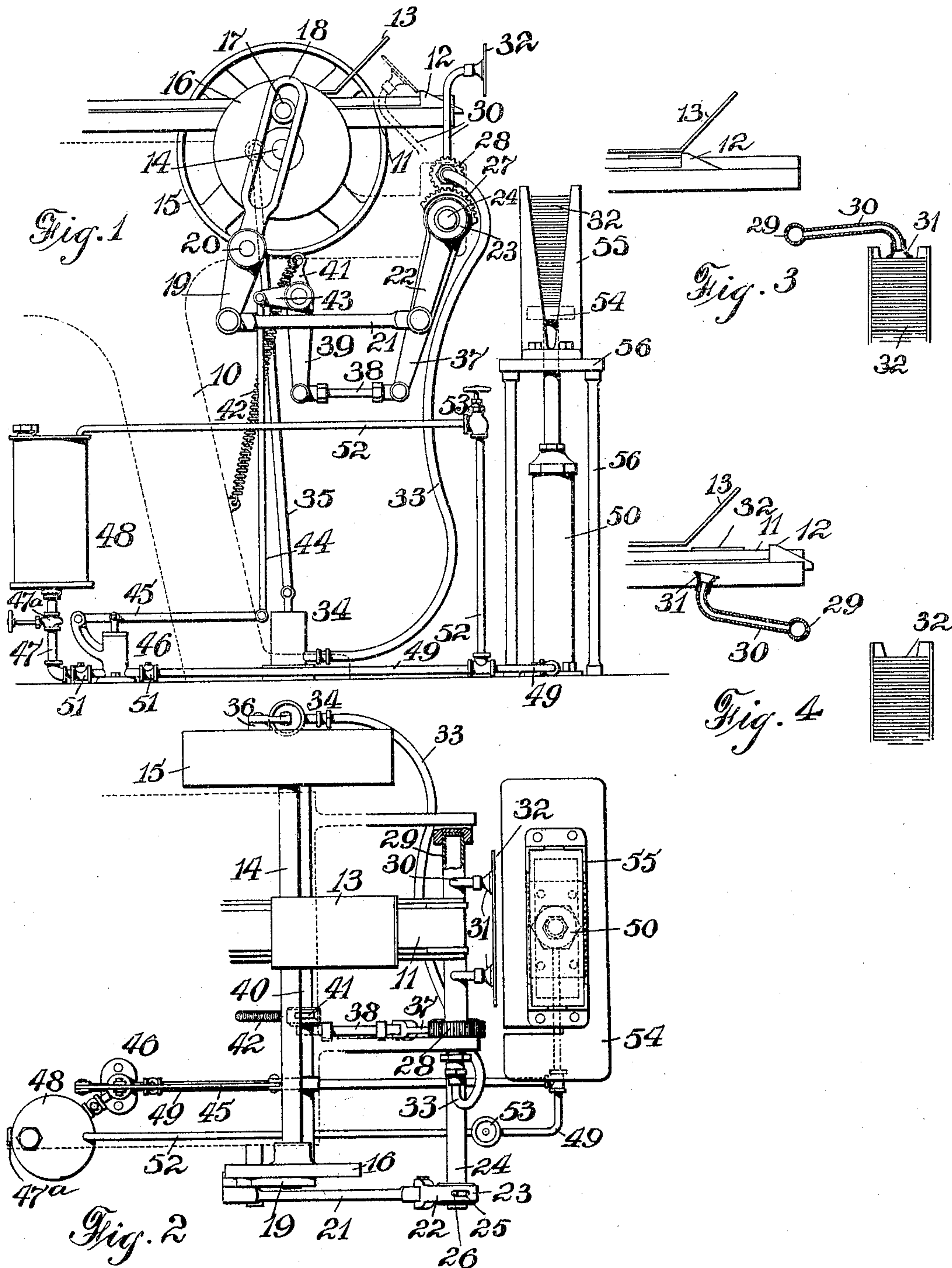


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PATENTED JULY 4, 1905.

C. O. ERICSON.
SHEET FEEDING APPARATUS.
APPLICATION FILED DEC. 28, 1904.



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SHEET-FEEDING APPARATUS.

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To all whom it may concern:

Be it known that I, CHARLES OSCAR ERICSON, of Helmetta, in the county of Middlesex and State of New Jersey, have invented a new and Improved Sheet-Feeding Apparatus, of which the following is a full, clear, and exact description.

My invention relates to improvements in devices for feeding sheets of metal or other material to a machine on which or in which the sheets or blanks are to have certain operations performed on them.

My invention is at present used for feeding sheets of tin to a can-making machine; but obviously the mechanism which I employ can be used to advantage in feeding sheets of metal, board, or other material to any other form of machine using the sheets.

The object of my invention is to produce an apparatus of this character which will work smoothly, rapidly, and positively and in which the sheets are successively taken by means of suction applied to the surfaces, delivered to the necessary point, and then released, the suction being also released at the time the sheet is delivered to the machine.

My invention is further intended to provide an automatic and simple means of compensating for the loss of height in the column of sheets, so that the top sheet will always be at the necessary height to provide means for regulating the movement of the sheets, and in general to produce a simple and effective apparatus for the purpose intended.

With these ends in view my invention consists of certain features of construction and combinations of parts, which will be hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of my apparatus as applied to a can-machine, the frame of the machine being shown in dotted outline. Fig. 2 is a broken plan view of the apparatus. Fig. 3 is a detail elevation, partly in section, showing the lifting-pipes as they engage the top sheet of a series; and Fig. 4 is a view simi-

lar to Fig. 3, but showing the position of the parts after the sheet has been delivered.

In the drawings, the machine 10, to which the sheets are fed, is shown in dotted outline, and this is provided with a slide 11, on which the sheets are laid flat, the said sheets being delivered behind the shoulders 12 and beneath the shield 13. The machine is also shown with a driving-shaft 14, having a pulley 15 attached thereto; but all this is incidental, and it will be understood from the description to follow that the sheet-delivering mechanism can be arranged so as to discharge the sheets upon any usual part of a sheet-working machine. As shown, the driving-shaft 14 is provided with a disk pulley 16, having thereon a roller 17, working in the slotted end 18 of a lever 19, and this is fulcrumed, as shown at 20, and connected by a rod 21 with the crank 22 of the shaft 24, which is arranged parallel with the shaft 14. The crank 21 has a collar 23, fitting loosely on the shaft 24, and the collar is slotted, as shown at 25, (see Fig. 2,) to receive the pin 26 on the shaft, thus providing for a little slack motion, which compensates for any inequalities in the pile of plates or sheets, to be hereinafter referred to, the pin and the end wall of the slot being held in engagement normally by a spring 42, to be hereinafter mentioned.

It will be seen that the oscillations of the lever 19 will by the mechanism described be imparted to the crank 22 and shaft 24, and the latter has a gear connection with a hollow shaft 29, which can be of any usual kind, but which, as shown, comprises the gear-segment 27 and the pinion 28. The hollow shaft 29 is journaled in suitable bearings, as shown in Fig. 2, and it is provided with hollow arms or pipes 30, which are curved upward and outward, as shown, and which have flaring mouths 31, preferably of rubber, but which may be of leather or other yielding or resilient material, these mouths being adapted to come in contact with the sheets 32, which are to be delivered to the main machine 10.

It will be seen from the description which

I have given that the hollow arms 30 will oscillate backward and forward, the mouths 31 coming in contact with successive plates 32, and that the return movement of the arms carries them to the position shown in Fig. 4, thus lifting a plate or sheet 32 and carrying it to the slide 11. The arms 30 move a little below the slide 11 to make sure that they clear the sheet 32, which they carry; but they are not literally pulled from the sheet, because, as will be presently seen, the suction is removed at the time the sheets contact with the slide 11. I have shown a pair of these hollow arms 30 as being best adapted for the purpose intended; but obviously a single arm or a plurality of arms can be used to suit various purposes.

The hollow shaft or air-shaft 29 connects, by means of a flexible pipe 33, with a vacuum-pump 34, and the latter can be of any usual kind and can be operated by any mechanism which will create a suction in the pipe 29 and arms 30, while the latter are in engagement with a sheet 32; but, as shown, the pump 34 is operated by a pitman 35, which connects with a crank 36 (see Fig. 2) on the shaft 14. The connection with the shaft is such that the pump will be operated to produce the necessary vacuum during the up-stroke of the arms 30 and to cease suction as the sheet is deposited by the arms.

The shaft 24, previously referred to, has a crank 37, which connects by a rod 38 with the crank 39 of a shaft 40, which is parallel with the shafts 14 and 24, and a crank-arm 41 on the shaft connects by a spring 42 with the machine-frame 10, so that the pull of the spring acting through the mechanism described causes the shaft 24 to be held in position for the pin 26 to engage the end wall of the slot 25, and thus the shaft will be held in position for operative work and still be permitted to yield a little when necessary. The shaft 40 has also a crank 43, connecting by a pitman 44 with the lever 45 of a liquid-pump 46, which can be of any usual kind and which connects by a pipe 47 with the tank 48, in which water or other liquid is stored. The pipe 47 is provided with a valve 47^a, by means of which the amount of liquid withdrawn from the tank can be regulated, and in this way the movement of the hydraulic jack 50 can be controlled. The pump 46 connects by a pipe 49 with the said jack 50, and the pipes 47 and 49 have a check-valve 51 on each side of the pump 46. The pipe 49 also connects by a pipe 52, which is controlled by a valve 53 with the top of the tank 48, and this arrangement provides for the return of liquid from the jack 50. The jack 50 has its piston connected with the movable bottom 54 of the hopper 55, in which the sheets 32 are piled. The hopper 55 is carried on a suitable stand 56. It will be seen, therefore, that if the bottom 54 is raised

higher than is necessary or if the sheets are exhausted, or nearly so, the operator stops the machine and can then press back on the bottom 54 after opening the valve 53, and the liquid can be forced back from the cylinder of the jack 50 through the pipes 49 and 52 to the tank 48, as the check-valves 51 prevent its return through the pipe 47.

The operation of the apparatus is as follows: At the first movement of the shaft 14 the shafts 24 and 29 will be oscillated, as already described, and the hollow arms 30 thrown into engagement with the top sheet 32 in the hopper 55. At this moment the pitman 35 will be raised, so as to produce a suction in the pipe 33, shaft 29, and arms 30, so that the sheet 32 will be held snugly to the mouths 31 of the arms 30. The continued oscillation of the arms 30 carries the sheet upward to the point where it is practically in engagement with the slide 11, and when the sheet engages the slide the pitman 35 is regulated to begin its return stroke and the suction in the aforesaid pipes will be stopped and the sheet 32 dropped. At each return movement of the arms 30 the pump 46 will be operated by means of the connection with the shaft 24, already described, and sufficient liquid will be forced from the tank 48 to the jack 50 to raise the pile of sheets 32 the thickness of one sheet. This can be nicely regulated by means of the valve 47^a, so that the movement of the jack can be adjusted as wished, and any slight variation is also further compensated for by the slight lost motion of the arms 30, which is provided for by the slotted collar 23, as already described.

It will thus be seen that I have provided a simple and efficient means of feeding the sheets one by one to any mechanism intended to do work on them, and it will be understood that many of the details, such as the character of the pump, the lifting-jack, and the particular gear and lever connections can be departed from without materially affecting the principle of the invention.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. An apparatus of the kind described, comprising a sheet-holding hopper, a hollow shaft adjacent to the hopper, hollow arms carried by the shaft and having mouths to engage the sheets, means for oscillating the shaft, a vacuum-pump connected with the shaft, and automatic means for operating the pump with the oscillations of the said arms.

2. An apparatus of the kind described, comprising a sheet-holder, a lifting device to successively engage the sheets in the holder and lift them therefrom, a hydraulic jack beneath the sheets, a pump to supply the jack, and means for operating the pump as each sheet is lifted.

3. An apparatus of the kind described, com-

prising a sheet-holder, a hydraulic jack for lifting the sheets in the holder, a lifting device operating to successively engage and lift the sheets, a pump having a regulable
5 source of supply, the said pump connecting with the jack, and automatic means for operating the pump as each sheet is lifted.

4. An apparatus of the kind described, comprising a sheet-holding hopper having a movable bottom, a hydraulic jack connected
10 with the said bottom, a pump connected with a source of liquid supply and with the jack, sheet-lifting means to successively raise the sheets from the hopper, and automatic means
15 for operating the pump as each sheet is lifted.

5. An apparatus of the kind described, comprising a sheet-holding hopper, a hollow oscillating shaft, hollow arms connected with the shaft and having mouths to contact with
20 the sheets in the hopper, a vacuum-pump connected with the hollow shaft, a hydraulic jack for raising the sheets in the hopper, a pump connected with a source of liquid supply and with the jack, and means for alter-
25 nately operating the pumps as the oscillating arms are moved.

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