(No Model.) 2 Sheets—Sheet 1.

J. A. V. SMITH.

METHOD OF MAKING STEEL FLY FRAME FLIERS.

No. 453,269. Patented June 2, 1891.

Fig. 1.

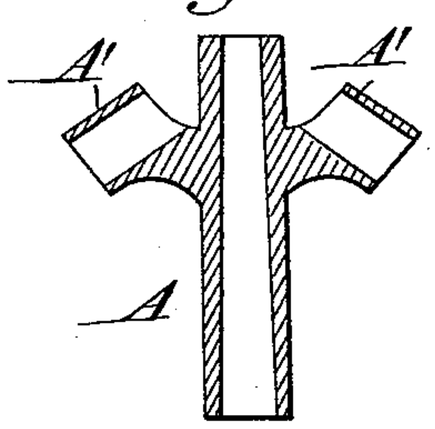


Fig. 2.

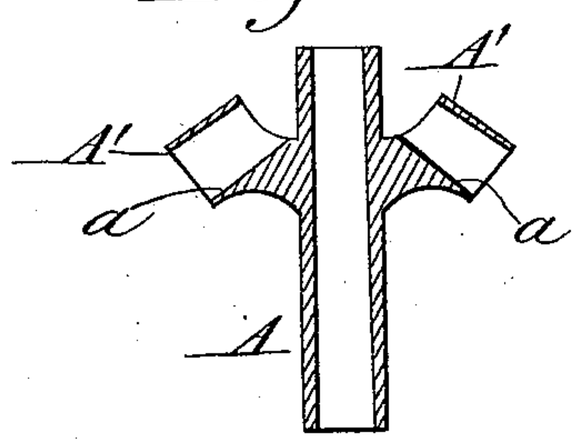


Fig. 4.

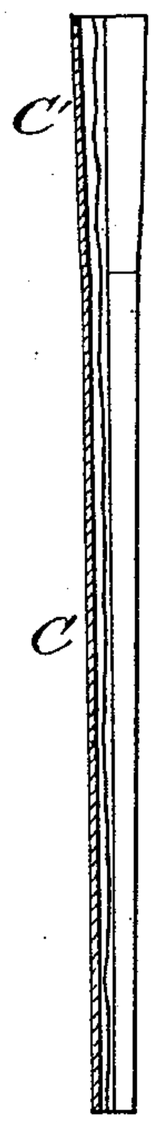


Fig. 3.

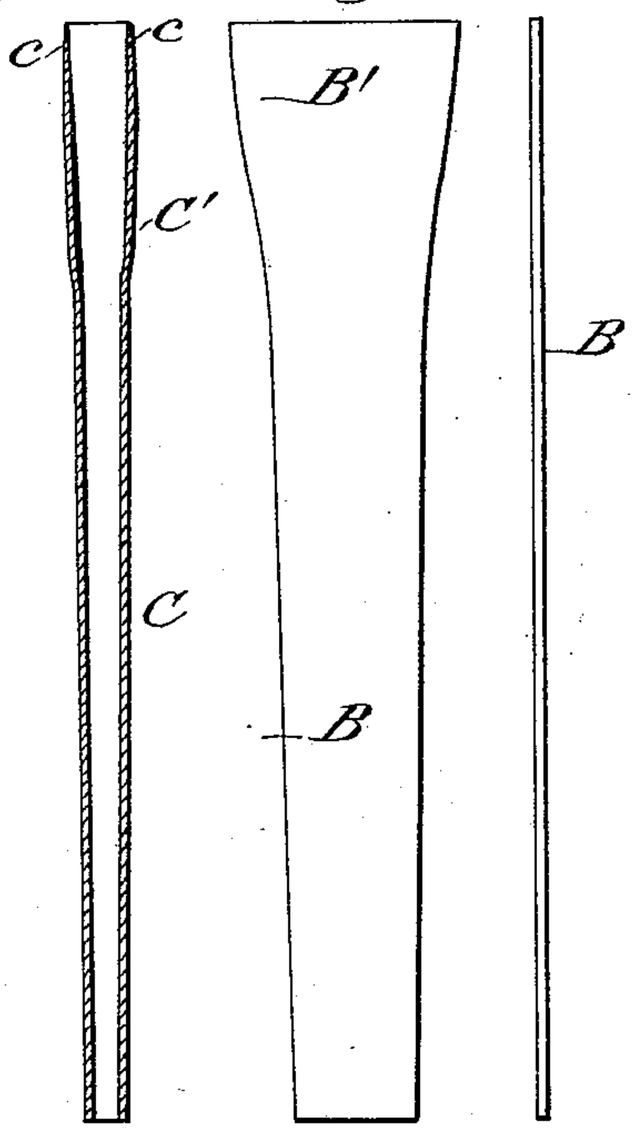


Fig. 5.

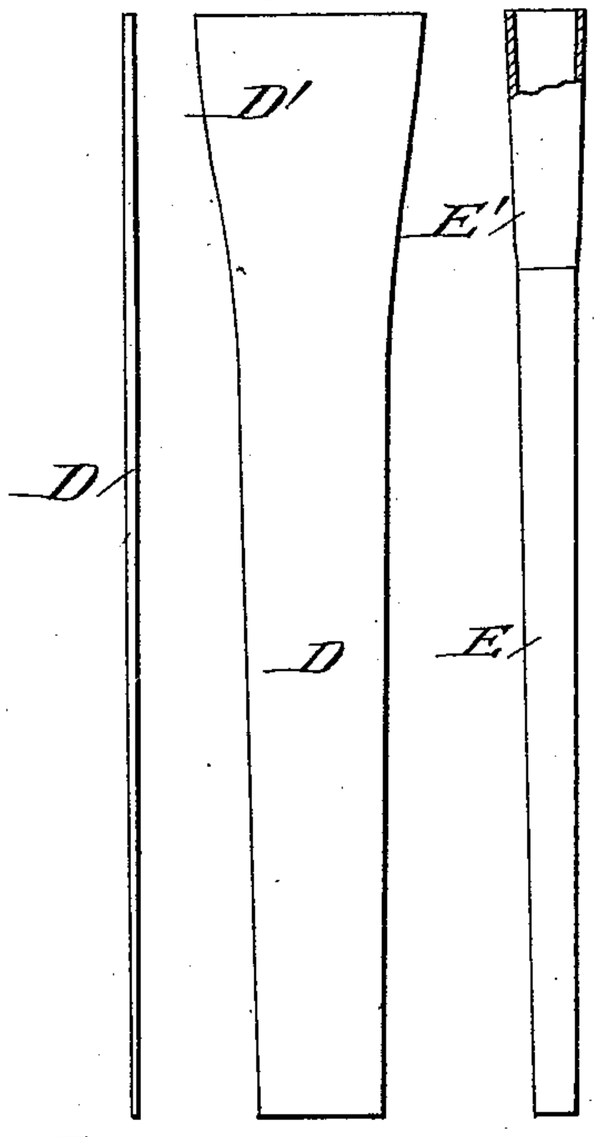


Fig. 6.

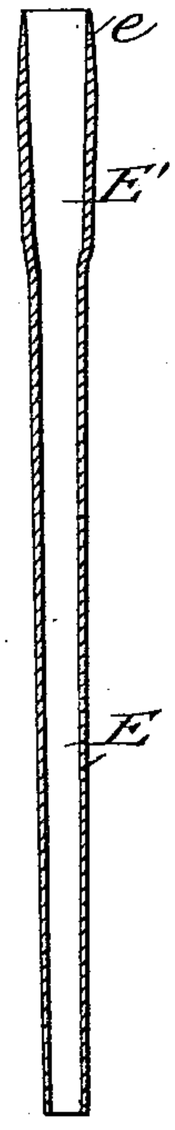
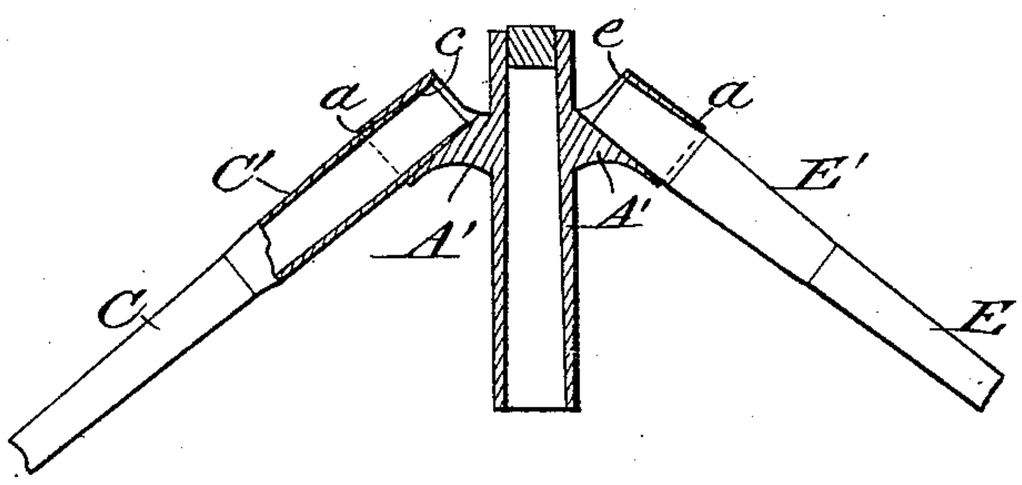


Fig. 7.



Attest:

F. H. C. Schott

Wm L. Boyden

Inventor:

John A. V. Smith

per John C. Tasker,

Atty.

(No Model.) 2 Sheets—Sheet 2.

J. A. V. SMITH.

METHOD OF MAKING STEEL FLY FRAME FLIERS.

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Fig. 8.

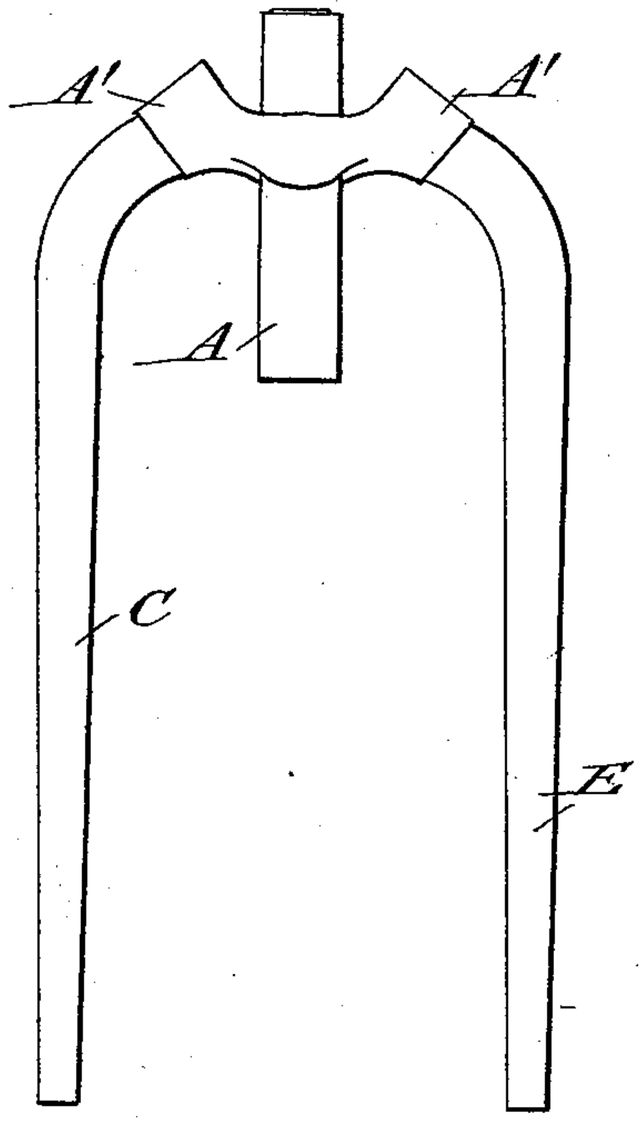
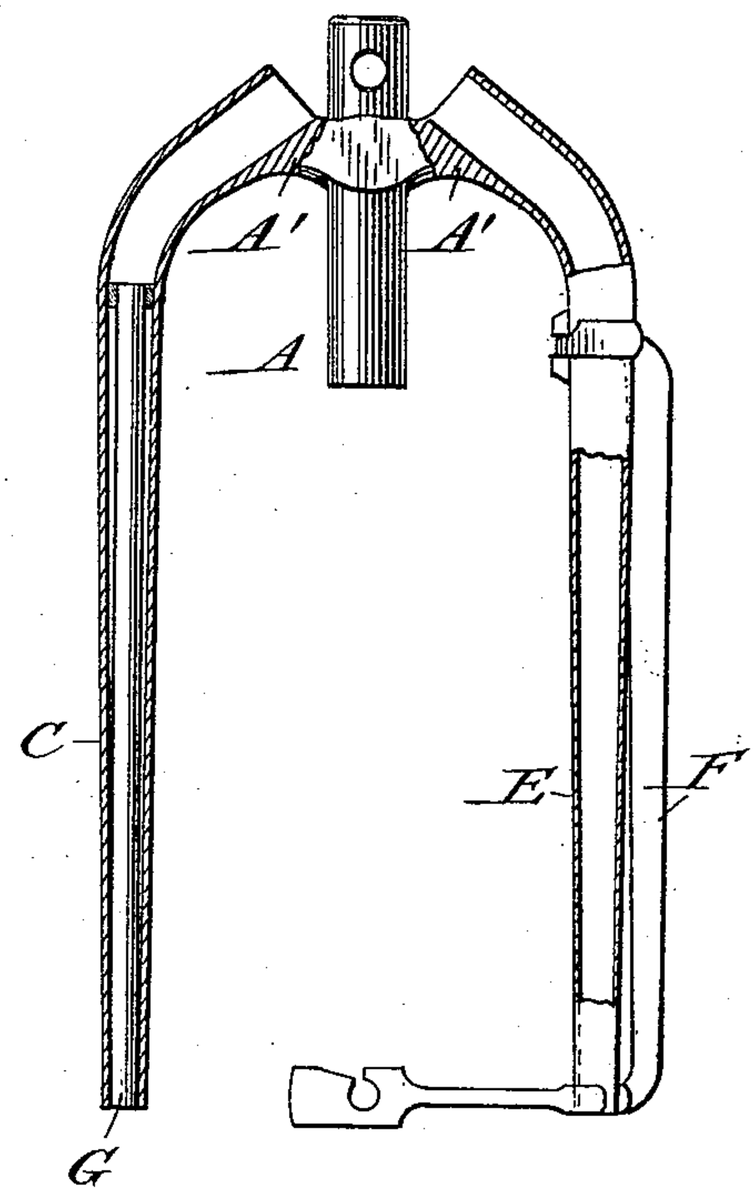


Fig. 9.



Attest:

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Atty.

UNITED STATES PATENT OFFICE.

JOHN A. V. SMITH, OF MANCHESTER, NEW HAMPSHIRE.

METHOD OF MAKING STEEL FLY-FRAME FLIERS.

SPECIFICATION forming part of Letters Patent No. 453,269, dated June 2, 1891.

Application filed February 18, 1891. Serial No. 381,869. (No model.)

To all whom it may concern:

Be it known that I, JOHN A. V. SMITH, a citizen of the United States, residing at Manchester, in the county of Hillsborough and State of New Hampshire, have invented certain new and useful Improvements in Methods of Making Steel Fly-Frame Fliers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My present invention relates to an improved method of making steel fliers for use in connection with bobbins in the bobbin and fly-frame, the object of the invention being to provide a method whereby a perfect and complete flier having strength and elegance may be made easily, quickly, and cheaply; and the invention therefore consists in a series of novel operations or steps acting in connection with suitable means and materials to produce a flier, and also in the improved flier itself, which results from the practical operation of the successive steps of the method, substantially as will be hereinafter described and claimed.

In order to explain more fully how my improved method of making fliers may be carried into practical effect, I have annexed hereunto certain sheets of drawings, whereon I have delineated the several parts of my flier as they appear during the successive steps of the method, beginning with the first step and representing the development of the flier in its several parts until the complete and perfected article is at last produced in a simple, cheap, and effective manner, but possessing all the useful qualities which are needful in as great a degree as any flier that is now made by more expensive and laborious methods.

In the drawings, Figure 1 is a vertical section of the casting which forms the top piece of the flier. Fig. 2 is a similar section of the same part after it has been turned and the sockets reamed for the reception of the arms. Fig. 3 shows a plan view and an edge view of the metallic plate cut into the proper shape and adapted to be bent into the form of a tube to make that arm of the flier which is commonly termed the "balance arm or leg." Fig. 4 represents a sectional elevation of the balance-tube after it is first formed, and also a longitudinal section of the completed balance-tube. Fig. 5 is a plan view and also an edge view of the metallic plate which is cut into the proper shape to be ready for bending into the tube, which constitutes the roving tube or arm. Fig. 6 represents an elevation in partial section of the roving-tube after it is first formed, and also a longitudinal section of the finished roving-tube. Fig. 7 is a sectional view of the top casting with the balance and roving arms connected thereto. Fig. 8 is an elevational view of a flier as it appears after the balance and roving tubes have been connected to the top casting and have then been bent into the proper shape and parallelism. Fig. 9 is a longitudinal section of a completed flier, showing the balance-rod located within the balance-arm, and showing also the presser connected with the roving-tube and indicating likewise the several parts finished in complete, perfect, and elegant form.

Like letters of reference designate like parts throughout all the different figures of the drawings.

In carrying my improved method of making fliers into practical effect, I first provide the top pieces or frames, which are cast of steel or similar metal in the form shown in Fig. 1, said top castings being supplied in large numbers in this form and constituting one of the parts or pieces of material which is used in the carrying out of the method, said top piece having the tubular or hollow vertical stem A, which is provided with the two lateral sockets or projections A′ A′, said sockets being inclined downwardly, so as to lie at a angle to the part A. Fig. 1 represents this top piece just as it comes from the foundry, it having been made there in any suitable and desirable manner.

The casting represented by Fig. 1 is taken and properly turned and rounded, so as to give it a neat finish and trim appearance, and its lateral sockets are reamed, so that the tubular openings therein will taper, as shown in Fig. 2, to allow the lower edges of the sockets to be quite thin, as at *a*, Fig. 2. We thus provide tapering sockets for the arms of the flier. The sockets are thus the thickest near the upper end of the casting and the thinnest at the lower edge *a*, and, as will be hereinaf-

ter seen, the ends of the arms, which are admitted into these sockets, are correspondingly inclined or tapered, so that they may be brazed neatly and securely and with great strength into the sockets.

The next step is to construct the balance-tube, which is to be connected to the left-hand side of the top casting. This is called the "balance tube or arm," because its weight must be great enough to balance that of the other arm, which is denominated the roving tube or arm.

To make the balance-tube I provide a suitable strip of metal B, (see Fig. 3,) which is cut into a suitable elongated form, one end being wider and larger, as at B′, than the other. This strip of sheet metal is then bent or rolled into a tube C, (see Fig. 4,) the larger end B′ of the strip forming, consequently, the larger end C′ of the balance-tube. This tube has two tapers, therefore, the part of larger diameter C′, which, it will be seen, is tapered, and the part of smaller diameter C, which is likewise tapering. This second taper at the upper end of the arm is an exceedingly important feature, because by it the flier is made strong, stiff, roomy, and durable. The greatest strength is given to the flier just at the point where it is most needed, and also expansion is lessened, which is another highly important feature in a high-speed flier. The balance-tube having this double taper, which I have just explained, has the upper end thereof turned to fit the socket A′, which is adapted to receive it, and said end of the tube or arm is turned very thin, as at *c*, Fig. 4, very little strength being needed at this particular point.

The next step is to make what is known as the "roving-tube." I take a suitable strip of metal D, cut into suitable and desirable form, one end D′ being larger than the rest, and this strip is bent or rolled into the shape of a tube E, of which one end E′, formed by the bending of the larger part D′ of the strip, is larger than the rest of the tube, and the said tube or arm has two tapers, the part E′ being tapered and the other part E being likewise tapered, the roving-arm being thus made hollow but strong and stiff. The upper end of this tube is turned so as to have a thin edge *e*, which is adapted to be inserted into the right-hand lateral socket A′ of the top casting. The roving-tube E tapers very gradually from the second taper E′ toward the base, the lower end varying from two to four numbers, according to the size of the flier. The purpose of this is to lighten the tube so that after the presser has been attached it will not require so much additional weight upon the balance leg to balance the flier. Prior to bending the plate or metallic strip D into the tube form I polish it so that after the tube has been completed it may be the more easily finished.

The next step is to connect the balance-arm and the roving-arm to the top casting. This is done by brazing them strongly together. In Fig. 5 this is clearly represented. The end of the balance-arm is inserted into the left-hand lateral socket A′ until its thin upper edge or end *c* comes flush with the upper end of the socket, while the thin lower edge *a* of the socket bites closely around the larger part C′ of the balance-arm, the part of the balance-arm adjacent to the socket being thus very large and strong, while the peculiarly shaped end of the arm or tube forms when brazed a secure and a permanent connection of great strength with the top casting. Similarly it will be seen that the roving-arm has its upper thin edge *a* inserted into and through the right-hand inclined socket A′ until said end reaches the outer or top part of the said socket, while the lower thin edge *a* of the socket is closed tightly around the larger part E′ of the roving-tube, and the part of the roving-arm adjacent to the socket with which it is connected is large and strong, so that the flier is constructed in a durable and lasting manner, stiff and unyielding, and competent to perform any service that may be demanded of it. With this construction plenty of room is afforded at the top end of the flier to hold the slack roving whenever the bobbin does not take care of it as fast as the rolls feed it out, which is often the case, it being particularly noted that this large construction at the top ends of the flier-arms afford great strength and thickness.

Just as soon as the roving and balance tubes have been brazed and firmly connected thereby to the top casting, the said roving and balance arms may be bent into the position shown in Fig. 8, where they are parallel to each other, there being a neat and elegant curvature at their upper ends where they connect with the sockets and then they will be nicely finished, so that in the completed flier the marks of connection between the upper ends of the arms and the tubes will be substantially obliterated and it will appear as if the whole were formed integral.

In Fig. 9 we have a section of the completed flier. After the arms have been properly bent and the device has been otherwise finished, the balance-arm will have inserted thereinto a rod G, which serves to supplement its weight and enable it to overcome the weight which is added to the roving-arm when the presser is connected to it. The rod G may be soldered or brazed into its position, and the completed flier may have the socket A′ which holds the balance-arm closed at the upper end, if preferred, to keep all dirt from entering this tube, which might throw the flier out of balance.

F denotes the presser having the usual right-angled arm at its lower end and provided with an eye through which the roving passes.

In this manner, by the carrying out of the several steps of my improved method, I am enabled to provide a flier having many ex-

cellencies and advantages, and constructed cheaply and quickly. Certain of the important points about the method are the making of two tapers on the balance and the roving tubes, and also making the upper ends of the roving and balance arms or tubes so that they will be thin, and may thus be better connected with the sockets, which have likewise been reamed out so as to have thin edges.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The herein-described method of making fliers, which consists in providing suitable top castings having lateral sockets, then rolling metallic plates into tubes to serve as arms, then connecting these arms to the sockets, and finally bending said arms into proper shape and finishing them.

2. The herein-described method of making fliers, which consists, first, in providing top castings having lateral sockets, turning said castings and reaming the sockets so that they may have a thin edge, then rolling metallic plates into suitable tubes to serve as arms, the upper ends of said tubes being then turned thin to enter the sockets, and then brazing the arms firmly to the sockets, bending them to the proper shape, and finishing the device in any suitable manner, substantially as described.

3. The herein-described method of making fliers, which consists in rolling suitable metallic plates into hollow tubes to serve as arms having two tapers on two diameters, the upper tapered section being the larger, and having its upper end turned thin, and then inserting and firmly brazing the thin upper ends of these arms into the sockets of top castings, and finally bending the arms to suitable shapes and finishing the flier, substantially as described.

4. The herein-described method of making fliers, which consists, first, in providing top castings having lateral downwardly-inclined sockets, then turning said castings and inwardly tapering the sockets so that their lower edges may be thin, then rolling suitable metallic plates into hollow tubes having two tapers on different diameters, the larger taper being near the upper end, said tubes being adapted to serve as the roving and balance arms of the flier, then turning thin the upper ends of said flier-arms, and finally connecting these arms by brazing them within the sockets, after which the arms may be bent as desired and the flier finished.

5. The herein-described method of making fliers, which consists, first, in providing castings having lateral downwardly-inclined sockets, rolling suitable metallic plates into hollow tapering tubes to serve as the balance- and roving arms of the flier, brazing these arms into the sockets, providing the balance arm with the internal rod and the right-angled arm with a presser, substantially as described.

6. The herein-described flier, consisting in the combination of the top casting having lateral inclined sockets, in combination with the tubular arms having thin upper edges, said arms being brazed within the sockets and having a tapering form, substantially as described.

7. The combination, with the top casting A, having sockets A′ A′ reamed out so as to provide the thin edges *a*, of the balance-tube C, having the enlarged parts C′ formed with thin edge *c*, and the roving-tube E, having enlarged part E′ formed with thin edge *e*, said roving and balance tubes being connected to the sockets A′ A′, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN A. V. SMITH.

Witnesses:
C. H. BARTLETT,
JAMES P. TUTTLE.