D. F. Smith.

Flier.

No. 2,862.
33,866.

Patented Dec. 3, 1861.

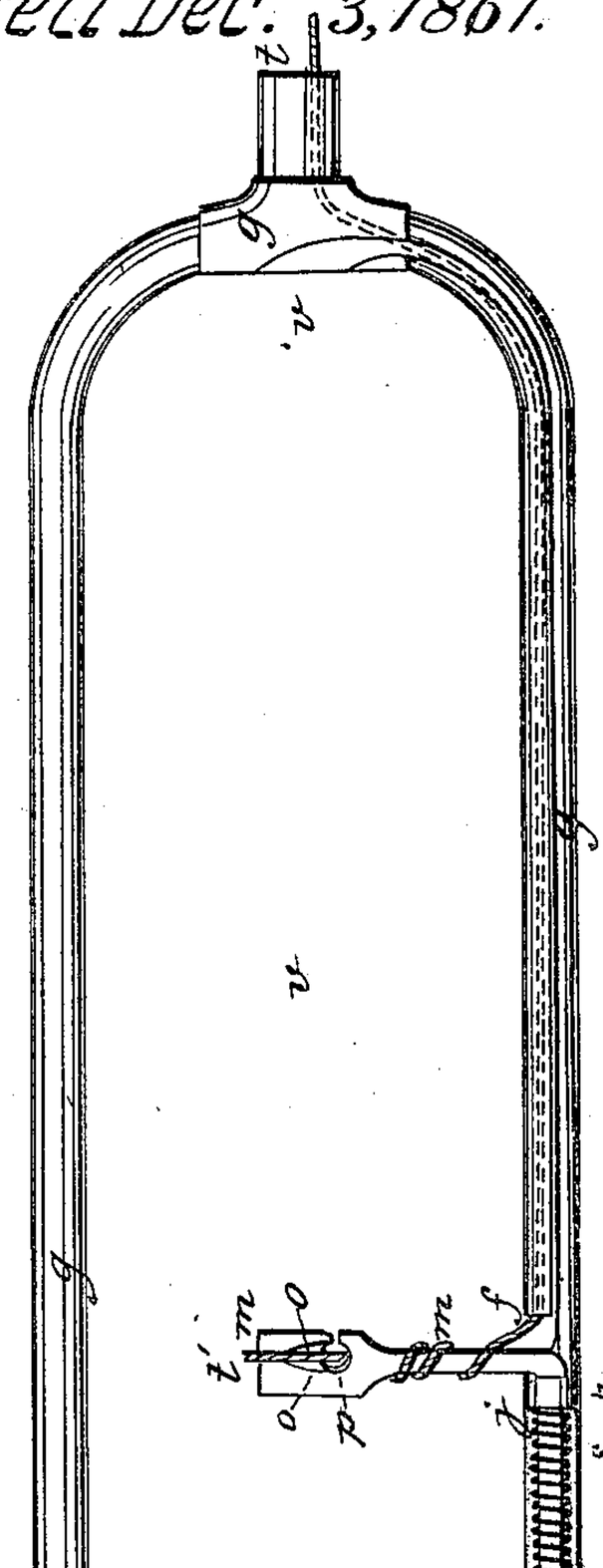

Fig. 1.

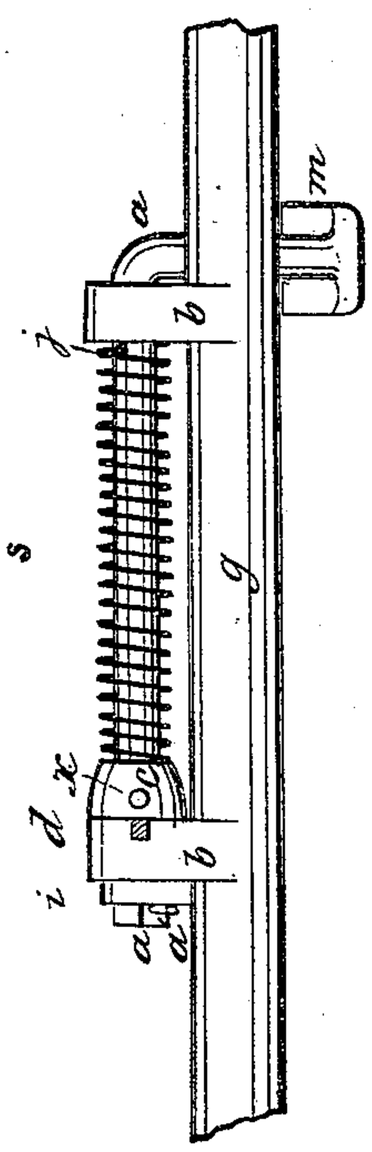

Fig. 2.

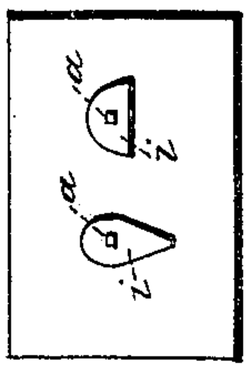

Fig. 3.

Witnesses
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UNITED STATES PATENT OFFICE.

JOSEPH B. CLARK, OF MANCHESTER, NEW HAMPSHIRE, (ADMINISTRATOR OF DAVID F. SMITH, DECEASED,) ASSIGNOR TO AARON W. SMITH, OF SAME PLACE.

IMPROVEMENT IN FLIERS.

Specification forming part of Letters Patent No. **33,866**, dated December 3, 1861.

To all whom it may concern:

Be it known that DAVID F. SMITH, late of Manchester, in the county of Hillsborough and State of New Hampshire, deceased, in his life-time invented certain new and useful Improvements (called the "Presser") in Fliers Used for Spinning Cotton, Woolen, and other Fibrous Substances, and that I, JOSEPH B. CLARK, administrator of said SMITH, do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification.

The object of said invention is to wind more closely and evenly than heretofore the thread upon its bobbin by means of an adjustable presser attached to the flier, as hereinafter more fully described.

Figure I of the drawings represents that portion of the flier in which the bobbin or spool is inserted with the presser attached to side of the flier. Fig. II represents a part of one side of the flier on which the presser is secured, and the presser itself of full size. Fig. III represents two forms of a washer on the shaft of the presser.

Like letters represent similar parts in the several figures.

To enable others skilled in the art to make and use the said invention, I will proceed to describe its construction and operation.

g g g g indicate the flier, and *v v* line of spindle on which bobbin or spool is set for winding, being the center of the flier.

b b, Fig. II, are stands attached to *g* for holding the presser; *a a*, Fig. II, shaft of presser; *m m*, Fig. I, arm of presser; *s*, spring of presser coiled around its shaft; *c*, washer or adjustable ring for regulating spring *s; j*, a pin by which one end of *s* is fastened to shaft *a; i*, a stop-washer to prevent *m* from passing center of flier *v v; f*, a projection of *c*, Fig. I, that is forced by *s* into a notch *d* cut into *b*, Fig. II, for holding the spring *s* at the desired place.

Other letters represent other parts, as hereinafter set forth.

The operation of the presser is as follows, with the reasons of its construction:

The bobbin having been placed in the flier the flier is set in motion with the thread, represented by red lines, coming into top of same at *t*, and passing along down *g* until it arrives half-way of *g*, Fig. I, there coming out of *g* at *y*, Fig. I, is wound round *m* several times. Passing through hole in *m* at *p* and comes out of the inside of *m*, as shown, to *t'*, from whence the thread goes directly to its bobbin. By the revolution of the flier the thread is wound on its bobbin, and the arm of the presser *m*, flattened at its end, is continually held down to the surface of the bobbin by means of its spring *s*. Spring *s* is a spiral spring coiled around shaft of presser *a*, between *b b*, Fig. II, one end (the top) of which is made fast by a pin *j*, Fig. I, to shaft of presser *a*, and the other end of *s* is made fast by soldering to washer *c*.

e is a ring or washer playing, when relieved, as hereinafter described, freely around shaft *a*. It is necessary to have *s* coiled tightly or loosely, as the speed of the flier requires, or the nature or condition of the thread spun may from time to time demand.

To regulate the spring *s* to a greater or less tension in order to secure more or less pressure of *m* on the bobbin, the washer *c* has two or more projections or lips on its lower end, one of which is shown in Fig. I at *f*, and *f f* are by *s*, when coiled, pressed into notches or mortises cut into the inner or upper side of *b* next to *c*, as shown in Fig. I, and *c* is thus prevented from revolving, as it would on tightening the coil of *s* or when arm *m* is drawn back or from the center in process of winding. In fact, were it not for these lips, *s* could not be tightened and loosened and secured.

s is wound on *a* as follows: It being fastened at *j*, a pin or common hand-awl is inserted into a hole *c* in *c*, Figs. I and II, and by pressing the awl up or toward *j*, *f* is withdrawn from its notch *d*, and then while holding the awl in *x*, *c* is turned by the hand a quarter or half round until its lip *f* comes opposite another notch *d*, when the elasticity of *s* forces *f* into *d*, thus holding *c* firmly in its place, and a greater pressure is given to *m* by the half or quarter turn of *s*. The reversing of *c* in the same manner will lessen

the tension of *s*, and thus by turning *c* on the shaft *a* in the manner described one way or the other any desired pressure of *m* may be attained and secured. This mode of regulating the amount of pressure is but the work of a moment and requires no removal of the flier or any part thereof. Shaft *a* plays freely through holes drilled in *b b*, and on its lower end at *a'*, Fig. II, is fastened a washer *i*, *a* at this end being made square and *i* fitted to the same, *a* being of round iron from this point until reaching near the end of arm *m*, as represented. *i* is made, as represented in Fig. III, in form of the letter **V**, or of a half-moon shape, with its point or lower part long enough to prevent its passing *g*, thereby limiting the action of *s* in one direction, so as to prevent *m* from passing the center line *v v v* of the bobbin's revolution. The thread *t* is received upon its bobbin at the end of *m*, Fig. I, and *m* gently or firmly pressing the bobbin itself at the point of winding, assisted by groove *o o* inside of *m*, secures the desired tightness of the thread upon its spool, the thread itself being too weak to be closely wound without constant breaking. As these fliers are run at the speed of twelve or fourteen hundred revolutions per minute and the threads are very loose and feeble any strain upon the thread or on any unsupported distance of thread is very liable to break the same, and one great advantage of this presser is not only the tight winding of the bobbin it secures, but in obviating a further difficulty heretofore experienced, viz: In all other pressers for fliers their construction is such that the thread in passing from tube *g* to its presser is for a considerable space—a half inch or more—entirely unsupported, except by its own strength, whereas by the mode herein described the presser-arm that receives the thread plays back into a notch cut into *g* at *q*, Fig. I, out of which notch the thread comes, and the thread thus passes directly from the inside of the tube *g* onto *m* when the flier is in revolution.

A yet further advantage consists in the method of attaching this presser to its flier, so as to secure an even balancing of and consequent equable motion of the flier, which at the high speed these are driven is extremely important, the least irregularity or disturbance of poise being fatal to good work. Thus *b b* are attached on one side of *g* and by crooking the arm *m*. *m* while in revolution is also brought upon the opposite side of the flier-tube, thus bringing the presser nearer the center of revolution than heretofore, (all pressure heretofore used being attached in my belief on the outside of fliers,) and also further securing a true revolution by the arrangements of parts *m m* on one side of the bobbin and the parts from the elbow of the presser—viz., *a a*, *b b*, *s*, and *c*—on the opposite side of the bobbin, the weight of these several parts being counterbalanced by their different distances from the axis of revolution, so that when the bobbin is full and all the space between the sides *g* and *g*, Fig. I, is filled, and while the bobbin is filling, in practice there is no appreciable variation or disturbance in the process of winding. Further, the space occupied by this presser being much less than that occupied by others, and the distance of its several parts from the axis of revolution being much less than other pressers in use, the disturbance of revolution is greatly lessened compared to other pressers, as the "Brown presser," so called, and others that run up to the top of the flier. Pressers located near the top of the flier are a great obstruction to the insertion or mending of the roving near this place, where in practice it is most liable to breakage. Especially is this the case in mending the thread or roving of the rear flier, one row of fliers being located directly in the rear of another row on their spinning-frames.

A further advantage over others is constructing the presser, as described, so that stands *m m* can be brazed onto the flier at the time the flier is wrought. These stands are solid pieces, and are afterward drilled out for the reception of shaft *a*, and *a* is secured by *a'* after it is passed through *b b*. This brazing on of *b b* in practice is a great security, as other pressers whose stands are soldered to the fliers are frequently thrown off in their high revolutions and do much damage. The construction of other pressers is such—as, for instance, the Brown—that it cannot be brazed onto its flier, but must be soldered. After holes are drilled in *b b* and shaft *a* let into and through the same from the top, one end is confined by the elbow of arm *m*, the other by pin *a'*. In pressers for fliers that have been heretofore used in spinning this peculiar thread called "roving," (strictly speaking no thread at all, but the beginning thereof as the cotton comes from the carders,) their power and efficiency have been dependent on a counter balance or weight near the top of the flier regulated solely by the speed of revolution, and ever varying as that speed, whereas in this improvement the adjustable spring *s* has no sort of connection or dependence on the revolution of the flier or anything else; but is an independent positive reliable constant force of whatever amount is desired, whether the speed be high or low, a desideratum always sought, but never in my belief before attained. Further, in all processes of winding roving or threads of fibrous substances, it is demonstrated that a spiral spring is the best adapted of all kinds of springs to the constant variations that machinery is liable to. Spring *s* is therefore made of steel wire, and is spring-tempered, and although a particular method of adjusting the same to different pressures has been pointed out it is not intended to confine this spring to such mode of adjustment solely; but *s* may be regulated by collar *c* being placed on its opposite end

and stops or notches cut into *b*, or in any other way or manner that substantially serves the purpose of this adjustable spring for regulating the presser. Pressers constructed as above are nearly one-half lighter than others and fill heavier bobbins.

I do not wish to confine the manufacture of the spring *s* to steel; but the same may be made of any other metal or combination of metals.

I do not claim the presser itself in form of its shaft or arm or other part as set out in Letters Patent heretofore granted to said SMITH, bearing date the 3d day of May, 1859, used on a different sort of flier; but

What I claim as administrator aforesaid, and desire to secure by Letters Patent, is—

The mode of regulating the presser by means of the adjustable spiral spring *s* connected thereto, substantially as herein described, and for the purposes set forth.

JOSEPH B. CLARK,
Administrator.

Witnesses:
NAHUM BALDWIN,
B. P. CILLEY.