or atmosphere and line 8 is connected with pressure air line 11 thereby quickly moving piston 6 and plunger 5 to the right.

On the stamping ejecting stroke plunger 5 contacts stamping 4 and kicks it out of the press or to the right, Figs. 1 and 2, on to the roller conveyor 18, which conveys the panel 4 on to platform 19. When the panel 4 falls on to platform 19 it depresses lever 20 pivotally mounted as at 21 on valve housing 22. Valve 22 is connected by pipe line 23 with a source of air under pressure and valve 22 is connected with air cylinder 24 by pipe line 25. As lever 20 is depressed, valve sleeve 26 is shifted to the left, Fig. 4, against compression spring 27. Upon being shifted to the left, sleeve 26 connects line 23 with line 24 through ports 28 and 29, thus admitting air through line 25 into cylinder 24. This air under pressure moves piston 30 and plunger 31 outwardly in the direction of the arrow, Fig. 2, or to the right, Fig. 3. Plunger 31 kicks stamping 4 on to roller conveyor 32 which conveys the stamping 4 to the next machine for the next operation. The momentum of the kick or push which plunger 31 gives stamping 4 carries the stamping 4 along roller conveyor 32. As soon as the stamping is pushed off of the platform 19, compression spring 27 slides valve sleeve 26 to the right, thereby raising lever arm 20, opening line 25 to atmosphere through ports 28 and closing ports 29. This permits coil spring 60 and cylinder 24 to return piston 40 and plunger 31 to the retracted position, as shown in Fig. 2.

In the modified form, shown in Fig. 5, plunger 5 kicks or ejects the stamping 4 from the press on to a platform 40 pivoted to frame 41 as at 42. Platform 40 is provided with a plurality of rollers 43 which form a roller conveyor. The platform 40 is arranged to be swung from the lowered position, shown in the full lines, to the elevated position, shown in the dotted lines, by means of an air motor in the form of a cylinder 44 pivotally mounted as at 45 provided with a piston 46 and connecting rod 47 pivotally connected as at 48 to platform 40.

Valve 22, identical with that shown in Fig. 4, connects air line 50 with air line 51. Air line 51 runs between valve 22 and cylinder 44 and valve 50 runs between a source of compressed air (not shown) and valve 22. When panel 4 falls upon valve lever 20, valve sleeve 26 is shifted to connect air line 50 with line 51, thereby projecting piston 46 and connecting rod 47 to tilt platform 40 and stamping 4 to vertical position adjacent the vertical back-stop 52. As soon as the stamping 4 is upended or stood up, it rolls down roller conveyor 43 toward another work station.

Rollers 43 are positioned so that each roller is slightly lower than the one immediately ahead of it. Thus, stamping 4 when up-ended will roll by gravity down conveyor 43. As soon as stamping 4 rolls off trigger or lever 20, spring 27 again closes valve 22, shutting off air line 20 and opening line 50 to atmosphere. This permits coil spring 54 to return piston 56 and platform 40 to lowered position.

I claim:

1. A material handling device comprising in combination a support upon which the material is adapted to fall by gravity, means engaging said material for a relatively short distance for moving said material when it tends upon the support a relatively longer distance, a source of power for actuating said means, and connections including a stationary control between said source of power and said means, said control being actuated by the material when the material falls upon the control to connect the source of power with said means only while the material is on said control whereby said means moves the material by giving the material a kick or quick push, said control when relieved of the material disconnecting the said means from its source of power, and a second means operative to return said first means to its starting position as soon as the material clears said control.

2. A material handling device comprising in combination a first support from which the material is discharged, a second support lower than the first support upon which the material falls preparatory to being moved from one place to another, means engaging said material for a relatively short distance for moving said material when it falls upon the second support a relatively longer distance, a source of power for actuating said moving means, and connections including a stationary control between said source of power and said moving means, said control including a member positioned adjacent the second material support and below the first support and adapted to be actuated by the weight of the material when it falls upon the second support to automatically connect the source of power with said moving means only while the material is on said control whereby said means moves the material by giving the material a kick or quick push and relieves said member of the material, the said control when relieved of the weight of the material automatically disconnecting the said material moving means from its source of power, and a second means operative to return said first means to its starting position as soon as the material clears said control.

3. A material handling device comprising in combination a first support from which the material is discharged, a second support lower than the first support upon which the material falls by gravity, fluid operated means engaging said material for a relatively short distance for moving said material as soon as it falls on the second support a relatively longer distance, a source of fluid under pressure for actuating said means, connections including a stationary control valve between the source of fluid under pressure and the fluid actuating means, said control valve being automatically actuated by the weight of the material when it lands upon the second support to connect the source of fluid under pressure with said fluid actuated means only while the material is on said control valve whereby said means moves the material, said control valve when relieved of the weight of the material automatically disconnecting the said fluid actuated means from the said source of fluid under pressure, and a second means operative to return said first means to its starting position as soon as the material clears said control valve.

4. A material handling device comprising in combination a support upon which the material is adapted to fall by gravity, projecting means engaging said material for a relatively short distance for projecting the material along the said support a relatively longer distance, a source of power for actuating the projecting means, and connections including a control mechanism between the source of power and said projecting means, said control mechanism including a member upon which the material falls and arranged to be actuated by the weight of the material as soon as it lands upon the support whereby the control automatically connects the projecting means with the source of power and the projecting means projects the material along the support by giving the material a kick or quick push, the said control mechanism when relieved of the weight of the material automatically disconnecting the projecting means from its source of power, and a second means operative to return said first means to its starting position as soon as the material clears said control.

5. A material handling device comprising in ocmbination a support upon which the material is deposited by gravity preparatory to being projected along the support, fluid operated projecting means engaging said material for a relatively short distance for projecting the material along the said support a relatively longer distance, a source of fluid under pressure, and connections including a stationary control valve between the source of fluid under pressure and said projecting means, the said control valve being arranged to respond to the weight of the material as it lands upon the support to automatically connect the projecting means with the source of fluid under pressure only while the material is on said control valve whereby the projecting means projects the material along the said support by giving the material a kick or quick push, said control valve when relieved of the weight of the material automatically disconnecting the projecting means from its source of power, and a second means operative to return said first means to its starting position as soon as the material clears said control valve.

6. A material handling device comprising in combination a conveyer from which the material is discharged, a support lower than the conveyer upon which the material falls preparatory to being projected along the support, a fluid operated motor in the form of a cylinder and plunger, a source of fluid under pressure, connections including a control valve between the source of fluid under pressure and said fluid motor, said control valve being actuated automatically by the weight of the material when it falls upon the support to connect the fluid motor with the source of fluid under pressure only while the material is on said valve whereby the plunger on its projecting stroke engages said material for a relatively short distance and projects or shoves the material along the said support a relatively longer distance by giving the material a kick or quick push, said control valve when relieved of the weight of the material automatically disconnecting the fluid under pressure from the fluid motor, and a second means operative to return

said first means to its starting position as soon as the material clears said control valve.

7. A material moving device comprising an elongated stationary support upon which the material to be moved is placed, a reciprocating plunger having a stroke which is relatively short in comparison to the distance which the material is moved upon said elongated support, power means for projecting said plunger, and a control for said power means fixed on said stationary support responsive to the weight of said material whereby the power means projects the plunger into contact with said material while the said material is on the control and the plunger gives the material a kick along said support, and means for retracting said plunger as soon as the material clears the said control.

8. A material moving device comprising an elongated stationary support on which the material to be moved is placed, a reciprocating plunger having a stroke which is relatively short in comparison to the length of said support mounted adjacent one end of the said support, means actuated by fluid pressure for projecting said plunger, a source of fluid under pressure including a pressure line to said means, a valve for connecting and disconnecting the source of fluid under pressure and the said means, a control for opening and closing said valve fixed on one end of the support adjacent the said plunger, said control being actuated to open the valve to connect the source of fluid under pressure with said means whenever the material to be moved is placed upon said control and only while said material is on the said control whereby the plunger executes a quick stroke to project or kick the material along the said support, and means effective as soon as the material clears the control for retracting the said plunger.

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