

E. G. STAUDE.  
 FEED DEVICE FOR FLEXIBLE BOX MAKING MACHINES.  
 APPLICATION FILED AUG. 28, 1906.

906,827.

Patented Dec. 15, 1908.  
 3 SHEETS—SHEET 1.

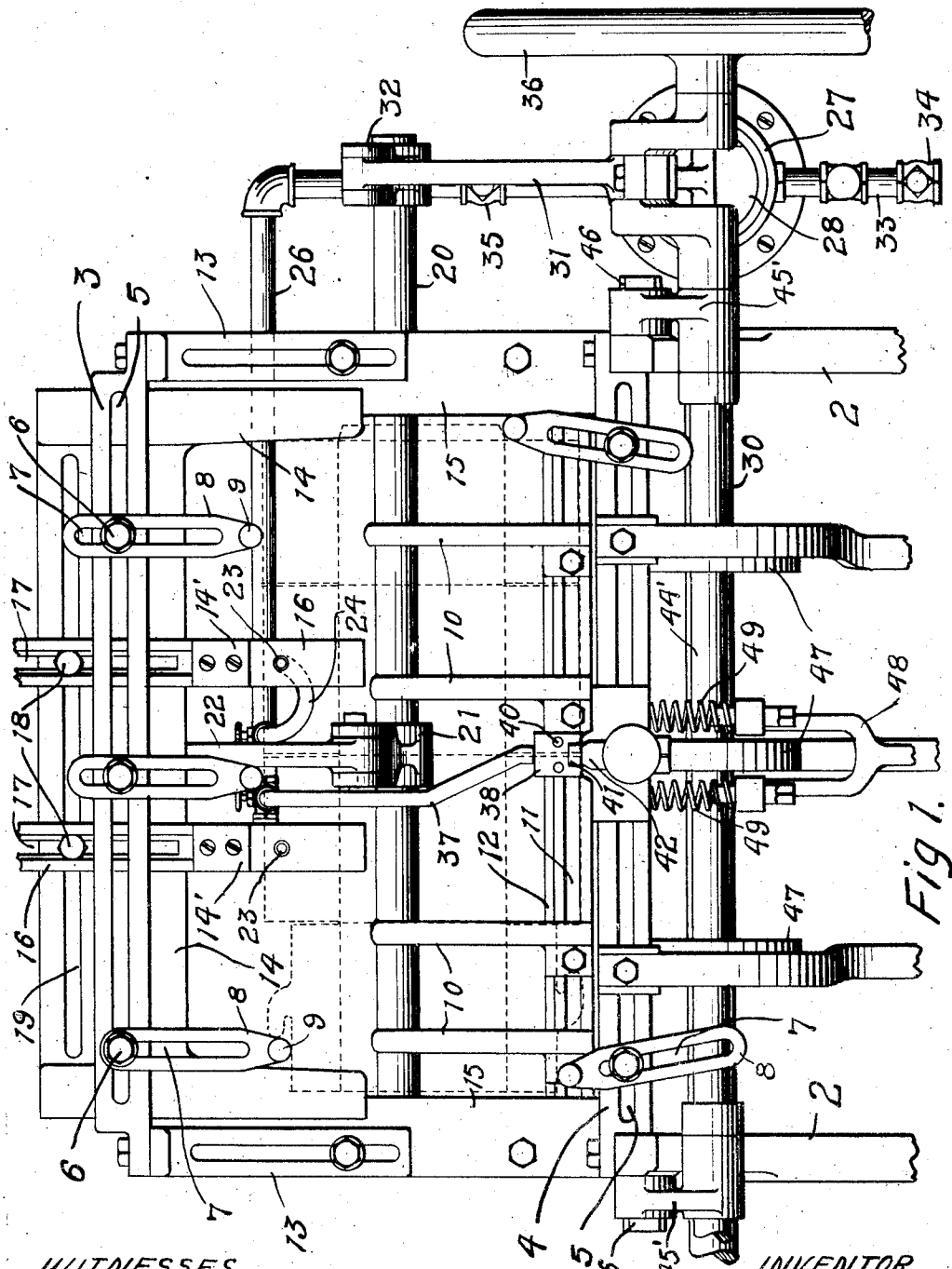


Fig. 1.

WITNESSES  
*M. Valatton*  
*C. Marnamara*

INVENTOR  
 EDWIN G. STAUDE.  
 BY *Paul & Paul*  
 HIS ATTORNEYS.

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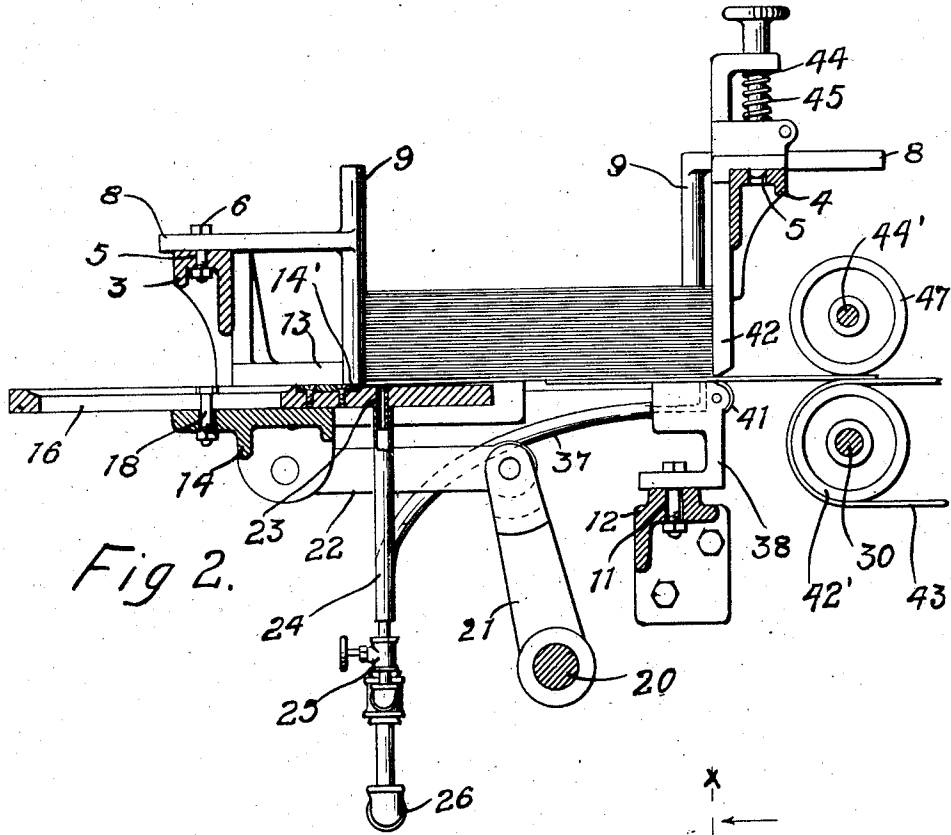


Fig 2.

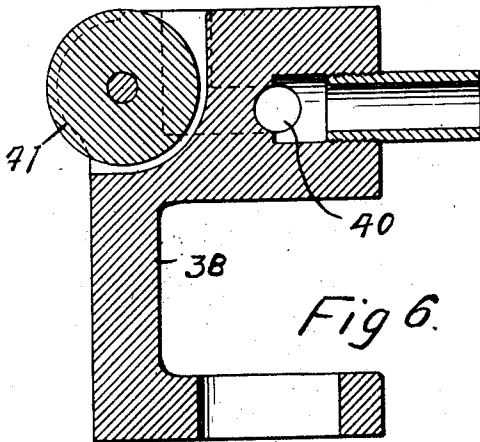


Fig 6.

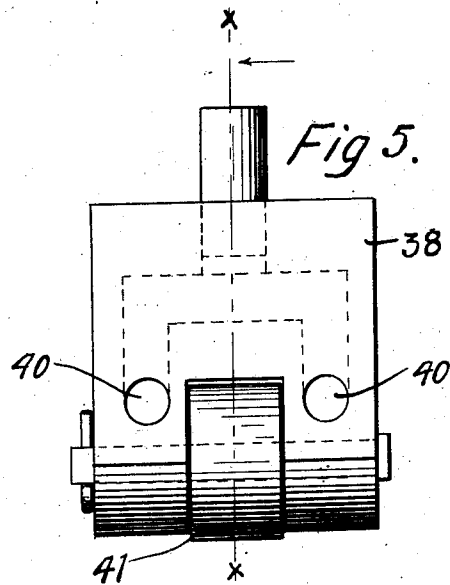


Fig 5.

WITNESSES  
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*E. Thannamara*

INVENTOR  
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 BY *Paul & Paul*  
 HIS ATTORNEYS

## FEED DEVICE FOR FLEXIBLE BOX MAKING MACHINES.

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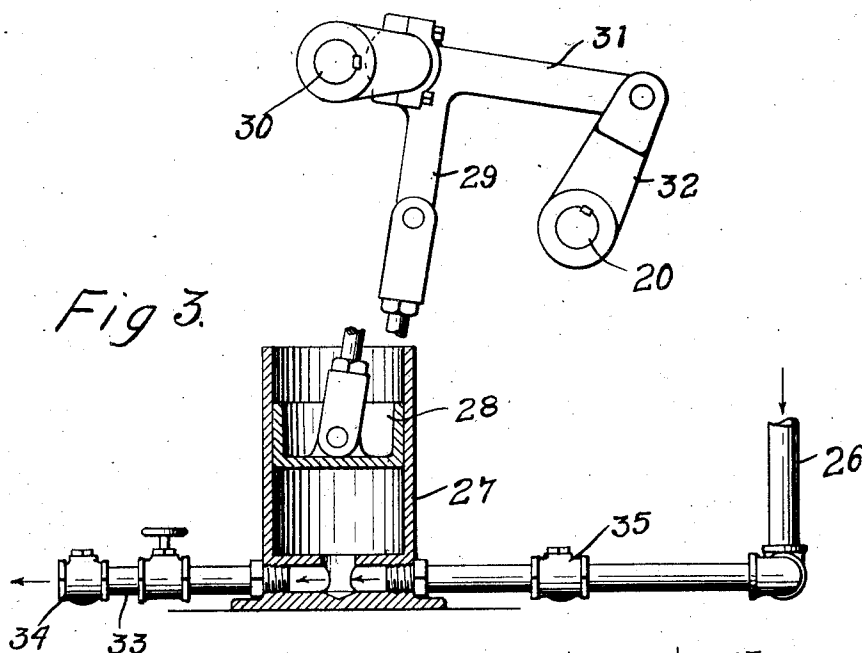


Fig 3.

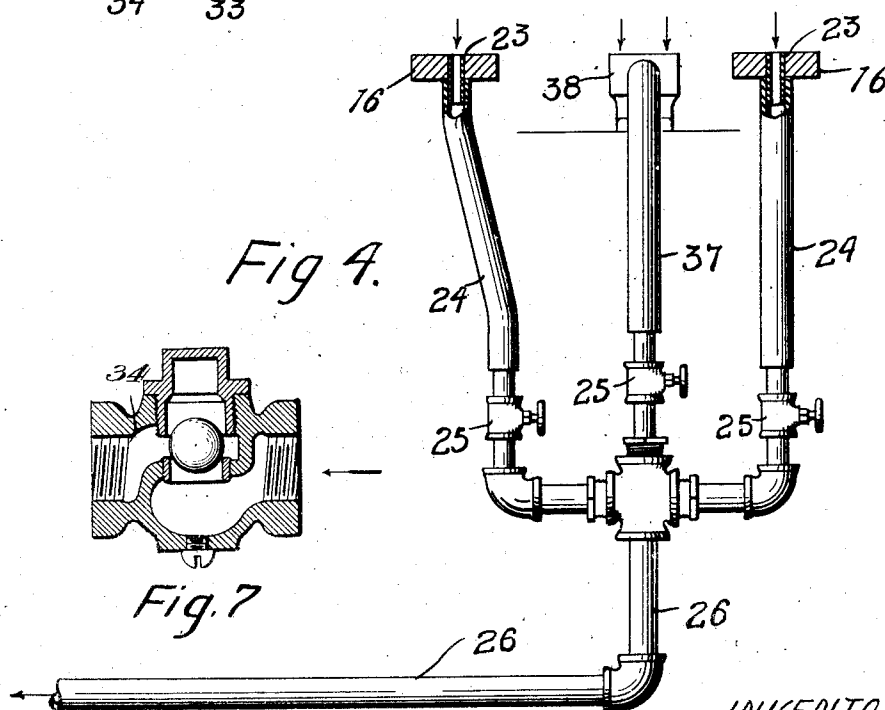


Fig 4.

*Fig. 7*

WITNESSES  
M Walstrom  
Q. Inasmuch as

INVENTOR  
EDWIN G. STAUDE.

BY *Paul & Paul*  
HIS ATTORNEYS

# UNITED STATES PATENT OFFICE.

EDWIN G. STAUDE, OF MINNEAPOLIS, MINNESOTA.

## FEED DEVICE FOR FLEXIBLE-BOX-MAKING MACHINES.

No. 906,827.

Specification of Letters Patent.

Patented Dec. 15, 1908.

Application filed August 28, 1905. Serial No. 276,045.

*To all whom it may concern:*

Be it known that I, EDWIN G. STAUDE, of Minneapolis, Hennepin county, Minnesota, have invented certain new and useful Improvements in Feed Devices for Flexible-Box-Making Machines, of which the following is a specification.

My invention is designed particularly for use in connection with the machine shown and described in a certain pending application for Letters Patent of the United States filed February 23, 1905, No. 246,840, and the object of my invention is to provide means to facilitate the feeding of the blanks and preventing them from bending or buckling during the feeding operation.

The invention consists generally in providing a carriage and a suitable support for the pile of blanks and a feed device operating to engage the bottom blank of the series, and a suction device arranged to draw down the bottom blank and prevent it from bending or buckling while it is being fed from beneath the pile.

In the accompanying drawings forming part of this specification, Figure 1 is a plan view of the hopper and feed device with my invention applied thereto. Fig. 2 is a vertical sectional view of the same, a portion of the mechanism being omitted for clearness of illustration. Fig. 3 is a detail sectional view of the pump device showing its attachment to the crank shaft. Fig. 4 illustrates the pipe connections from the pump to the carriage and the support for the blanks. Fig. 5 illustrates the antifriction wheel provided beneath the forward edges of the blanks and the ports leading to the pump arranged on each side of the wheel. Fig. 6 is a sectional view on the line  $x-x$  of Fig. 5. Fig. 7 is a detail view illustrating the form of check valve employed in the exhaust pipe of the cylinder.

In the drawing, 2 represents the side and 3 and 4 the cross bars of the feed hopper. The bars 3 and 4 have longitudinal slots 5 wherein bolts 6 are slidably arranged and pass through slots 7 provided in arms 8 which have vertical standards 9 to bear upon the edges of the blanks and hold them in their proper relative position in the hopper. A series of arms 10 form supports for

the forward portion of the blanks, and are adjustable in a slot 11 provided in a cross bar 12. The cross bar 3 is also adjustable toward and from the other bar by means of the slotted castings 13 mounted on the side bars 2. These adjustments of the bars and arms allow the hopper to be adapted for box blanks of different sizes. A carriage 14 is slidably supported upon ways 15 mounted on the side bars 2, and bars 16 are arranged on said carriage and have slots 17 through which bolts 18 pass into a slot 19 extending transversely of said carriage and allowing the bars 16 to be moved toward or from each other or adjusted longitudinally according to the size of the blanks. Feed plates 14 are mounted on the bars 16 and are of sufficient thickness to engage the bottom blank and feed it out of the pile. When placed in the hopper the blanks will rest upon the arms 10 and the forward portion of the carriage in front of the feed plates. A rock shaft 20 is provided beneath the hopper having an arm 21 pivotally connected by a link 22 with the carriage 14 to impart a reciprocating movement thereto when the shaft 20 is rocked. Holes 23 are provided in the bars 16 communicating through flexible tubes 24 and valves 25 with a pipe 26 leading to a pump cylinder 27 whose piston 28 is pivotally connected with one arm of a bell crank 29 mounted on a crank shaft 30 and having its other arm 31 pivotally connected to an arm 32 on the rock shaft 20 to operate the same. The pump cylinder has an exhaust pipe 33 and a valve 34 which is arranged to open when the piston descends and allow the escape of air. The form which I prefer to employ is illustrated in Fig. 7 in which a valve casing is shown containing a ball and a seat therefor, as shown in valves of this type. The pipe 26 has a valve 35 oppositely arranged from the valve 34 and adapted to close when the pump piston descends and open when it ascends to create a suction in the pipe 26 and its connections. A hand wheel 36 is shown on one end of the drive shaft 30, and a driving pulley (not shown) is provided on the opposite end. A pipe 37 leads from the pipe 26 to a casting 38 adjustably supported on the cross bar 12 and having port holes 40 communi-

cating with the pipe 37 upon each side of an antifriction or idle wheel 41. This casting is normally stationary and a sufficient space equal to the thickness of the blank is provided between the wheel 41 and a depending finger 42 to allow the feed of the box blanks from the hopper. The cross bar 4 supports the finger 42 and a pin 44 has a screw connection with said cross bar and a slide connection with the finger 42, to allow the convenient adjustment of the same, a spring 45 being provided on said pin for normally holding said finger in its raised position. By turning the pin in one direction the finger will be lowered and the distance between its lower edge and the wheel 41 decreased, and by turning the pin in the opposite direction the spring 45 will raise the finger away from the wheel 41 and enlarge the feed opening. The shaft 30 is provided with a wheel 42' for the feed belt 43', and a shaft 44', pivoted by means of arms 45' at 46 on the frame of the machine, is provided with wheels 47 which rest upon the blanks and hold them down upon the feed belt. A fork 48 is pivotally supported on the shaft 44' and extends forwardly therefrom and is provided with a series of small wheels (not shown) that are adapted to bear on the blanks and hold them down upon the feed belt. A fork is yieldingly held with its wheels in engagement with the blanks by the coil springs 49.

In the operation of the machine a series of flexible box blanks are placed in the hopper, and as soon as the reciprocating feed device is started the feed plates will engage the edge of the bottom blank and feed it forward out of the hopper. The movement of the mechanism is so timed that the bottom blank will be fed out of the hopper before the feed device begins to push forward the next to the bottom blank. Simultaneously with the operation of the feed device a suction will be established through the ports beneath the bottom blank, and will be drawn down and held in a flattened position during the feeding operation, and all tendency of the blank to bend or buckle when engaged by the feed plates will be positively prevented. I am thus able to feed the blanks out of the hopper very rapidly and thereby increase the capacity and efficiency of the machine.

I claim as my invention:

1. The combination, with means for supporting flexible box blanks placed one above another, of a feed device arranged to engage the bottom blank and feed it forward from beneath the pile, and means arranged to act on the under side of the bottom blank for holding the said bottom blank in a flattened position to prevent it from bending or buck-

ling during the operation of feeding the said bottom blank from beneath the others.

2. The combination, with means for supporting a series of flexible box blanks placed one above the other, of a feed device arranged to engage the edge of the bottom blank and feed it forward from beneath the pile, and a suction device for holding the said bottom blank in a flattened position during the operation of feeding it from beneath the other blanks.

3. The combination, with means for supporting a series of flexible box blanks placed one above another, of a reciprocating carriage having feed plates arranged to engage the edge of the bottom blank and feed it forward from beneath the pile of blanks, and means arranged to act on the under side of the bottom blank for holding the bottom blank in a flattened position on said carriage during said feeding operation.

4. The combination, with a hopper, of a reciprocating carriage having a feed plate, said carriage being provided with a port in front of said plate, and a suction pump connected with said port, for the purpose specified.

5. The combination, with a hopper wherein a series of flexible box blanks are placed one above another, of a carriage operating beneath the rear edge of said blanks and provided with means to engage the edge of the bottom blank and feed it forward from beneath the pile, an antifriction wheel provided beneath the forward edges of the blanks, air ports provided in said carriage and near said antifriction wheel, and a suction pump connected with said ports, for the purpose specified.

6. The combination, with a hopper adapted to contain a series of flexible box blanks placed one upon another therein, of an antifriction wheel arranged beneath said hopper and over which the blanks are fed from said hopper, an air port provided in a stationary support at one side of said wheel, and a suction pump connected with said port and a blank feeding means, for the purpose specified.

7. The combination, with a hopper adapted to contain a series of flexible box blanks placed one above another therein, of a reciprocating carriage provided with means for engaging the edge of the bottom blank to feed it forward from beneath the pile of blanks, air ports adapted to draw both the rear and forward portions of the blank, and a suction pump connected with said ports.

8. The combination, with a hopper adapted to contain flexible box blanks placed one above another therein, of a reciprocating carriage having feed plates to engage the edge of the bottom blank and feed it for-

ward from beneath the pile, a feed wheel  
over which the blanks are fed from said hop-  
per, a finger adjustably supported above  
said wheel and between which finger and the  
5 wheel the blanks are fed, and means for  
drawing down the forward and rear edges of  
the bottom blank and holding the same in a  
flattened position during the operation of

discharging it from the hopper, substan-  
tially as described.

In witness whereof, I have hereunto set  
my hand this 25th day of August 1905.

EDWIN G. STAUDE.

Witnesses:

RICHARD PAUL,  
C. MACNAMARA.