

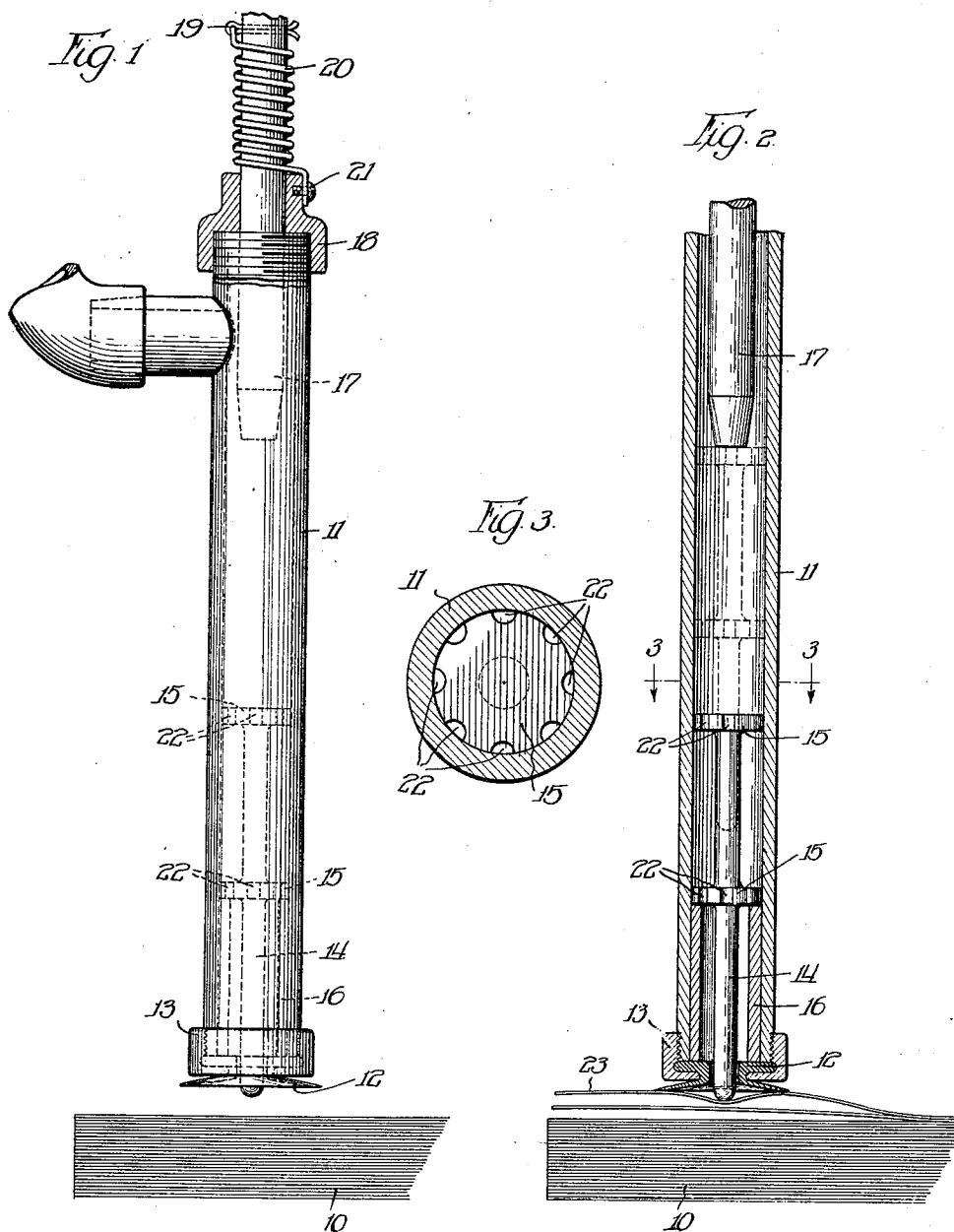
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C. HENDERSON

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SEPARATING MECHANISM FOR SHEET MATERIAL

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UNITED STATES PATENT OFFICE.

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SEPARATING MECHANISM FOR SHEET MATERIAL.

Application filed February 1, 1922. Serial No. 533,182.

To all whom it may concern:

Be it known that I, CARL HENDERSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Separating Mechanism for Sheet Material, of which the following is a specification.

This invention relates to sheet feeding mechanism.

As is well known, there is a tendency for raising not only one, but sometimes a second or third sheet of paper from a stack or pile when the top sheet is being withdrawn therefrom in the feeding of paper.

One object of this invention is to provide simple and efficient means which is positive in its action for separating a second sheet from the top sheet when the latter is being withdrawn from a pile of sheet material.

Another object of the invention is to provide a simple and reliable paper separating device adapted to meet the various requirements for commercial use.

These and other objects are accomplished by means of the arrangement disclosed by the accompanying sheet of drawings, in which—

Figure 1 is a side elevation of my improved sheet separating mechanism shown in association with a pile of sheet material.

Figure 2 is a fragmentary vertical longitudinal sectional view of the same illustrating how a second sheet is separated from the top sheet under operating conditions; and Figure 3 is a sectional view taken in the plane of line 3—3 of Figure 2.

The various novel features of my invention will be apparent from the following description and drawings and will be particularly pointed out in the appended claims.

Referring to the figures of the drawings, it will be noted that I have shown my paper separating mechanism mounted over a pile of sheet material 10, such as paper, the sheets to be removed one by one preparatory to being fed to a machine such for example as a printing press. This paper separating mechanism includes a hollow tube 11 to the lower end of which a flexible or rubber suction shoe 12 is secured by means of a cap 13 threaded onto the lower end of the tube 11. Mounted within the tube 11 is a plunger 14 which is lifted within the tube as a re-

sult of suction and which falls within the tube as a result of its own weight for causing a separating action between the first and second sheets, as will be described in detail hereinafter. The plunger is guided in its vertical reciprocatory movements by two guide flanges 15 preferably formed integrally with the plunger. A stop member 16 is mounted in the lower end of the tube for limiting downward movement of the plunger 14. For limiting upward movement of the plunger 14 a stop member in the form of a pin 17 is provided. This pin extends through a cap 18 which is secured to the tube 11 in any suitable manner. Extending through the pin is a key 19 to which a coiled spring 20 is secured, said coiled spring being wrapped around the upper end of the pin 17 and having its lower end anchored by a threaded member 21 screwed into the cap 18. The tendency of the spring 20 is to hold the pin 17 in its lowermost position. As will be explained later, the plunger 14 is caused to rise in the tube with a quick action and engages the lower end of the pin 17 with considerable force, whereupon the latter rises as a result thereof against the tension of spring 20. The spring 20, however, after taking up the shock of impact immediately returns the pin 17 to its normal position.

In connection with the sheet separating action it will be noted that the lower end of the plunger 14 is spaced from the interior surface of the hollow stop member 16 to provide an air passageway, and that the guide flanges 15 also are provided with slots or air passageways 22 in the periphery thereof. With the parts arranged as shown in Figure 1, when the lower end of the flexible shoe 12 is not sealed air is drawn upwardly through the shoe passageways 22 and through the tube 11. As a result thereof the plunger 14 is quickly raised and continues in its upward movement until stopped by the stop member 17, as explained hereinabove. As soon as the suction shoe becomes sealed by the sheet material the air pressure on opposite sides of the guide flanges 15 becomes equalized, whereupon the plunger drops of its own weight with considerable force, the lower end of the plunger striking the top sheet and forcing it from a position in which it conforms to the lower surface of the suction shoe 12 downwardly to the position

shown in Figure 2, causing a relative movement between the top sheet and the second sheet, if the latter has been drawn up with the top sheet, and thereby causing a separation of the second sheet from the top sheet. It will be understood that the separation of the second sheet from the top sheet is caused both by a relative movement of the top and second sheets when the plunger drops into engagement with the top sheet and also as a result of the impact. The area of the guide flanges 15 and of the openings 22 may be proportioned or varied in accordance with requirements, it being necessary only that the openings 22 permit the upward passage of air, but still causing enough suction to draw the plunger up to the stop pin 17. The plunger then remains in its raised position until the suction shoe is sealed by the sheet, whereupon the plunger drops and delivers a quick hammer-like blow upon the top sheet 23 of material, cooperating to efficiently separate the top sheet from the second sheet in the manner described. Owing to rebound, the plunger may deliver several blows to the sheet, the number depending upon the resiliency of the particular kind of sheets being operated upon. This also augments the separating action since it imparts vibratory motion to the sheets.

It is my intention to cover all modifications of the invention falling within the spirit and scope of the following claims.

I claim:

1. In separating mechanism for sheet material, the combination of means for causing sheet material to be withdrawn from a pile, and means for separating a second sheet from the first sheet with a hammer-like blow if a second sheet adheres to the first sheet.

2. In separating mechanism for sheet material, the combination of means for sucking sheet material from a pile, and means for separating a second sheet from the first sheet with a hammer-like blow if a second sheet adheres to the first sheet.

3. In separating mechanism for sheet material, the combination of means including a suction shoe for drawing sheet material from a pile, and means for delivering a hammer-like blow at said suction shoe for separating a second sheet from the first sheet if a second sheet adheres to the first sheet.

4. In separating mechanism for sheet material, the combination of suction means for drawing sheet material from a pile and including a movably mounted plunger actuated in accordance with suction conditions, said plunger for delivering a hammer-like blow to the sheet material drawn from said pile for separating a second sheet from the first sheet if a second sheet has adhered to the first sheet.

5. In separating mechanism for sheet ma-

terial, the combination of a tube, a suction shoe mounted at the end of said tube through which air is drawn and whereby sheet material may be drawn from a pile, a plunger operable in said tube whereby suction first moves said plunger away from said shoe and after shoe is sealed delivers a blow to the sheet, and separates a second sheet from the first sheet if a second sheet has adhered to the first sheet.

6. In separating mechanism for sheet material, the combination of a tube through which air may be drawn for lifting sheet material from a pile, a plunger movably mounted in said tube, the plunger being caused first to rise in said tube as a result of suction and after the lower end of said tube becomes sealed to drop into engagement with the sealing sheet material and separating a second sheet from the first sheet if a second sheet has been drawn from the pile at the same time.

7. In separating mechanism for sheet material, the combination of a tube through which air may be drawn for lifting sheet material from a pile, a plunger movably mounted in said tube, the plunger being caused first to rise in said tube as a result of suction and then when the lower end of said tube is sealed to drop into engagement with the sealing sheet material and separating a second sheet from the first sheet if a second sheet has been drawn from the pile at the same time, and means for limiting the upward movement of said plunger.

8. In separating mechanism for sheet material, the combination of a tube through which air may be drawn for lifting sheet material from a pile, a plunger movably mounted in said tube, the plunger being caused first to rise in said tube as a result of suction and then when the lower end of said tube is sealed to drop into engagement with the sealing sheet material and separating a second sheet from the first sheet if a second sheet has been drawn from the pile, means for limiting the upward movement of said plunger, and means for limiting the downward movement of said plunger.

9. In separating mechanism for sheet material, the combination of a tube through which air may be drawn for lifting sheet material from a pile, a plunger movably mounted in said tube, the plunger being caused first to rise in said tube as a result of suction and then when the lower end of said tube is sealed to drop into engagement with the sealing sheet material and separating a second sheet from the first sheet if a second sheet has been drawn simultaneously from the pile, and means for cushioning and limiting the upward movement of the plunger.

10. In separating mechanism for sheet material, the combination of a tube, a flexible suction shoe at the lower end of said tube,

and a plunger having discs for guiding the movement of said plunger, said discs having openings to permit the passage of air there-
through, said plunger first rising in said tube
5 when suction is applied and then when the suction shoe is sealed by sheet material drawn from a pile dropping in said tube for deliver-

ing a hammer-like blow to the sheet material and separating a second sheet therefrom if a second sheet has adhered thereto.

Signed at Chicago, Illinois, this 28th day of December, 1921.

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CARL HENDERSON.