

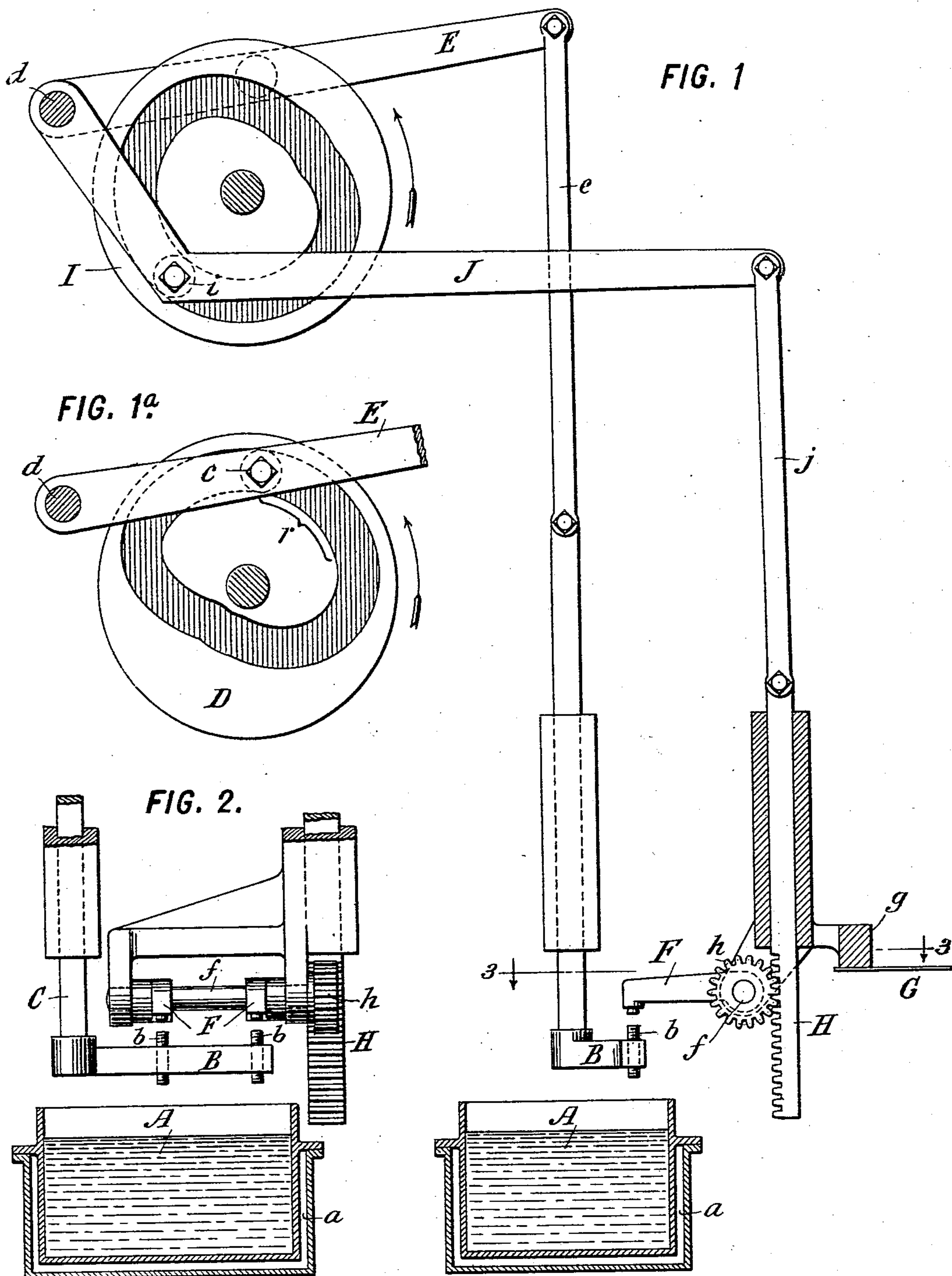
(No Model.)

3 Sheets—Sheet 1.

H. E. SMYSER.
GLUING MECHANISM.

No. 560,009.

Patented May 12, 1896.



WITNESSES:

C. E. Ashley
H. W. Lloyd

INVENTOR:

Henry E. Smyser,
By his Attorneys,

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FIG. 3.

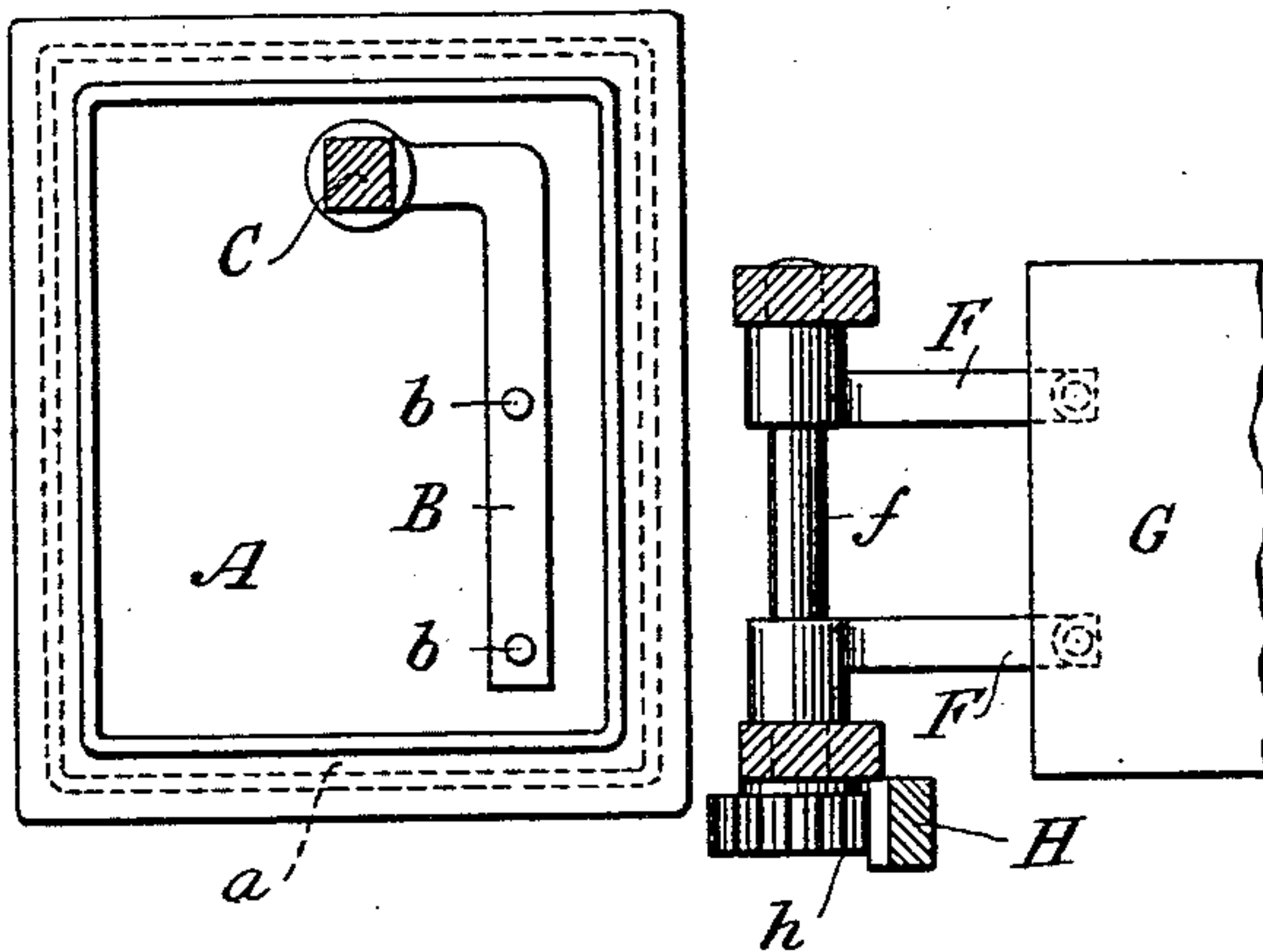


FIG. 4.

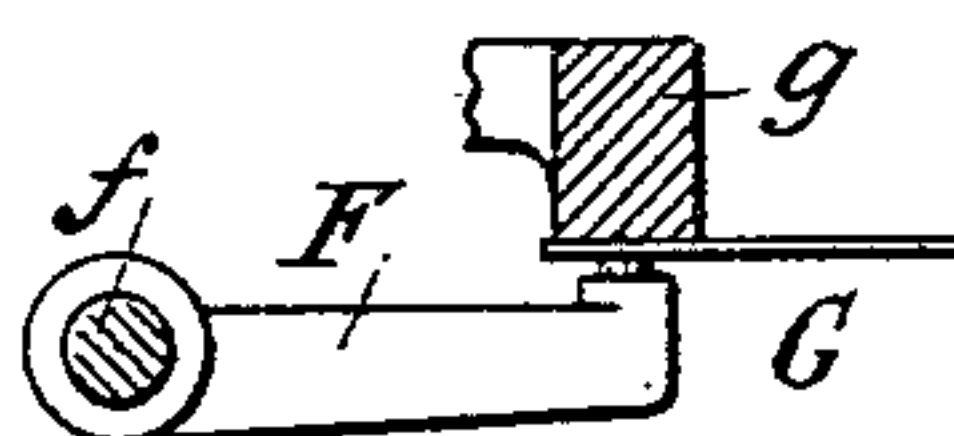
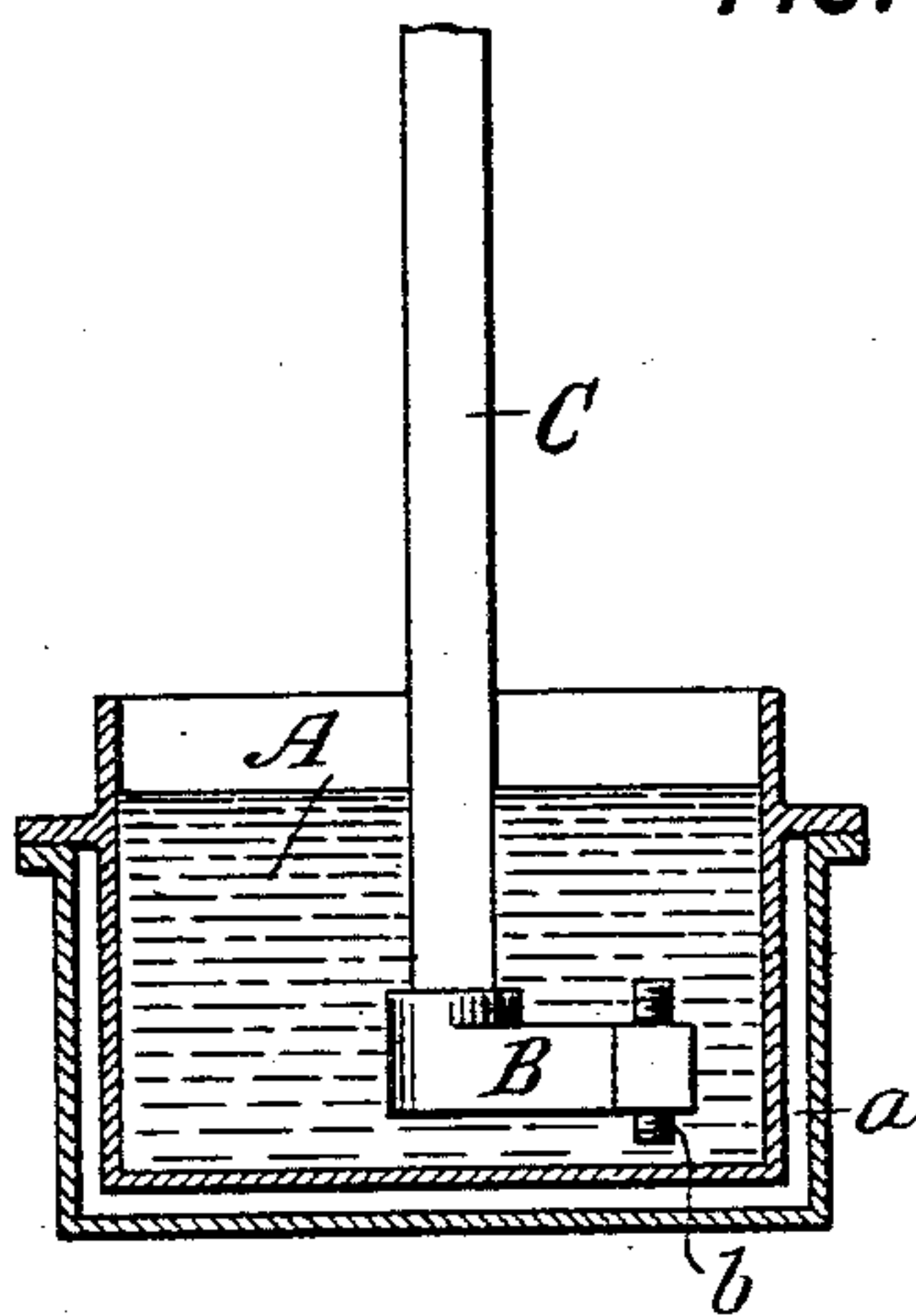


FIG. 5.

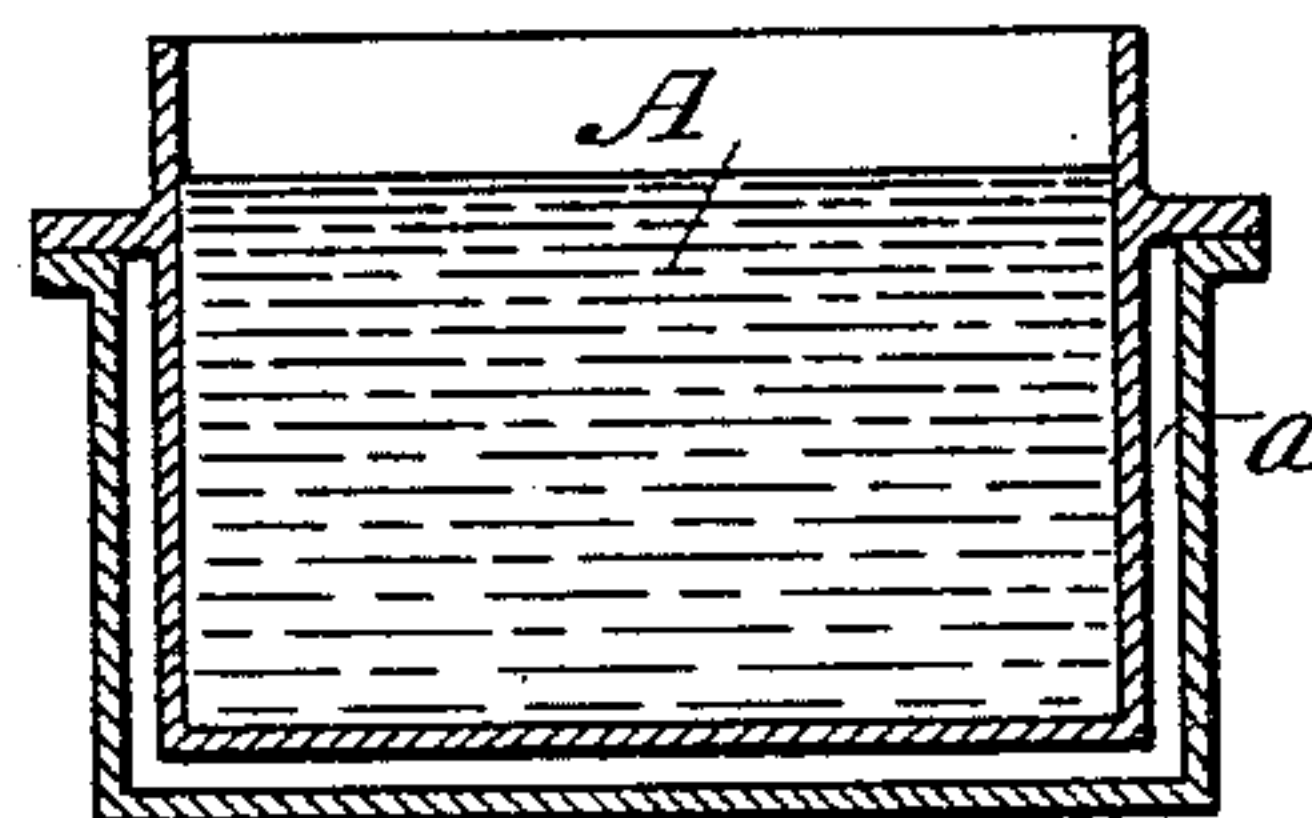
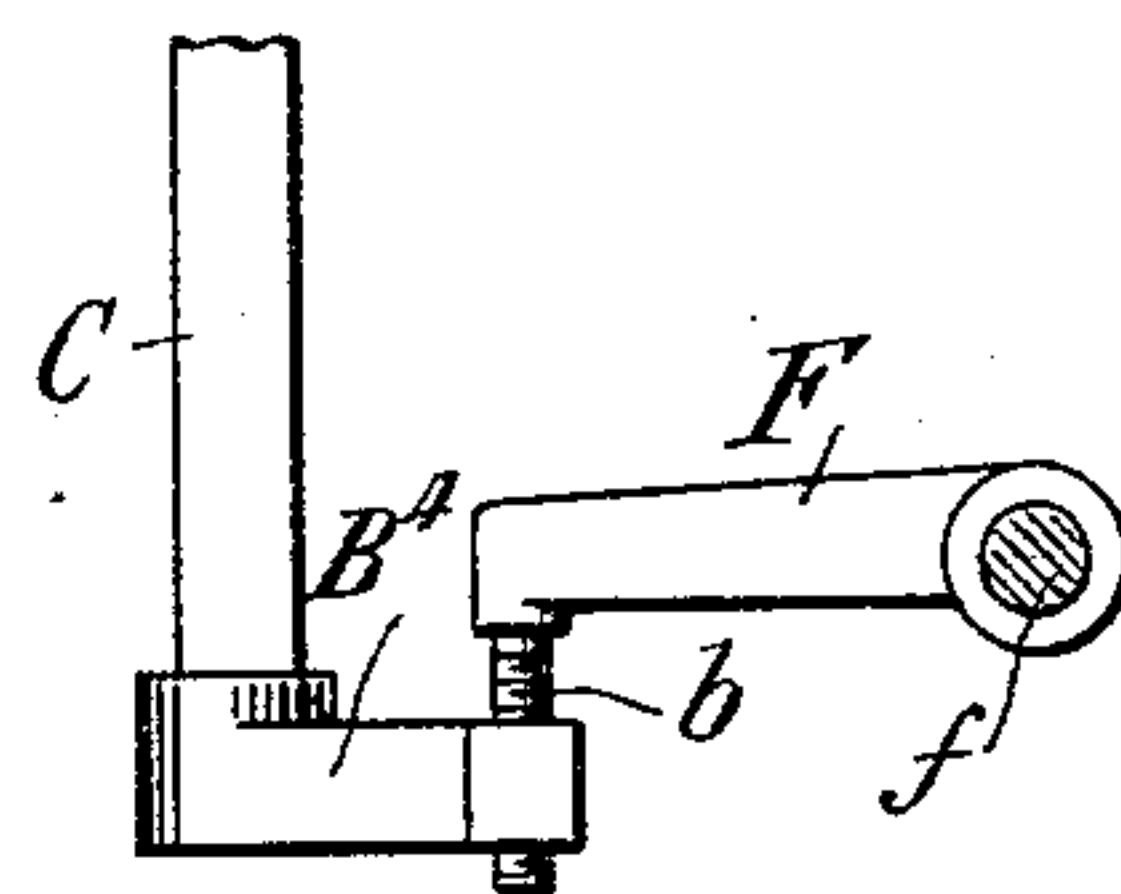


FIG. 6.

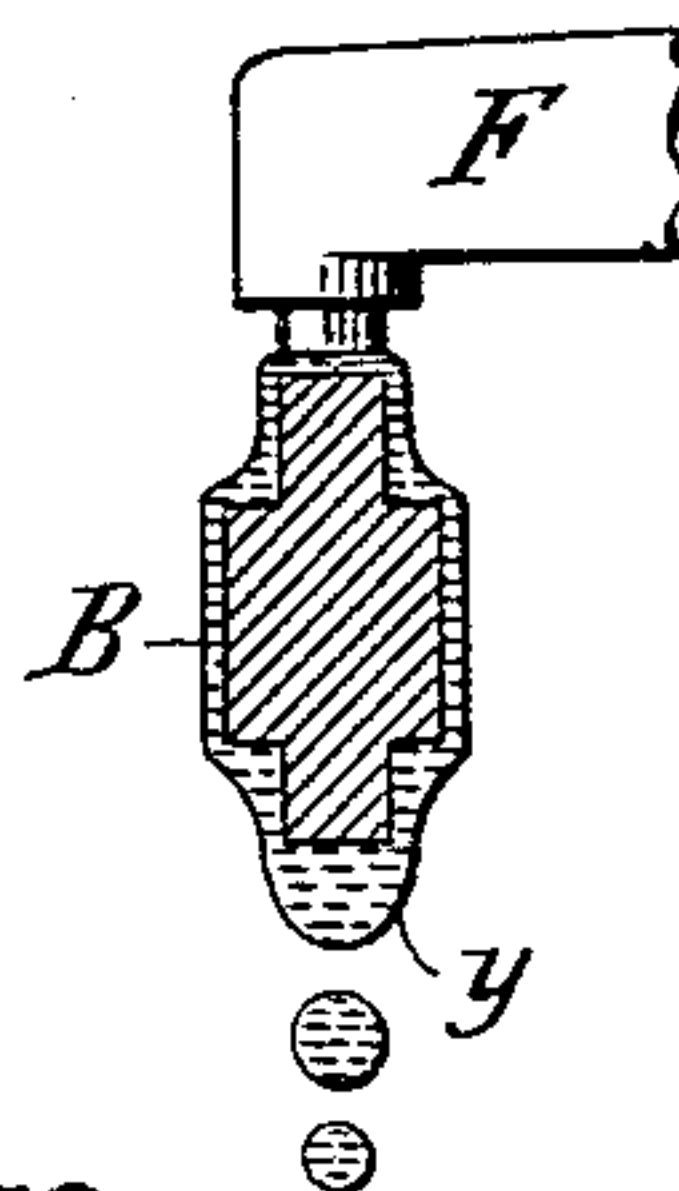


FIG. 7.

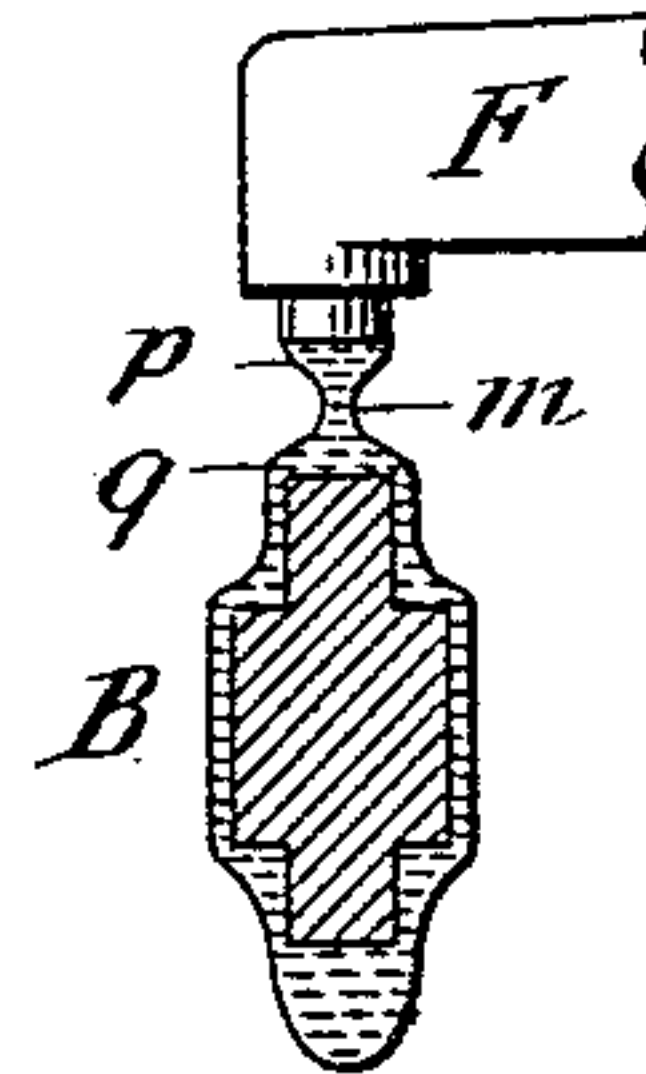
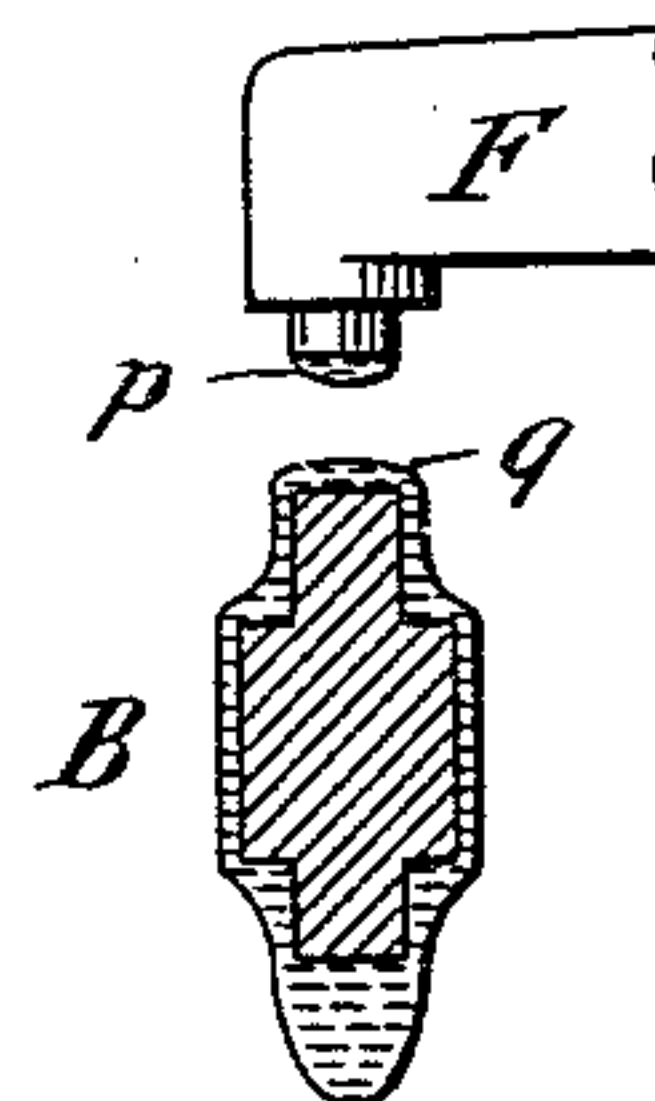


FIG. 8.



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FIG. 9.

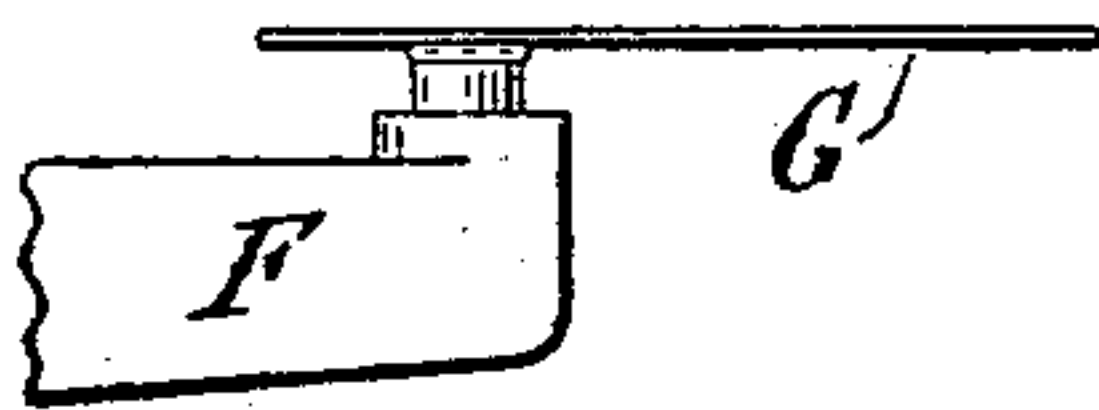


FIG. 10.

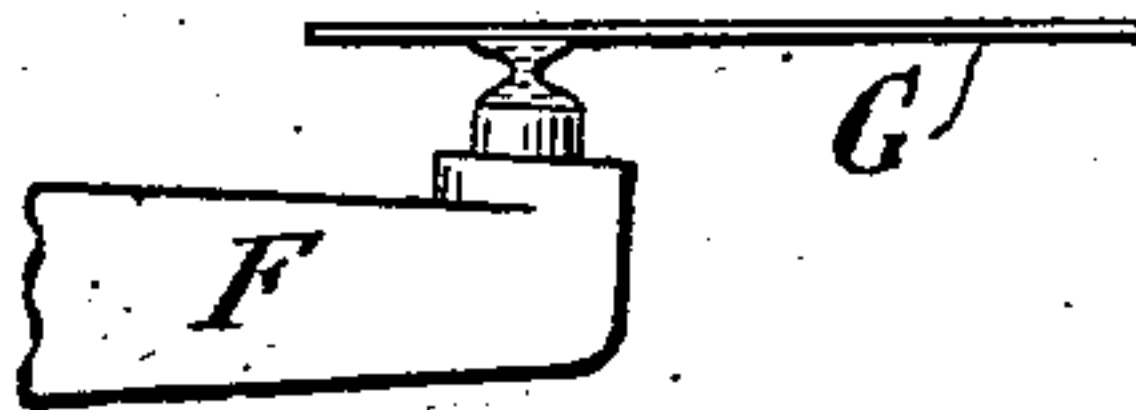


FIG. 11.

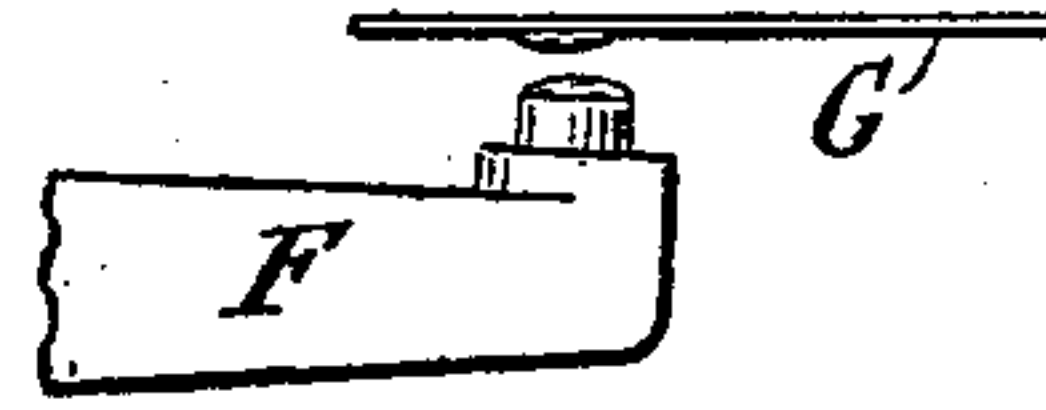
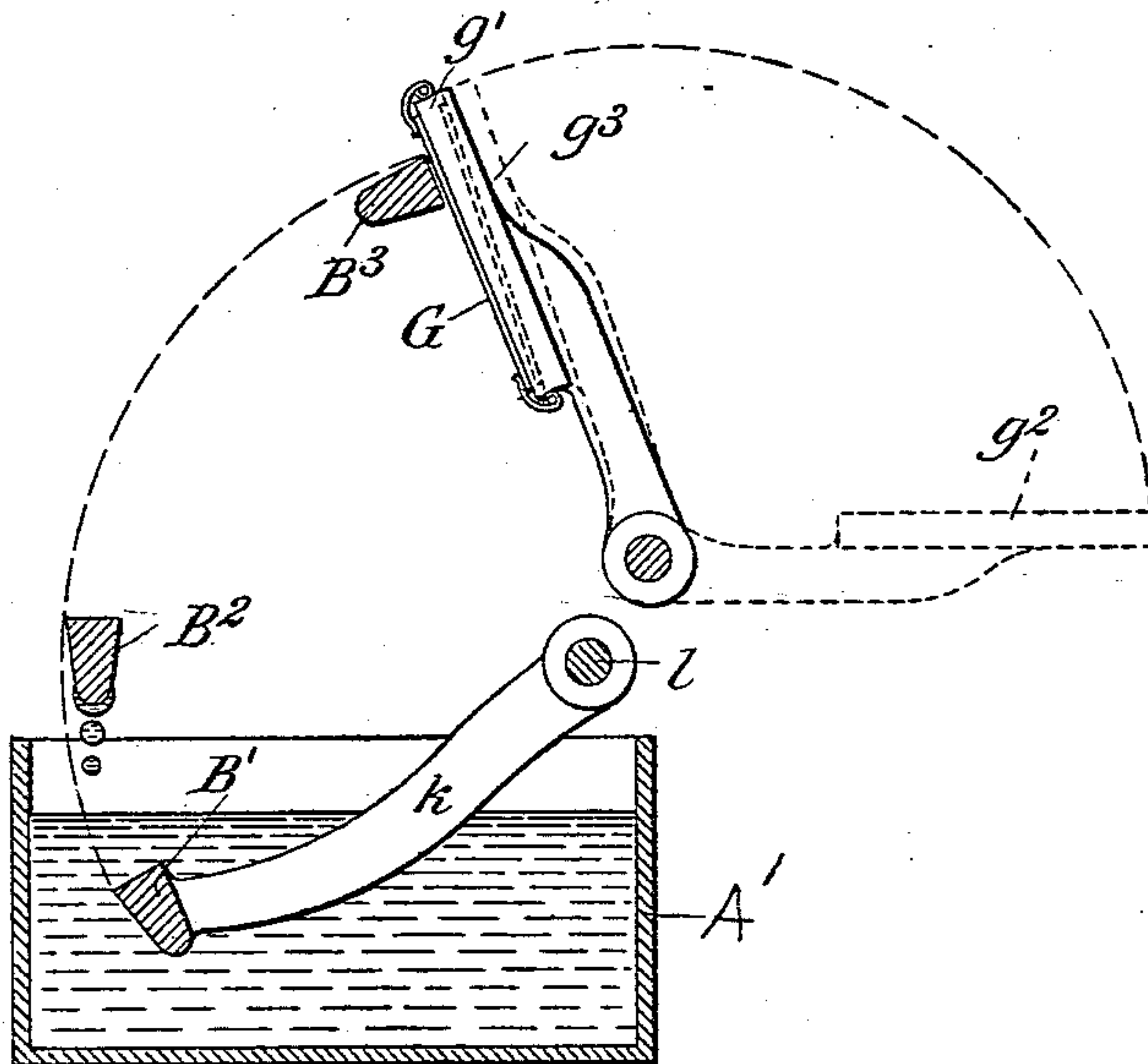


FIG. 12.



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UNITED STATES PATENT OFFICE.

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GLUING MECHANISM.

SPECIFICATION forming part of Letters Patent No. 560,009, dated May 12, 1896.

Application filed February 1, 1895. Renewed September 25, 1895. Serial No. 563,665. (No model.)

To all whom it may concern:

Be it known that I, HENRY E. SMYSER, a citizen of the United States, residing in Philadelphia, (Germantown,) in the city and county of Philadelphia, and State of Pennsylvania, have invented certain new and useful Improvements in Gluing Mechanisms, of which the following is a specification.

This invention relates to mechanisms for applying adhesive substances in the nature of glue, mucilage, or the like to paper or other materials. It is particularly designed for use with adhesive substances having a high degree of viscosity, and which consequently occasion difficulty by reason of their tendency to draw into threads or filaments which obstruct and impede the proper operation of the mechanism. For convenience I shall refer to the adhesive substances of this character—such as glue, mucilage, and the like—as “glue,” and I will refer to the mechanism for applying such adhesive material as a “gluing” mechanism. Although applicable to a great variety of machines wherever it is required to apply such adhesive material to sheets, plates, or boards, the improved mechanism provided by my invention is especially designed and adapted for use in machines for making paper boxes, bags, envelopes, or the like.

My invention is based upon a discovery which I have made whereby the thread-drawing of glue or viscid gum may be prevented. I have found that in applying a viscid glue of the character described—such, for example, as a strong solution of fish-glue—from one part coated therewith to another part or surface, if the two parts are separated rapidly after such application, the glue is drawn or spun out into threads or strings between the relatively-receding surfaces; but if, on the contrary, the two parts are relatively separated to only a slight extent—say, for example, about one-quarter of an inch—and are then held stationary or nearly so for a short time the two masses of glue adhering to the respective surfaces will by their cohesive attraction draw toward them the portion of glue which at first is extended between them, thereby severing this intervening portion or string and leaving the two small masses of glue wholly segregated, after which the respective sur-

faces may be moved apart at any desired speed without liability of any thread-drawing or stringing of the glue. Applying this principle to a gluing mechanism, I construct the cam mechanism or other driving mechanism for moving the glue-applying part relatively to the glue-receiving part in such manner that after having brought these parts together to apply the glue from the one to the other it shall cause their separation and shall then pause, holding them stationary or nearly so relatively to one another for a sufficient time to enable the intervening glue to draw apart or separate into two distinct masses, after which the retraction of the one part from the other is completed.

Having thus explained the general principle of my invention, I will proceed to illustrate one suitable application thereof with reference to the accompanying drawings, wherein—

Figure 1 is a sectional elevation of a gluing mechanism. Fig. 1^a is a similar elevation showing a part which is concealed in Fig. 1. Fig. 2 is a sectional elevation of the lower part of the mechanism shown in Fig. 1, looking from the left in that figure. Fig. 3 is a plan of the lower part of the mechanism in horizontal section on the line 3 3 in Fig. 1. Figs. 4 and 5 are sectional elevations corresponding to the lower part of Fig. 1, but showing the parts in different relative positions. Figs. 6, 7, and 8 are fragmentary views showing the glue plunger and dabber (or glue-applying and glue-receiving parts) in three successive positions. Figs. 9, 10, and 11 are similar fragmentary views showing the dabber and sheet or plate of paper or the like material (being the glue-applying and glue-receiving parts) in three successive positions. Fig. 12 is a vertical section showing a modified construction.

Referring to the drawings, let A designate a glue-box or any suitable receptacle for holding the glue. If desired, it may have a steam-jacket *a*, by which to heat or warm the glue. A plunger B moves up and down, alternately plunging into the mass of glue and rising above the same. This plunger is mounted on a vertical slide C, which in the construction shown is moved by a cam D, Fig. 1^a, hav-

ing a cam-groove which acts upon a roller *c* on a lever *E*, which is pivoted on a shaft *d* and connected by a link *e* to the slide *C*. The plunger *B* is constructed with projections *b b*, preferably adjustable, which serve for applying the glue to a dabber *F*, which in the construction shown consists of two arms projecting from a shaft *f*, their ends coming over the projections *b b*, respectively, and the arms being movable by the oscillation of the shaft *f* from the glue-receiving position shown in Fig. 1 to the glue-delivering position shown in Fig. 4, in which latter position they apply the glue to the sheet of paper or other material *G*, the latter being supported against the pressure of the dabber by a platen or reinforce *g*, which may be fixed or movable, provided it be stationary or approximately so at the instant when it is required to support the paper. For imparting the requisite oscillations to the shaft *f* for swinging the dabber-arms *F* it is provided in the construction shown with a pinion *h*, engaged by a sliding rack *H*, which is operated by a cam *I*, Fig. 1, having a cam-groove which engages a roller *i* on a lever *J*, which is fulcrumed on the shaft *d* and which connects at its free end, through the medium of a link *j*, with the slide *H*, as shown in Figs. 1 and 1^a.

So far as described there is no special novelty in this mechanism. In operation, the plunger *B* first descends into the mass of glue, as shown in Fig. 4, then ascends to the position shown in Fig. 5, where it presses the ends of its pins *b b* against the dabber-arms *F*, thereby transferring a part of the glue to the latter, after which the plunger again descends, and after the plunger has descended far enough to be out of the path of the dabber-arms the latter are swung around to the position shown in Fig. 4, where they press upwardly against the paper *G* to transfer the glue to the latter. In this particular instance only two dots of glue are applied to the paper; but the shape of the glue-applying surfaces—that is, of the projections *b* on the plunger—and of the glue receiving and delivering surfaces on the dabber will of course be varied according to the amount of surface that is required to be covered with glue on the paper or other material to which the glue is to be applied. The dabber after applying the glue to the paper swings back to the position shown in Fig. 5, and the plunger reascends and again applies glue to the dabber. In the use of gluing mechanisms of this character for applying fish-glue or any viscid gum great difficulty has been experienced by reason of the drawing of the glue into threads or filaments between the glue-applying and glue-receiving surfaces during the time that they are reciprocally receding. Thus the plunger after applying glue to the dabber and while moving away from the latter is liable to draw a thread of glue between them, and by the rapid attenuation of this thread it becomes dried in the air sufficiently to give it consid-

erable strength. During the forward swinging movement of the dabber one end of this thread is carried forward with it, and during the successive movements the successive threads thus formed constitute in time such a mass or tangle of accumulated filaments as to seriously obstruct the operation of the machine. Threads are also liable to be formed during the separation of the dabber from the paper, so that the paper while being fed on over the successive portions of the machine (in an envelop or bag machine, for example) carries these adhesive threads with it and applies them to the subsequent mechanisms, which become gummed and obstructed by the threads and rendered adhesive, so that they cling to and soil or perhaps tear the paper. These difficulties have proven so serious that the employment of glue or viscid gum has been largely abandoned in favor of paste and other adhesive substances which have not this tendency to draw into threads, notwithstanding the superior advantages which in other respects are inherent in glue or such other strong viscid cement. I have succeeded in entirely overcoming this difficulty by the simple expedient of causing the glue applying and receiving surfaces as they mutually recede to pause when only slightly separated and remain relatively stationary for an instant to afford sufficient time for the cohesive attraction of the glue to draw the masses thereof on the two surfaces apart and thereby sever the incipient string or thread connecting them. This action, which constitutes the gist of my invention, is best shown in Figs. 6, 7, and 8. In Fig. 6 the plunger *B* has ascended covered with glue, which is dripping off from it at *y* underneath, and has brought this glue into contact with the glue-receiving surfaces of the dabber *F*, the two being pressed sufficiently together to insure the adhesion of the glue to the dabber. The respective parts are then separated to approximately the extent indicated in Fig. 7, which may be done by moving the plunger downward or the dabber upward, or by both movements simultaneously. After reaching this extent of separation their relative movement ceases and the parts rest in this position, remaining immovable, or nearly so, with reference to one another for a sufficient time to cause the glue to part, as indicated in Fig. 8. In Fig. 7 is clearly shown the incipient string or thread *m* of glue uniting the upper mass *p* to the lower mass *q*. By the mere pause or dwell of the parts in this position the cohesive attraction of the glue in connection with its adhesion to the respective surfaces is made effective to sever the intervening string *m*, the upper mass *p* drawing upwardly and the lower mass *q* downwardly until the two are separated. When this separation has occurred, as shown in Fig. 8, the two parts, being entirely disconnected, may now be moved apart at any suitable speed without danger of thread-drawing. If, however, they had

been drawn apart immediately without introducing the pause which I have described, the incipient string *m* (shown in Fig. 7) would in many instances not have been severed, but would have been drawn or spun out into a fine 5 tenuous thread or filament, acquiring increased tensile strength as it is drawn out by reason of its drying in the air, and this adhesive thread or filament would give rise to the 10 difficulties above explained.

In carrying out my invention in connection with the mechanism shown I so shape the cam-grooves in the cams *D* and *I* (either or both) that the glue-applying and glue-receiving 15 parts, instead of moving apart immediately by one movement, as heretofore, are moved apart but a short distance, are caused to dwell or remain stationary relatively to one another, and are then again moved apart to complete their 20 mutual recession. This result may be effected by moving either part alone relatively to the other, the other part remaining stationary, or by imparting simultaneous motion to both parts, as desired. In the particular construction 25 shown the dabber *F* remains stationary while the plunger *B* applies glue to it, then moves slightly away from it, pauses for an instant, both parts remaining stationary, and the plunger then resumes its descent, after 30 which when the plunger has moved well out of the way the dabber commences its movement and swings forward to apply the glue to the paper. The pause referred to is caused by the dwell or concentric portion *r* of the 35 cam *D*, Fig. 1. While my invention is not limited to any exact proportions, yet for the guidance of those skilled in the art I will state that I have attained the most successful results by causing the glue-applying sur- 40 face to recede about one-quarter inch from the glue-receiving surface, and then to pause for a duration equivalent to about one-sixth of the rotation of the actuating-cam, the speed of the latter being approximately 45 twenty-one revolutions per minute, the glue in this instance being a viscid solution of fish-glue.

In the applying of the glue from the dabber to the paper there is less liability of 50 thread-drawing; but with some kinds of glue—as, for example, certain highly-viscid solutions of glue—some difficulty is likely to be experienced from this cause. In such cases I apply the same principle to the operation 55 of the dabber, as shown in Figs. 9, 10, and 11. Fig. 9 shows the dabber in the act of pressing the glue against the paper. From this position the dabber is moved slightly away from the paper until approximately the position 60 shown in Fig. 10 is reached, where it pauses long enough for the cohesion of the glue to break the intervening string. Fig. 11 shows the condition after this string has been broken. After this occurrence the retreating 65 movement of the dabber may be resumed. It will be understood that instead of the paper remaining motionless and the intermit-

tent motion being communicated to the dabber the dabber after applying glue to the paper may remain stationary and the paper be 70 moved away from the dabber to the extent shown in Figs. 10 and 11, after which at any convenient time the return movement of the dabber may be effected.

Fig. 12 shows a modified embodiment of 75 my invention, *A'* being the glue-vessel or glue-box; *B'*, the plunger or glue-applying part; *G*, the paper, and *g'* a movable platen carrying the paper. The plunger *B'* is carried on an arm *k* from an oscillating shaft *l*, oscillated 80 by suitable cam mechanism. On rising out of the bath of glue the glue-plunger pauses in the position shown at *B*² to let the excess of glue drain or drip back. It then rises to the position *B*³ for applying the glue to the paper. 85 The platen *g'* moves from the position shown at *g*², where the paper is laid on, to the position shown at *g'*, where the paper comes in contact with the glue-plunger, receiving glue 90 therefrom. The platen then moves away from the stationary plunger to the position shown at *g*³, where it pauses for a sufficient length of time to permit the glue to part and 95 break the string. After this occurs the glue-plunger moves back into the bath of glue and the platen returns to its position *g*². It may be observed that in this modification the glue-plunger *B'* applies the glue directly to the paper, thereby combining the functions of the 100 plunger *B* and dabber *F* in the previously-described construction.

My invention may be variously otherwise modified, provided the essential principle which I have explained is preserved. It will be understood that during what I have called 105 the "pause" to permit the cohesive attraction of the glue to break the string or incipient thread the parts need not be absolutely stationary, but only require to be stationary relatively to each other, as in fact both may 110 be moving with relation to other parts. It is also admissible that instead of being absolutely stationary with relation to each other they may, during what I have called the 115 "pause," be moving very slowly, provided their motion be so slow as to permit of the described parting action of the glue.

I claim as my invention the following-defined novel features, substantially as hereinbefore specified, namely: 120

1. In a gluing mechanism, the combination with a part for applying glue to another part, of driving mechanism adapted to bring them into contact, then to separate them slightly and pause sufficiently to permit the glue to 125 draw apart, and then to retract the one part from the other, whereby the thread-drawing of the glue during such retraction is prevented.

2. In a gluing mechanism, the combination 130 with a plunger movable to alternately descend into the bath of glue and ascend therefrom, and a part to which it applies glue, of driving mechanism adapted to move said plunger to

first bring it into contact with said part, then to separate them slightly and pause sufficiently to permit the glue to draw apart, and then to retract the plunger, whereby the thread-drawing of the glue during such retraction is prevented.

3. In a gluing mechanism, the combination with a plunger movable to alternately descend into the bath of glue and ascend therefrom, and a dabber to which it transfers glue, of a driving mechanism adapted to move said plunger to first bring it against said dabber, then to move the plunger and dabber apart slightly and pause long enough to permit the glue to draw apart, and then to retract the plunger, whereby the thread-drawing of the glue during such retraction is prevented.

4. In a gluing mechanism, the combination

with a platen or support for the paper or other sheet or plate to be glued, of a dabber for carrying glue to said paper, and a driving mechanism for moving it relatively to said platen to first bring it into contact with the paper, then to separate them slightly and pause sufficiently to permit the glue to draw apart, and then to retract the dabber, whereby the thread-drawing of the glue between the dabber and paper is prevented.

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

HENRY E. SMYSER.

Witnesses:

JAMES J. FROST,

W. F. HIRSREWHITTREE.