T. McCAMPBELL.

PUNCTURING AND INKING MEANS.

APPLICATION FILED DEC. 14, 1910.

999,824. Patented Aug. 8, 1911.

2 SHEETS—SHEET 1.

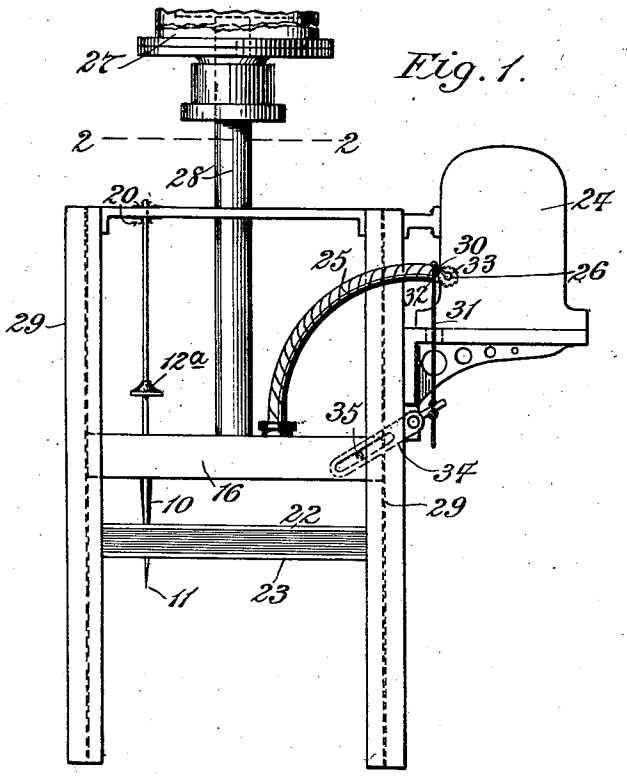


Fig. 1.

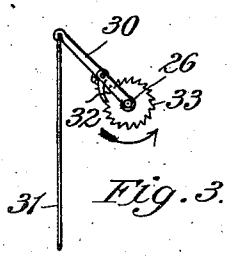
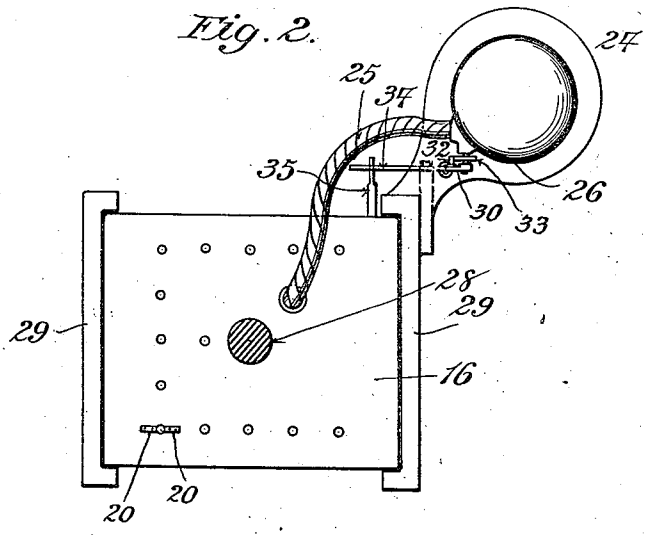


Fig. 3.

Fig. 2.



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2 SHEETS—SHEET 2.

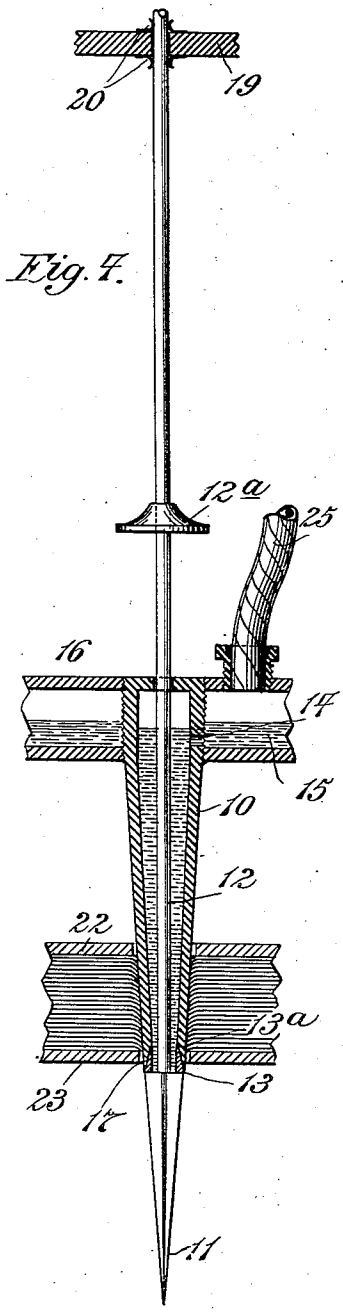

Fig. 4.

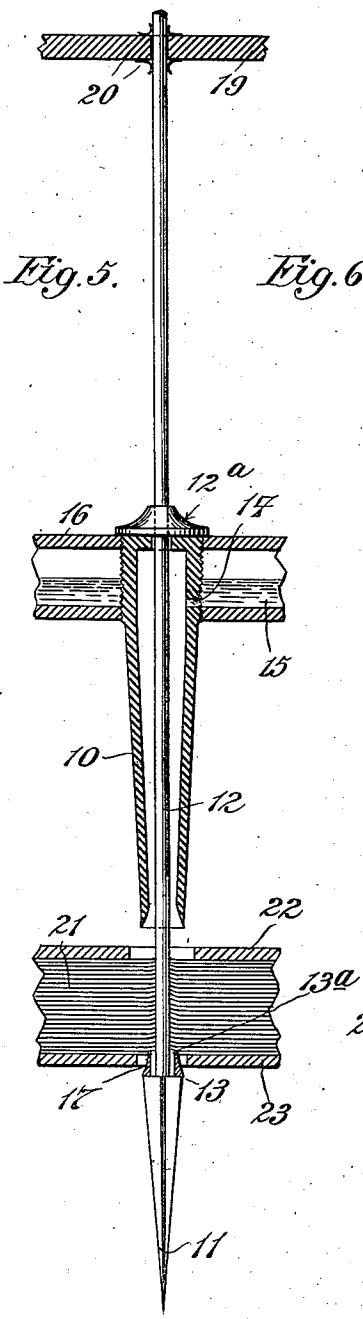

Fig. 5.

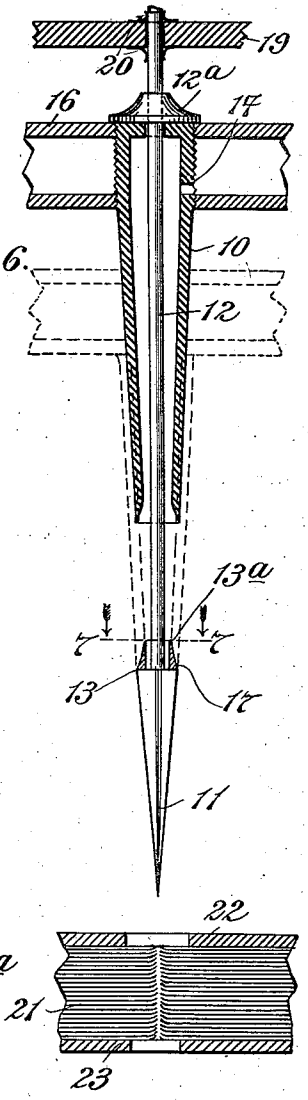

Fig. 6.

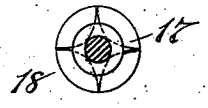

Fig. 7.

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UNITED STATES PATENT OFFICE.

THERON McCAMPBELL, OF NEW YORK, N. Y.

PUNCTURING AND INKING MEANS.

999,824. Specification of Letters Patent. Patented Aug. 8, 1911.

Application filed December 14, 1910. Serial No. 597,381.

To all whom it may concern:

Be it known that I, THERON McCAMPBELL, a citizen of the United States, residing in the city and county and State of New York, have invented a new and useful Improvement in Puncturing and Inking Means, of which the following is a specification.

My present invention relates to an improved apparatus for simultaneously puncturing sheets of paper and inking the edges of the punctures.

The main object of the invention is the provision of apparatus of the class described whereby a large number of sheets of paper, fabric or the like may be punctured at a single stroke and whereby the deposit of ink upon each and every punctured sheet may be positively assured, while at the same time avoiding all danger of excessive deposit or flow of ink upon the sheets.

Another object of the invention is to provide apparatus of the class described which shall be adapted to use in connection with a thick form of ink, and wherein means are provided for exactly and adjustably regulating the ink supply.

The broad principle of this invention may be embodied in a variety of forms and in connection with many structural details which will occur to those skilled in this art, which it is not necessary to illustrate or describe herein. For instance, the grouping of the needles to form letters, numerals, etc., for use in paper patterns and in other connections, is well understood, and I have described my invention in its essentials as embodied in a single needle, and in simple rows only, since the principle of the invention is fully embodied in this arrangement.

In its broader aspect my invention involves the use of a puncturing device, a wiping device within the puncturing device, and means for appropriate movement of the same with relation to the material.

The invention involves further a number of subordinate coöperative features whose advantages and objects appear hereinafter.

The method of applying ink to a multitude of sheets as hereafter described, I have not claimed in these Letters Patent, as the same forms the subject matter of another application filed by me April 24th 1911, Serial No. 622930.

I have shown an illustrative embodiment of my device in the accompanying drawings, wherein—

Figure 1 is a side view of a puncturing machine showing one needle in place, Fig. 2 is a top view of the same with the plunger shown in section on the plane 2—2 in Fig. 1, Fig. 3 is an enlarged side view of the air valve operating ratchet, Figs. 4, 5 and 6 are vertical sections of the puncturing and wiping devices in different positions, and Fig. 7 is a horizontal section through the same on the plane 7—7 in Fig. 6.

It is to be understood that certain parts, particularly the puncturing needles and wiping cores, are exaggerated in their proportions for greater clearness.

As best shown in Figs. 4, 5 and 6, the puncturing devices take the form of hollow needles 10, supplemented by very sharp points 11, preferably having cutting edges as hereinafter described. I prefer to make the points fast to the lower ends of the wiping devices or inner cores 12, and so employ puncturing devices made in two parts, separable along the lines of junction 13 and 13ª. In this sense the puncturing devices are composed of piercing points 11 and protective sheaths 10, which latter are movable independently of the wiping devices 12. These latter are preferably fixed to said piercing points as shown, but this is not essential to my broad invention.

The expression "wiping device" as used herein and as expressed in the claims hereof relates to any element having the capability, by its form and mode of use, of depositing or wiping ink by contact against the edges of the paper.

The upper end of each protective sheath 10 is in communication, as by a hole 14, with a suitable supply of ink 15, preferably thick enough to flow sluggishly, and not to easily enter said hole unless forced through it, as hereinafter described. I prefer to fix the upper ends of the parts 10 in the movable reservoir 16, and this can be done as shown, that is to say by screwing each sheath into the reservoir.

The lower member of the puncturing device, or the piercing point 11, preferably consists of a conical annular portion 17 from which there depends the point proper, shaped somewhat as indicated in plan in Fig. 7, so as to form a plurality of very

sharp radiating blades tapering to a common point, as shown in Figs. 4, 5 and 6. This arrangement leaves small openings 18 between the radiating blades which permit escape of air from the interior of the puncturing device, to facilitate entrance of the viscous ink. The upper extremities of the sharp blades constituting the point 11 are fixed in common to the lower end of the interior core 12, constituting the wiping device. The diameter of this core is such as to leave a small but suitable space between it and the surrounding sheath 10, into which space the ink 15 is to be forced. The core 12 is extended upward through the top of the sheath 10, and finally passes through apertures in the frictional wiper-support 19. I prefer to supply each aperture with light springs 20, or equivalent means, which bear upon the core 12 as it slides, and supply enough friction to support its weight. A shoulder 12^a is fixed upon each core 12 at a proper height.

The sheets 21 to be punctured and inked are preferably held between retaining plates 22 and 23, suitably perforated to permit passage of the puncturing devices.

While the ink forcing means may take various forms without departing from the scope of my invention, I prefer the means shown wherein a supply of compressed air acts at suitable times and for suitable periods upon the body of ink 15 to force it into the sheaths 10 and against the surfaces of the wiping devices 12. In the specific form shown the means in question comprises a vessel 24 of compressed air connected by a flexible tube 25 and automatic valve 26 with the movable reservoir 16. The reservoir 16 is moved up and down by any suitable means, as for instance by the cylinder 27 and rod 28, and is steadied and guided by the uprights 29. The valve 26 is suitably operated by any automatic means connected with the other moving parts. As an instance of such means I have shown the lever 30, pivotally connected with the rod 31, which lever carries a pawl 32 engaging a ratchet wheel 33 fixed to the valve, so that said valve is only revolved when the lever 30 moves downward. Suitable motion is given the rod 31 and lever 30 by the link 34 operated by the pin 35 on the movable reservoir 16.

The operation is as follows:—Assuming the parts to be as shown in Figs. 1 and 4, just after the sheets have been punctured, the reservoir begins to move upward, carrying with it all the hollow sheaths 10 and leaving the cores 12 and points 11 behind, as shown in Fig. 5. The cores 12 are covered with a layer of viscous ink (as will be described hereinafter) and, as the sheaths 10 are withdrawn from the punctured sheets 21, the punctures in these latter close up against the cores 12, by their own resilience, somewhat as shown in Fig. 5. When the sheaths 10 are in the raised position shown in Figs. 1 and 4, a certain amount of ink will adhere to the inner walls thereof. This ink (which is not shown) is too thick to drop out, and even if relatively thin ink were used, it could not flow out because of the smallness of the lower aperture and the absence of air pressure above it. As soon as the lower ends of the sheaths 10 are raised clear of the plate 22 (see Fig. 5) the top of the reservoir reaches the shoulders 12^a on the cores 12, and, as the upward movement continues, the cores in their turn are dragged up out of the punctured sheets, wiping the ink off onto the edges of the punctures as they go. By this means every sheet is sure to get a share of the ink and the distribution of ink is substantially uniform on all the sheets. The upward motion continues until the lower ends of the points 11 are clear of the plate 22 as in Fig. 6. All this time the air valve 26 has been closed, and no ink has entered the sheaths because no air pressure was present in the reservoir 16. Downward motion then commences. As the reservoir moves down with the sheaths 10, the cores 12 and points 11 remain suspended by the friction plates 19, until the lower ends of the sheaths 10 close down snugly over the conical parts 17 on said points, in the position shown in dotted lines in Fig. 6. As soon as this occurs, whereby the puncturing devices are completed and closed, the valve 26 opens for a sufficient period of time to force the desired amount of ink through the holes 14 into contact with the cores 12, and then said valve closes. Further downward movement punctures the sheets 21, bringing the parts into the original position, shown in Figs. 1 and 4, and the operation is repeated.

Various changes and additions may be made to this apparatus without departing from the scope of my invention, and I do not limit myself to the details herein shown and described.

What I claim is—

1. A machine of the class described comprising in combination a puncturing device for superposed sheets, a wiping device for depositing ink on the edges of the punctures and means for temporarily shielding the sheets from contact with said wiping device while said wiping device is in operative position, substantially as described.

2. A machine of the class described comprising in combination a puncturing device for superposed sheets, a wiping device for depositing ink by contact on the edges of the punctures, a temporary shielding means for said wiping device adapted to enter said punctures, an ink reservoir, and means for

forcing ink from said reservoir between said wiping device and said temporary shielding means, substantially as described.

3. A machine of the class described comprising in combination a puncturing device for superposed sheets, a wiping device for depositing ink by contact, an ink reservoir, means for moving said puncturing and wiping devices and means adapted to operate automatically in correspondence with said moving means for forcing ink from said reservoir into contact with said wiping device, substantially as described.

4. A machine of the class described comprising in combination a puncturing device for superposed sheets, a wiping device for depositing ink by contact on the edges of the punctures, a temporary shielding means for said wiping device adapted to enter said punctures, an ink reservoir, and means for admitting fluid pressure to said reservoir for forcing ink therefrom into the space between said wiping device and said temporary shielding means, substantially as described.

5. A machine of the class described comprising in combination a hollow puncturing device for superposed sheets, a wiping device for depositing ink by contact within the same and means for admitting ink into said puncturing device, substantially as described.

6. A machine of the class described comprising in combination a puncturing device for superposed sheets, a wiping device for depositing ink by contact, and means for automatically imparting motion to the two sometimes together and sometimes separately, substantially as described.

7. A machine of the class described comprising in combination a hollow puncturing device for superposed sheets, a wiping device within the same for depositing ink by contact, and means for automatically imparting motion to the two sometimes together and sometimes separately, substantially as described.

8. A machine of the class described comprising in combination a puncturing device for superposed sheets, a wiping device for depositing ink on the edges of the punctures, and means adapted to enter said punctures for temporarily shielding the sheets from contact with said wiping device while the same is being moved into operative position, substantially as described.

9. A machine of the class described comprising in combination a movable ink reservoir, a hollow puncturing device carried thereby, a wiping device within the puncturing device, for depositing ink by contact, and means for admitting ink into said puncturing device, substantially as described.

10. A machine of the class described comprising in combination a movable ink reservoir, a hollow puncturing device carried thereby, a wiping device within said puncturing device, means for forcing ink from said reservoir into said puncturing device, and means connected with said movable reservoir for automatically controlling said ink forcing means, substantially as described.

11. In a machine of the class described, a puncturing device for superposed sheets including in combination a hollow sheath adapted to enter the apertures made by said puncturing device and a separable piercing point, substantially as described.

12. In a machine of the class described, a puncturing device including in combination a hollow sheath adapted to enter the apertures made by said puncturing device and a separable piercing point having sharp tapering edges, substantially as described.

13. In a machine of the class described, a hollow sheath, a wiping core within the same and adapted to be projected beyond the extremity of the same, and a piercing point fixed to said wiping core, all combined substantially as described.

14. In a machine of the class described a movable hollow puncturing device, a wiping core within the same for depositing ink by contact and extending beyond the end thereof, and means on said core for engaging with said puncturing device whereby the core and puncturing device are made to move together, all combined substantially as described.

15. In a machine of the class described, a movable puncturing device, a wiping device for depositing ink by contact adapted to enter the punctures formed by said puncturing device, and means for automatically producing movement of said two devices sometimes together and sometimes separately, substantially as described.

16. In a machine of the class described, a movable hollow puncturing device, a movable wiping core within the same for depositing ink by contact and extending beyond the end thereof, and a shoulder on said core, whereby said puncturing device can impart movement to said core, all combined substantially as described.

17. In a machine of the class described, a movable ink reservoir, a hollow puncturing device carried thereby, a wiping device for depositing ink by contact within said puncturing device, a compressed air reservoir, a valve and tube connecting said air reservoir with said ink reservoir and means connecting said ink reservoir with said valve for automatically controlling admission of air to said ink reservoir, all combined, substantially as described.

18. In a machine of the class described, two parallel perforated plates for confining the material, a puncturing device, a wiping device for depositing ink by con-

tact, and means for driving said puncturing device through both of said plates and for moving said wiping device through one of said plates at least, substantially as described.

19. In a machine of the class described, a puncturing device, a wiping device, and a temporary shielding means for said wiping device; in combination with automatic means for first moving all of said elements forward together, then drawing said shielding means backward to expose said wiping device, and lastly to draw said puncturing and wiping devices backward preparatory to repetition of the above described cycle of movement, substantially as described.

20. In a machine of the class described, a puncturing device, a wiping device, and a temporary shielding means for said wiping device; in combination with automatic means for moving said puncturing device and wiping device always together while moving said shielding means sometimes together with said devices and sometimes separately, substantially as described.

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M. M. MACARTSEY.