

Oct. 30, 1962

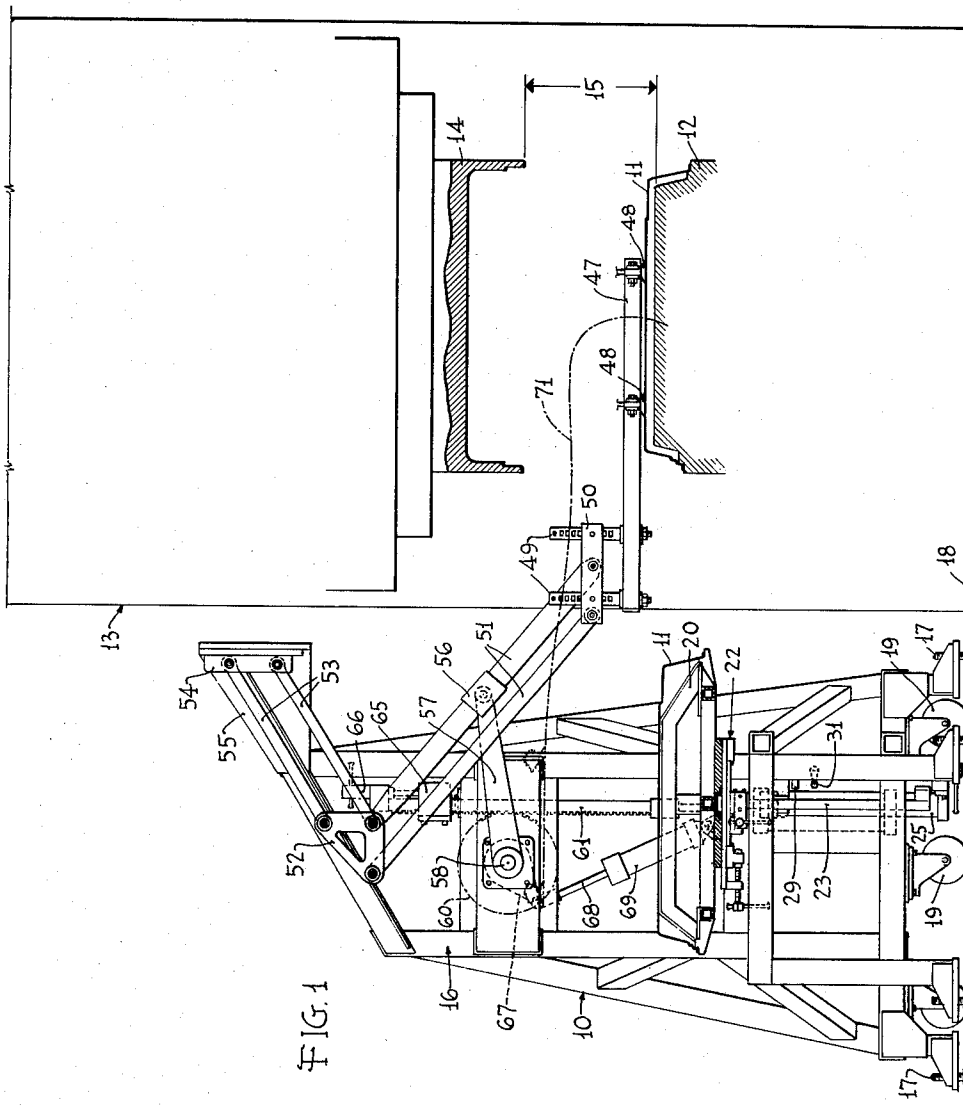
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3,061,118

FEEDING DEVICE, ESPECIALLY FOR METAL STAMPINGS

Filed April 22, 1959

4 Sheets-Sheet 1



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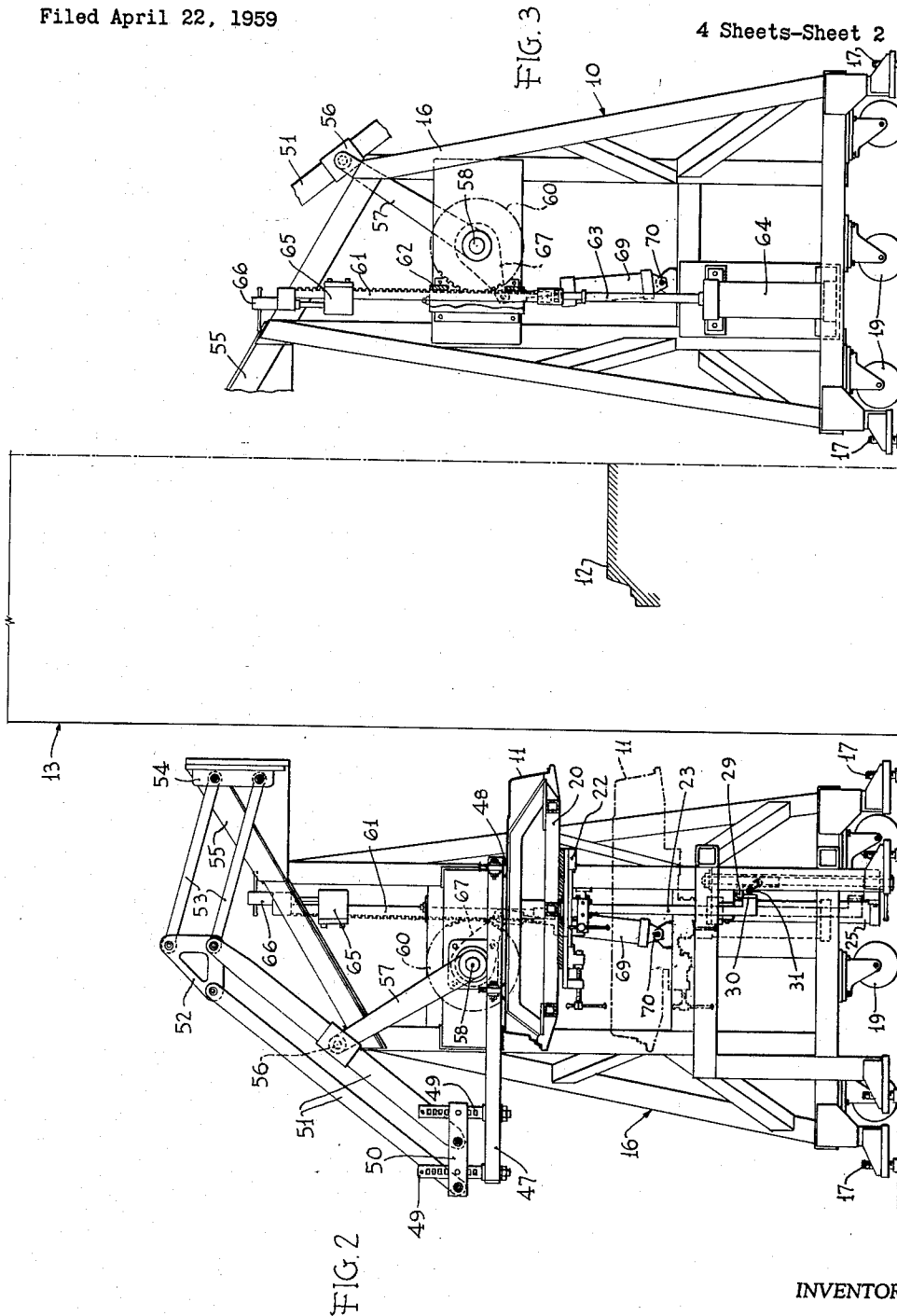
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4 Sheets-Sheet 3

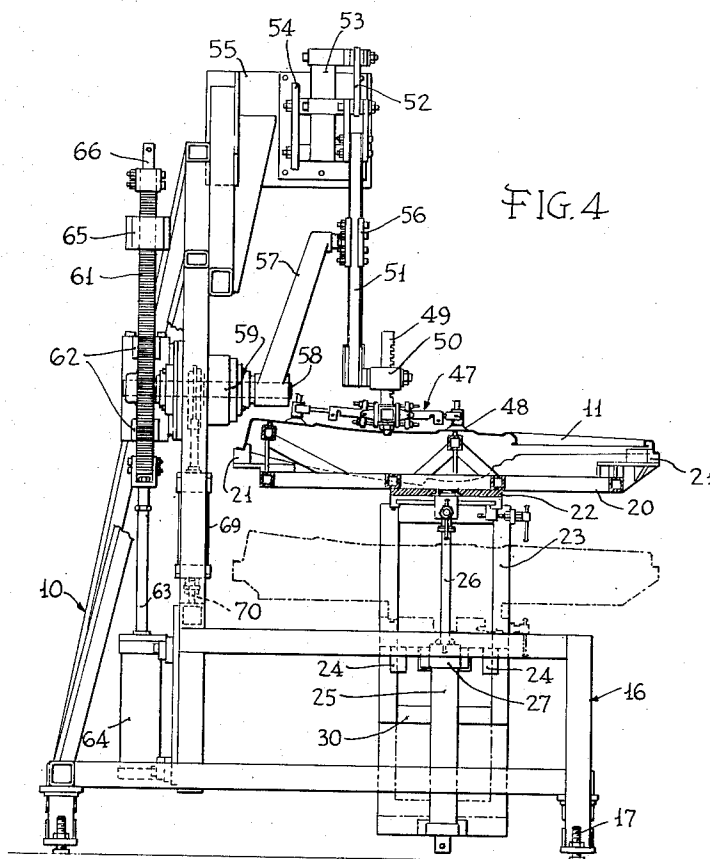


FIG. 4

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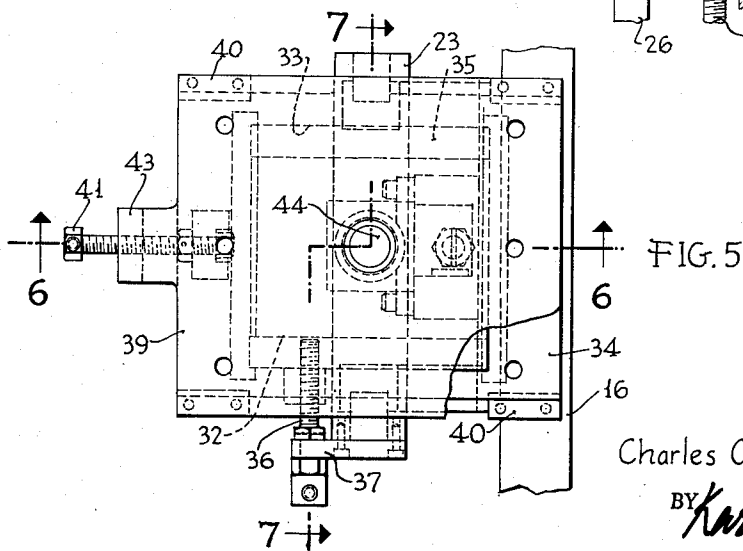
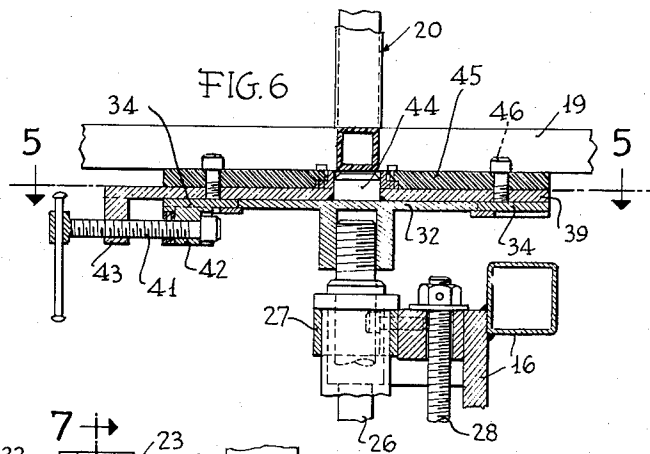
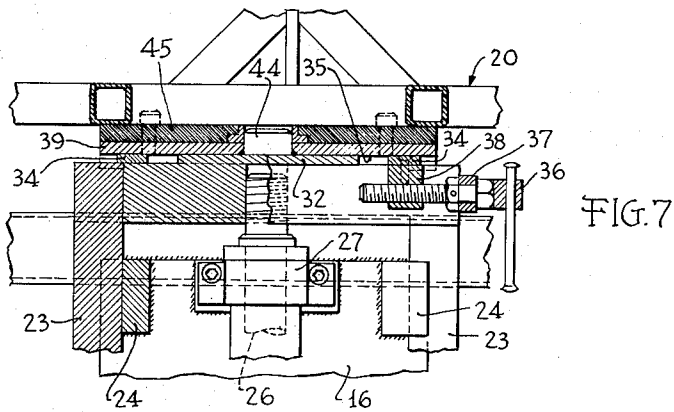
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4 Sheets-Sheet 4



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FEEDING DEVICE, ESPECIALLY FOR METAL STAMPINGS

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2 Claims. (Cl. 214—8.5)

The invention relates to a device for feeding articles, particularly metal stampings, into a machine which performs an operation on such article. More specifically, the invention relates to a device for feeding sheet metal stampings into a press which is to impart a further forming or trimming operation on such stamping.

Among the objects of the invention is a feeding device of the indicated type which will position the article or stamping so accurately in the machine that no further adjustment of the position by hand is necessary. This is of great importance for safety reasons, for reducing labor, for allowing greater speed of operations, and for eliminating safety equipment which would be necessary if feeding and/or final positioning were done by hand.

A further object of the invention is a feeder of the indicated type which works at great speed and thereby increases the production capacity of the machine to be fed due to the reduction in feeding time.

Among the objects of the invention is still further a feeder of the indicated type which is of simple and rugged construction, which is dependable in operation, which is easily adjustable to different stampings and different types of machines to be fed, and which lends itself to automatic operation in synchronism with the operation of the machine to be fed.

The aforesaid and other objects and advantages are mainly achieved by a feeding device comprising a gauging station or mechanism on which the article to be fed is accurately positioned outside of the machine to be fed and which moves the article toward a transfer device rather than move the transfer mechanism toward the gauging station, and by a transfer mechanism on which the article is received in a predetermined relative position from the gauging station and which moves the article substantially horizontally into the machine and then downwardly onto the latter's working tools, positioning members, or the like.

The hereinbefore briefly outlined and other objects, advantages and features of the invention as well as the details thereof are more fully described and will be more easily understood from the following description of an embodiment and its illustration in the attached drawing.

In the drawing:

FIG. 1 is a side elevation, partly in section, of a feeding device with a diagrammatic illustration of the machine to be fed, the parts being in the position at the moment of depositing a stamping on a forming die;

FIG. 2 is a side elevation corresponding to FIG. 1, yet with the parts in the position when the transfer mechanism receives the stamping from the gauging station;

FIG. 3 is a fragmentary elevation of the feeding device seen from the opposite side as FIG. 2;

FIG. 4 is an end elevation of the device with the parts shown in the same position as shown in FIG. 2;

FIG. 5 is a plan view on a larger scale of the adjustable supporting structure of the gauging station, the view being taken along line 5—5 of FIG. 6;

FIG. 6 is a section along line 6—6 of FIG. 5; and

FIG. 7 is a section along line 7—7 of FIG. 5.

The purpose of the feeding device 10 is to feed a pre-formed sheet metal stamping 11 onto the lower stationary die 12 of a forming press 13 which has an upper vertically reciprocating die 14.

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The dies 12, 14 are to give marginal portions of stamping 11 their final or a more accurate form. Noteworthy is that, with the upper die 14 in its uppermost, shown position, the dies 12/14 leave only a relatively shallow space 15 between them, a fact which rules out the employment of any feeder having parts which have to enter between the dies but which could not do so on account of their size or the direction or form of their movement.

10 The feeding device 10 comprises a rigid framework 16 which is held aligned in the desired position relative to press 13 by height-adjustable screws 17 engaging the ground 18 and which upon retraction of the screws 17 may be wheeled around on casters 19.

15 A gauging fixture 20, provided with form pieces 21 for engaging the margins of stamping 11, is secured to a table 22. This table 22 is supported by a frame 23 which is vertically slidably engaged by parts 24 of the machine frame 16 and which is reciprocably movable 20 by fluid cylinder 25 and rod 26 of a piston (not shown) in the cylinder. Rod 26 is guided in a bearing 27 on the frame work 16. A screw rod 28, paralleling piston rod 26, carries height-adjustably an abutment 29 which limits the upward movement of table 22 by engagement of the 25 lower member 30 of frame 23. Abutment 29 may also carry a control device 31, e.g. a so-called limit switch, which cuts off the fluid supply to cylinder 25 when table and frame 22/23 have reached the predetermined topmost position.

30 Inasmuch as the exact position of the gauging fixture 20, and thereby of stamping 11, is of greatest importance, table 22 is longitudinally and transversely adjustable, relative to frame 23.

The top of frame 23 and piston rod 26 are rigidly 35 connected with a rectangular plate 32. This plate is received in the rectangular opening 33 of a second plate 34 and slidably engages two opposite margins thereof (FIGS. 5, 6) while leaving free spaces 35 between itself and the other margins of plate 34 (FIGS. 5, 7). An 40 adjustment screw 36 is rotatably held in a bearing 37 of frame 23 and engages a nut 38 rigidly secured to and downwardly projecting from plate 34, thereby permitting accurate transverse movement and adjustment of plate 34.

A third plate 39 is guided along the outer margins of 45 plate 34 by gibs 40. A second adjustment screw 41 is rotatably held in a downwardly projecting bearing 42 of plate 34 and engages a nut 43 which projects downwardly from and is rigidly connected with plate 39 so as to provide longitudinal adjustment of plate 39 relative to plate 50 34 and to frame and plate 23, 32. Plate 39 is provided with an upwardly projecting pin or plug 44 which engages a positioning hole in mounting plate 45 of fixture 20, mounting plate 45 being additionally secured by bolts 46 to plate 39.

After a stamping 11 has been placed on the fixture 20 while the latter with its supporting table 22 is in its lower position (FIG. 1 and dash and dot lines in FIGS. 2 and 4), it is at the proper moment moved upwardly by means 60 of cylinder 25 so as to be received by head 47 of the transfer and feeding mechanism. Head 47 is provided with a number of suction cups 48, which are longitudinally and transversely spaced from each other, and is height-adjustably secured by vertical members 49 to a member 50. Member 50 in turn is journaled to one end 65 each of two parallel links 51 the other ends of which are journaled to a triangular member 52. Members 50, 51 and 52 form a first linkage parallelogram. Member 52 constitutes one side of a second linkage parallelogram, having links 53 and a stationary fourth side 54 which is a rigid part of the frame 16 and is secured to a cantilever 55 thereof.

One of the links 51 has its mid-portion journaled at 56

to a crank 57 which is rotatably supported by shaft 58 in bearing 59 of machine frame 16. Secured to shaft 58 is a pinion 60 which is engaged by a tooth rack 61, which is guided for vertical movement at 62 on frame 16, and which is connected with rod 63 of a piston (not shown) in fluid cylinder 64 secured to the frame 16. An abutment 65 is lengthwise adjustable on the upper end of rack 61 by screw 66. This abutment 65 operates a limit switch (not shown) which controls relay valves for switching the fluid supply from the upper part to the lower part of cylinder 64 and for venting the suction cups 48 or supplying them with compressed air. The abutment 65 furthermore limits mechanically the downward stroke of rack 61 by engagement with upper guide 62.

A cantilever or crank 67, rigidly secured to shaft 58 between crank 57 and pinion 60, has its outer end journaled to the piston rod 68 of a fluid cylinder 69, the latter being journaled at 70 to frame 16. The upper chamber of cylinder 69 communicates with a reservoir (not shown) of a compressed or pressure fluid so as to dampen the movement at the end of the strokes of the transfer device while boosting the start of the movements thereof for speeding up the operation.

The down-stroke of rod 63 and rack 61 will swing arm 57 from the position shown in FIG. 2 to the position shown in FIG. 1 with the resulting movement of the center point of head 47 along the dash and dot line 71 (FIG. 1). When the transfer device has reached the position shown in FIG. 1, the suction cups are vented or provided with compressed air thereby releasing the stamping 11 just deposited on lower die 12, whereupon pressure fluid is admitted to the lower portion of cylinder 64 causing upward movement of rack 61 with ensuing return movement of head 47 along line 71 until it reaches the position shown in FIGS. 2 and 4.

While the upper die goes through its cycle of its downward working stroke and following upward return stroke, the gauging fixture 20 with a new stamping 11 thereon is raised by admission of pressure fluid to the lower part of cylinder 25 until it engages the suction cups 48 from which air is withdrawn by appropriate means so as to firmly grip the stamping 11.

As soon as upper die 14 has sufficiently retracted from lower die 12 and while stamping 11 is being removed from between the dies, the transfer device is again set in motion and repeats its cycle of feeding another stamping 11 onto the lower die 12 and thereupon retracts into the position for receiving a still further stamping 11 placed in the meantime on the lowered gauging fixture 20.

The entire operation of the feeding device and of the press may be automatic. However, the arrangement may also be such that an operator initiates simultaneously the lifting of the gauging fixture and the press cycle and that the press during its cycle initiates the horizontal movement of the transfer device when the dies have sufficiently parted from each other. The valves, conduits, switches etc. serving for such automatic or semi-automatic operation are not shown, inasmuch as the basic features of the invention concern the gauging station and the transfer mechanism which could be set in operation individually by individual hand operated control devices.

The invention is not restricted to the illustrated and

described embodiment but is susceptible to modifications and adaptations to specific tasks and circumstances, which will easily refer to those skilled in the art upon having been appraised of the basic features of the invention.

What is claimed is:

1. A workpiece handling device for moving a workpiece from a stacked position to a working position along a path which is generally rectilinear and sharply tuned downward at the working position comprising,
 - a frame structure for supporting a stack of workpieces in vertical alignment,
 - a head support means for grasping the top of a workpiece from the stack of workpieces in vertical alignment,
 - a first parallelogram linkage having one end of its spaced parallel links pivoted to said head support means,
 - a floating link connected to the other end of said first parallelogram linkage in vertical alignment with said workpieces,
 - a turnable crank arm mounted on said frame intermediate said workpieces and said floating link and in vertical alignment with said workpieces and said floating link,
 - said crank arm having its outer end pivoted to one of said links of said first parallelogram linkage intermediate the ends of the link,
 - and a second parallelogram linkage having one end of its spaced parallel links pivoted to said floating connection member and the other ends of the links of said second parallelogram linkage being pivoted to said frame at a point above and out of alignment of said crank arm and said workpieces,
 - said crank arm being mounted on said frame to move said first parallelogram linkage from one side of said frame to the other in an arcuate movement of approximately ninety degrees.
2. A workpiece handling device as set forth in claim 1, further characterized by the fact that when the workpiece is above the working position the crank arm at its end pivot has substantially only a vertical component of movement to move the workpiece vertically.

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