

P. KRUSE.
FEEDING MEANS FOR SHEETS.
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1,153,434.

Patented Sept. 14, 1915.

Fig. 1.

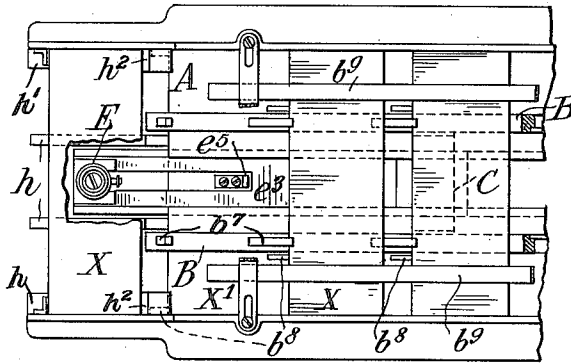


Fig. 3.

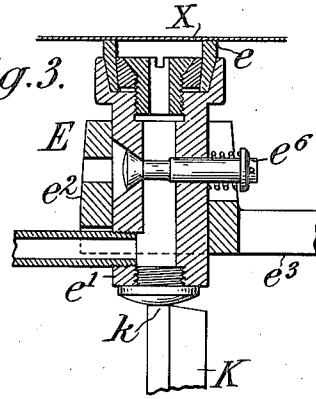
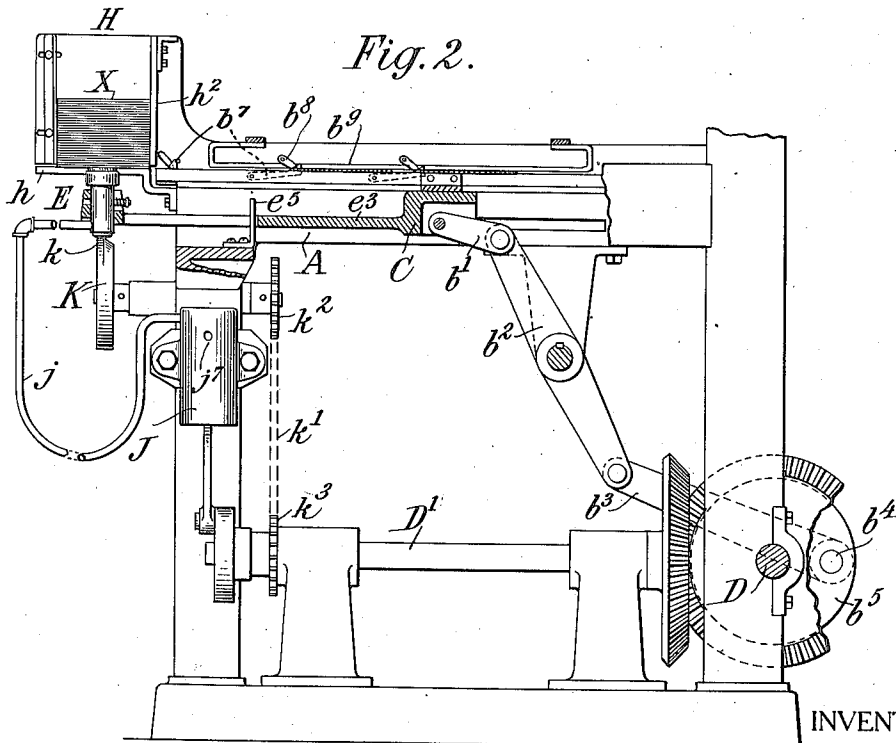


Fig. 2.



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FEEDING MEANS FOR SHEETS.

1,153,434.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, PETER KRUSE, a citizen of the United States of America, residing in the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Feeding Means for Sheets, of which the following is a specification.

This invention relates to means for feeding sheets, more particularly sheets of metal, to sheet working machines, and aims to provide improvements therein.

Heretofore sheets have been fed from a hopper to a sheet working machine by a suction device which separates or spaces a sheet in the hopper from the other sheets therein, the spaced or separated sheets being fed from the hopper by means of a reciprocating part having fingers thereon for engaging an edge of the sheet.

By the present invention a considerable simplification in the construction and operation of such machines is effected, a suction device being employed which acts to feed sheets directly from the hopper. Moreover the sheet is fed flat from the hopper, bending and distortion thereof being avoided.

An embodiment of the invention is illustrated in the accompanying drawing, reference to which drawing is made for a further and more detailed description of the invention.

In said drawing, Figure 1 illustrates a plan view of the feeding means together with parts of a metal working machine to which the feeding means may be applied. Fig. 2 is a side elevation, partly in section, of the parts shown in Fig. 1. Fig. 3 is a sectional detail view of the suction device.

In said drawings, the letter A designates a suitable table or bench forming the frame of the machine.

B B designate one or more feed bars working in suitable guide-ways in the top face of the table A, the feed bar or bars being preferably attached to a slide block or piece C, and adapted to be reciprocated by a suitable means, as for instance, a train of links and levers b^1 , b^2 , b^3 connected to a crank pin b^4 upon a disk b^5 , mounted upon a main driving shaft D.

E designates a suction device which is preferably mounted upon and reciprocates

with the feed bar or bars B B. The suction device E preferably comprises a suction cup e carried by a short plunger e^1 mounted in a block or socket e^2 . A shoulder on the plunger e^1 limits the movement of the plunger in the socket e^2 to a small amount. The block or socket e^2 may be connected to the reciprocatory feed bars by means of an arm or slide e^3 forming an extension of the slide block C. The suction device E is adapted to operate at the underside of any suitable hopper H.

The sheets of metal X rest on ledges h^1 at the bottom of the hopper, the upper faces of which are preferably flush with the upper face of the table A. Strips h may also be provided. A plate or arm h^2 is arranged at the front of the hopper, and its lower edge is spaced from the upper faces of the strips h about the distance of the thickness of a sheet of metal, so that but one sheet may be slid out from the underside of the hopper at a time, by the suction device, as hereinafter explained.

Any suitable means for establishing a vacuum or rarefaction in the suction device may be employed. Preferably, a suction pump J, which is driven by the machine, is provided, this pump being connected to the suction device by a tube j .

A cam, or other suitable means K is preferably provided for raising the suction device into contact with a sheet at the underside of the stack in the hopper, when the suction device is in position beneath the hopper. The cam K is preferably formed of a wheel which is rotated from a working part of the machine, as for instance, by a chain k^1 and sprockets k^2 , k^3 , the sprocket k^3 being mounted upon a shaft D^1 which is driven by the main shaft D through bevel gears or the like. The cam wheel K is adapted to make one revolution for each longitudinal reciprocation of the suction device. The cam wheel K carries a cam or face k which engages the plunger e^1 of the suction device when the suction device is at rest, or substantially at rest beneath the hopper, and thereby pushes the suction device into contact with the underside of a sheet in the hopper.

e^5 designates a stop upon the machine, which is preferably employed for striking

the stem of a valve e^6 on the suction device E for breaking the vacuum therein at the desired time.

Operation: When the suction device E is at the rearward limit of its reciprocation, and at rest or substantially at rest, the cam face k on the cam wheel K comes into contact with the end of the plunger e^1 of the suction device and presses the suction cup e into contact with a sheet at the underside of the pile of sheets in the hopper. A rarefaction existing at this time in the tube j , a suction or rarefaction is present in the vacuum cup, and the sheet with which the cup is in contact, is held firmly thereto. Upon the forward movement of the suction device the sheet is slid flatwise transversely out of the hopper into a position X^1 on the bench or table in front of the hopper. When the sheet reaches the position X^1 the stem e^6 strikes the stop e^5 , and the vacuum is broken, and the suction device falls by its own weight from the underside of the sheet, thus leaving the sheet in the position X^1 . The suction device is thereupon carried back to its initial position beneath the hopper, being brought into contact with a sheet at the underside of the stack in the hopper by the cam wheel K, as heretofore explained. As the suction device E moves back to a position beneath the hopper, a grip finger b^7 carried by the reciprocatory bar or bars B comes into contact or engagement with the rear face of the sheet in the position X^1 , and advances it upon the next reciprocation of the reciprocatory bars.

Suitable stops b^8 may be provided for preventing rearward movement of the sheets.

b^9 designates one or more longitudinal strips adapted to bear upon the upper sides of the sheets, to prevent displacement thereof.

The plunger of the pump J preferably makes one reciprocation for each reciprocation of the suction device, and is provided with a port j^1 which is adapted to be uncovered by the piston on its down stroke at substantially the same time that the suction device reaches the forward end of its reciprocation. The down stroke of the pump plunger begins, and the suction is initiated, slightly before the suction device reaches the rearward end of its reciprocation.

The inventive idea may receive other embodiments than that herein illustrated and specifically described.

What is claimed is:—

1. A sheet feeding means, comprising means for separating a sheet directly from the underside of a stack in the direction of the plane of the sheet, said means comprising a suction device adapted to contact with the underside of a sheet in a stack, and means for moving said suction device in the direction of the plane of the sheet, said suc-

tion device, when moved, exercising a tractive effect on the sheet.

2. A sheet feeding means, comprising means for separating a sheet directly from the underside of a stack in the direction of the plane of the sheet, said means comprising a hopper, a suction device adapted to contact with the underside of a sheet in a stack in the hopper, and means for moving said suction device in the direction of the plane of the sheet, said suction device, when moved, exercising a tractive effect on the sheet.

3. A sheet feeding means, comprising means for separating a sheet directly from the underside of a stack in the direction of the plane of the sheet, said means comprising a hopper, a suction device adapted to contact with the underside of a sheet in a stack in the hopper, means for moving said suction device in the direction of the plane of the sheet, said suction device, when moved, exercising a tractive effect on the sheet, and means for preventing more than one sheet passing out of the hopper at a time.

4. A sheet feeding means, comprising means for separating a sheet directly from the underside of a stack in the direction of the plane of the sheet, said means comprising a suction device adapted to contact with the underside of a sheet in a stack, means for moving said suction device in the direction of the plane of the sheet, said suction device, when moved, exercising a tractive effect on the sheet, and means for moving said suction device into contact with the sheet.

5. A sheet feeding means, comprising means for separating a sheet directly from the underside of a stack in the direction of the plane of the sheet, said means comprising a suction device adapted to contact with the underside of a sheet in a stack, and a reciprocating feed bar for moving said suction device in the direction of the plane of the sheet, said suction device, when moved, exercising a tractive effect on the sheet.

6. A sheet feeding means, comprising means for separating a sheet directly from the underside of a stack in the direction of the plane of the sheet, said means comprising a suction device adapted to contact with the underside of a sheet in a stack, means for moving said suction device in the direction of the plane of the sheet, said suction device, when moved, exercising a tractive effect on the sheet, and means for breaking the suction in said suction device.

7. A sheet feeding means, comprising a hopper, a suction device, a rotary cam for moving said suction device into contact with the underside of a sheet on the underside of a stack of sheets in the hopper, and means for moving said suction device and attached

sheet transversely for removing the sheet from the hopper.

8. A sheet feeding means, comprising a hopper, a suction device, a rotary cam for
5 moving said suction device into contact with the underside of a sheet on the underside of a stack of sheets in the hopper, and a reciprocatory feed bar for moving said suction device and attached sheet transversely
10 from the hopper, said rotary cam being

timed to act upon said suction device at about the time the suction device is at the rearward end of its reciprocation.

In witness whereof, I have hereunto signed my name in the presence of two subscribing
15 witnesses.

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Witnesses:

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