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C. A. JUENGST.

SUCKER DEVICE FOR SIGNATURE OR SHEET GATHERING MACHINES.

APPLICATION FILED MAR. 2, 1904.

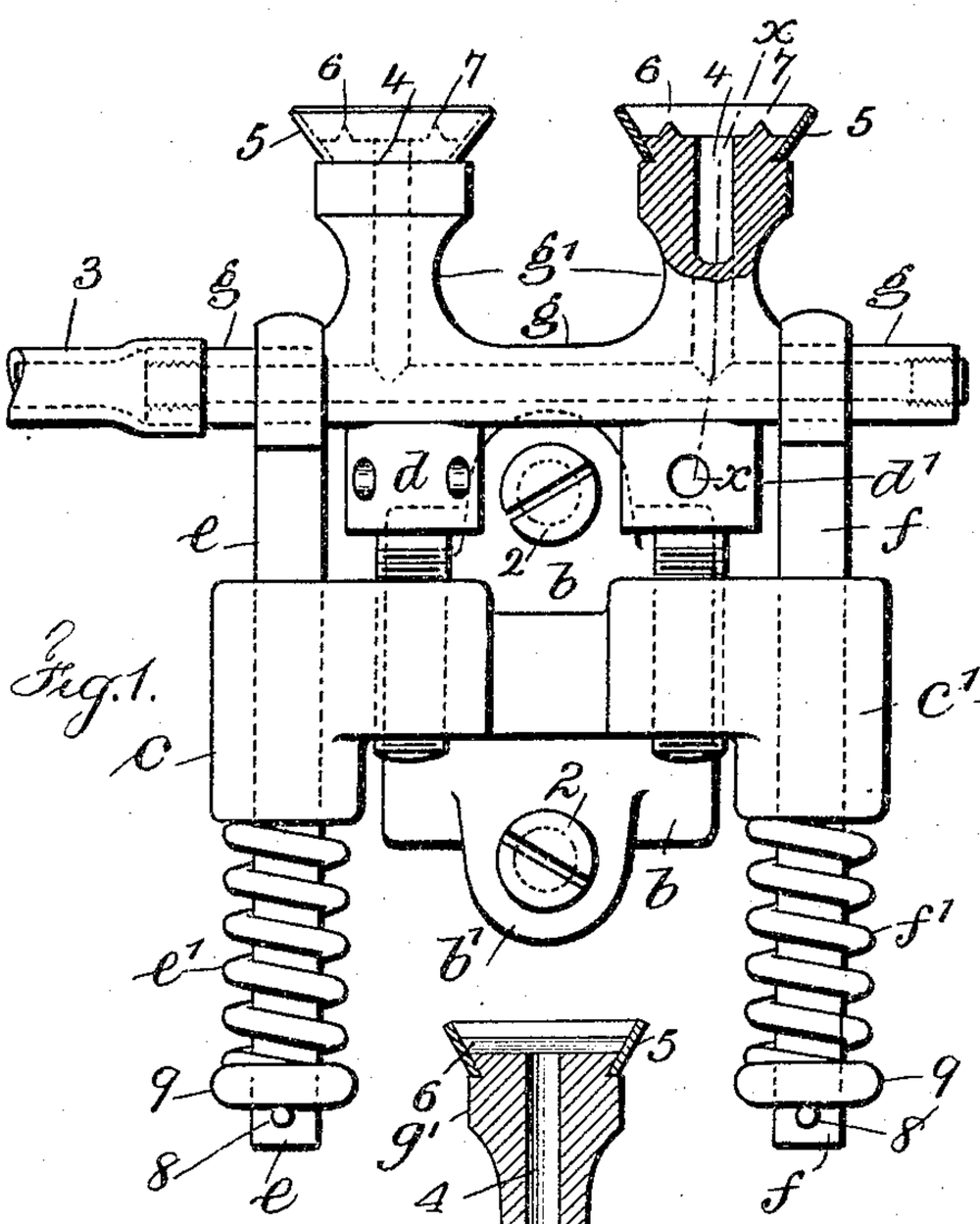

Fig. 1.

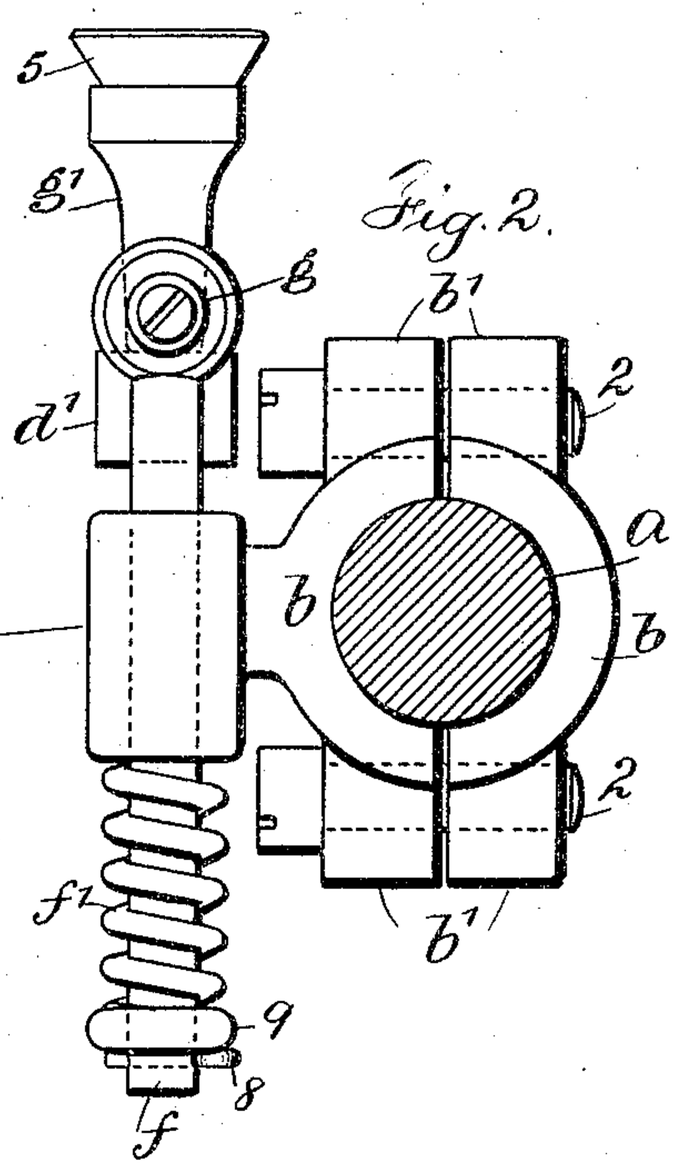

Fig. 2.

Fig. 7

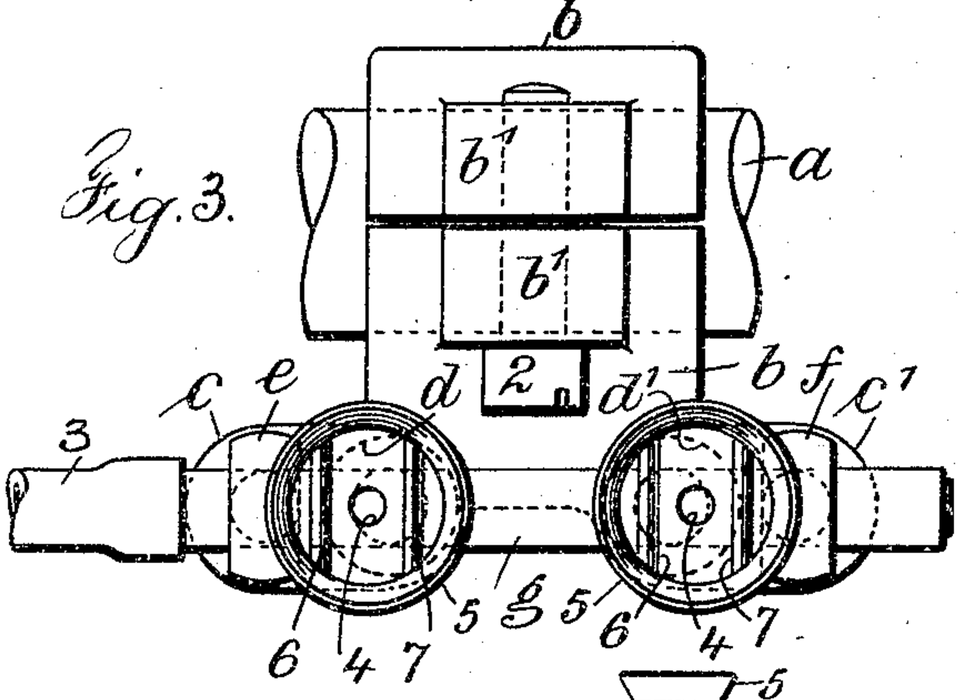

Fig. 3.

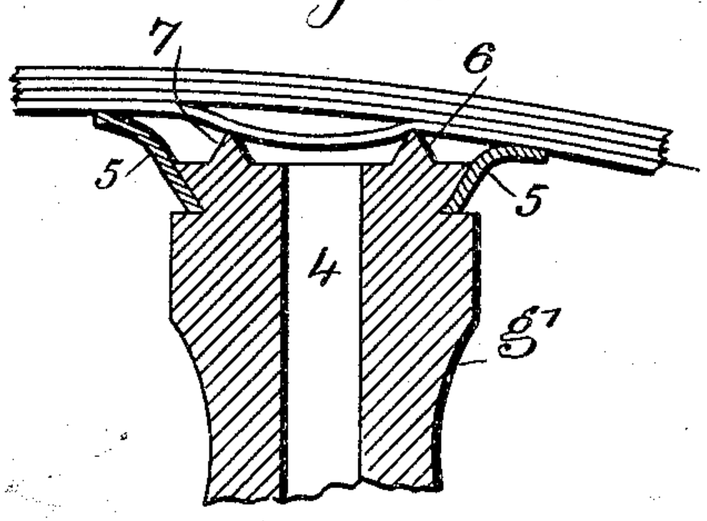

Fig. 4.

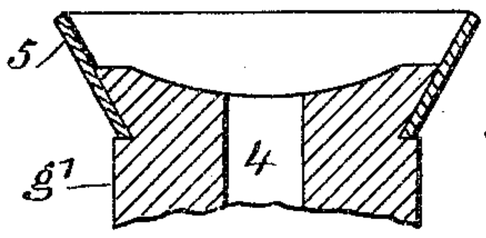

Fig 6.

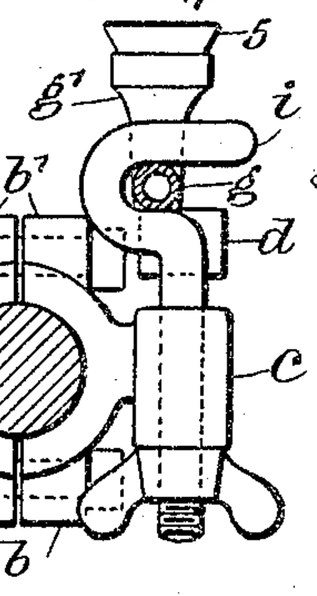

Fig. 5.

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No. 783,206. Patented February 21, 1905.

UNITED STATES PATENT OFFICE.

CHARLES A. JUENGST, OF CROTON FALLS, NEW YORK.

SUCKER DEVICE FOR SIGNATURE OR SHEET GATHERING MACHINES.

SPECIFICATION forming part of Letters Patent No. 783,206, dated February 21, 1905.

Application filed March 2, 1904. Serial No. 196,225.

To all whom it may concern:

Be it known that I, CHARLES A. JUENGST, a citizen of the United States, residing at Croton Falls, in the county of Westchester and State of New York, have invented an Improvement in Sucker Devices for Signature or Sheet Gathering Machines, of which the following is a specification.

My invention relates to a sucker structure adapted to be mechanically and pneumatically actuated to engage the lowermost signature or sheet of the superimposed pile for taking hold of and bending down the said signature or sheet so that it may be engaged by a gripper device for its removal; and the object of my invention is to so engage the said lowermost signature or sheet as to produce a bend or pucker therein, which immediately provides a space for the entrance of an appreciable amount of air, which spreads as a layer between and with the separation of the lowermost signature or sheet.

In carrying out my invention I provide the metal face of the sucker device within the boundary of the flexible periphery thereof with two or more angular corners or projections at either side of the central exhaust-aperture and which come directly against the under surface of the lowermost signature or sheet, so that when the exhaust is applied the signature or sheet within the limits of the flexible periphery is drawn down in contact with these projections and is bent or puckered thereby close to the advancing edge, thus permitting the air to enter between the two lowest signatures or sheets, which materially assists in the after movement of separation and removal, during which the air spreads as a layer until there is a perfect separation of the advancing end or edge of the sheet. I prefer that these projections be in the form of two ribs at either side of the central exhaust-aperture and in line with the direction of movement of the signature or sheet.

In the drawings, Figure 1 is an elevation and partial section, Fig. 2 a side elevation and partial section, and Fig. 3 a plan, of the device comprising my improvement. Fig. 4 is a vertical section, in larger size, of one of the sucker-heads, showing the functional action of the same under exhaust; and Fig. 5 is a side elevation representing a modification of my invention, the same being partly in section and in smaller size. Fig. 6 is a sectional view representing a modification of the sucker-head, and Fig. 7 is a vertical section on the line $x\,x$ of Fig. 1 and at right angles to the position of the parts in Fig. 1.

a represents a shaft common to and carrying the various sucker devices of a machine of this character, and as all of these devices are alike I have only shown and described one.

$b\,b$ are the parts of a split collar, and b' lugs thereof, held together by connecting tap-bolts 2, and thus bound firmly to the said shaft and obliged to turn therewith.

$c\,c'$ are bracket-arms integral with the stem of the split collar at one side, and $d\,d'$ are adjusting-screws in the bracket-arms $c\,c'$, the heads of which are preferably of enlarged size and provided with holes, permitting the tap-bolts to be turned by a wire rod or pin. The bracket-arms $c\,c'$ are vertically perforated for the eyebars $e\,f$, which pass through the same, and are provided with pins 8 in their lower ends and with collars 9, and between these collars and the under surface of the bracket-arms $c\,c'$ are springs $e'\,f'$.

The sucker device particularly comprises a tubular stem g, one end of which is plugged and to the other end of which is connected a flexible hose 3, passing to the exhaust. This tubular stem g is provided with one or more sucker-heads g'. The stem g at opposite ends passes through the eyes of the bars $e\,f$, and the under flat surface of said tubular stem rests upon the top of the heads of the adjusting-screws $d\,d'$. These screws $d\,d'$ apply a pressure or tension against the under surface of the tubular stem g, so as to slightly compress the springs $e'\,f'$ and cause their expansive action to hold the tubular stem snugly down upon the top of the heads of the adjusting-screws. The sides of the tubular stem g are flat, as well as the under surface between the bars $e\,f$, so that the tubular stem and the sucker-heads may be turned at a right angle to the position shown in Figs. 1 and 2, if desired, and in which

position the coöperative parts will hold the tubular stem and sucker-heads just as firmly as in the position shown.

The sucker-heads are each provided with an exhaust-aperture 4 with an undercut groove around the edge, into which is fitted a flexible annulus 5. The upper metal surface of the sucker-head is to be provided with one or more projections, and I prefer that these projections be in the form of the ribs 6 7 and that these ribs be so placed as to be in line with the direction of movement of the signature or sheet as the same is taken away from the superimposed pile by the gripper device, as such location performs the desired function to a better extent.

In the modification or form of the invention shown in Fig. 5 the eyes at the upper ends of the bars *e f* are replaced with a hook device *i*, the opposite surfaces of which in the jaw of the hook are to be parallel and flat. This structure provides a degree of adjustability of the tubular stem *g* and the sucker-heads, so that these parts may be set at exactly the point desired to engage the signature or sheet.

Fig. 4 illustrates the function performed by my improved form of sucker-head with reference to the lowermost signature or sheet, in which it will be seen that the lowermost signature or sheet as drawn down by the exhaust action not only bears upon the edge of the flexible annulus 5, but is drawn down so that it is puckered or bent and contacts with the surfaces of the ribs 6 7, thereby producing an aperture between the upper surface of the lowermost signature or sheet and the under surface of the signature or sheet directly above it, permitting the air to enter between the two lowest signatures or sheets, which materially assists in the after movement or separation, during which the air spreads as a layer until there is a perfect separation of the advancing edge or end of the signature or sheet.

Instead of the upper face of the sucker-heads being made with the ribs 6 and 7 the surface of said head may be made concave, as shown in Fig. 6, thereby producing angular corners for accomplishing the same purpose as said ribs 6 and 7.

I claim as my invention—

1. In a sucker device for signature and sheet gathering machines, the combination with a sucker-head, the support therefor and a shaft, of a flexible annulus around the sucker-head and projections upon the face of the sucker-head within the boundary of the annulus and between the same and the exhaust-aperture and coacting with the flexible annulus in engaging the signature or sheet.

2. In a sucker device for signature and sheet gathering machines, the combination with the sucker-head, the support therefor and a shaft, of a flexible annulus around the sucker-head, and projections upon the face of the sucker-head coming at opposite sides of the exhaust-aperture, and in line with the direction of movement of the signature or sheet, and coacting with the flexible annulus in engaging a signature or sheet.

3. In a sucker device for signature and sheet gathering machines, the combination with the sucker-head, the support therefor and a shaft, of a flexible annulus around the sucker-head, two parallel ribs upon the face of the sucker-head coming at opposite sides of the exhaust-aperture and coacting with the flexible annulus in engaging a signature or sheet.

4. In a sucker device for signature and sheet gathering machines, the combination with the sucker-head, the supports therefor and a shaft, of a flexible annulus around the sucker-head and two parallel ribs upon the face of the sucker-head coming at opposite sides of the exhaust-aperture and in line with the direction of movement of the signature or sheet and coacting with the flexible annulus in engaging a signature or sheet.

5. In a sucker device for signature and sheet gathering machines, the combination with a sucker-head, the support therefor and a shaft, of a flexible annulus around the sucker-head and projections upon the face of the sucker-head coming at opposite sides of the exhaust-aperture and coacting with the flexible annulus in engaging a signature or sheet, a spring-actuated device and an adjustable coacting device for maintaining the sucker-head and its support in the desired position.

6. In a sucker device for signature and sheet gathering machines, the combination with a shaft, a split-collar device connected thereto, and bracket-arms formed integral therewith, of bars passing vertically through the bracket-arms, springs for drawing the bars downward, a tubular stem passing through the apertures of the bars at their upper ends, adjusting-screws coming against the under side of the tubular stem and tending to lift the same and adjust its position against the action of the springs, sucker-heads upon the upper ends of the tubular stem, a flexible annulus surrounding the upper end of each sucker-head, and projections upon the face of the sucker-head coming at opposite sides of the exhaust-aperture and coacting with the flexible annulus in engaging a signature or sheet.

7. In a sucker device for signature and sheet gathering machines, the combination with a shaft, a split-collar device connected thereto, and bracket-arms formed integral therewith, of bars apertures at their upper ends passing vertically through the bracket-arms, springs for drawing the bars downward, a tubular stem passing through the jaws of the hook devices, adjusting-screws coming against the under side of the tubular stem and tending to lift the same and adjust its position against

the action of the springs, sucker-heads upon the upper ends of the tubular stem, a flexible annulus surrounding the upper ends of each sucker-head, and projections upon the face of the sucker-head coming at opposite sides of the exhaust-aperture and coacting with the flexible annulus in engaging a signature or sheet.

8. In a sucker device for signature and sheet gathering machines, the combination with a sucker-head, the support therefor and a shaft, of a flexible annulus around the sucker-head and angular corners upon the face of the sucker-head coming at opposite sides of the exhaust-aperture and coacting with the flexible annulus in engaging the signature or sheet.

Signed by me this 26th day of February, 1904.

CHAS. A. JUENGST.

Witnesses:
GEO. T. PINCKNEY,
S. T. HAVILAND.