(No Model.)

# J. C. & F. A. SPACH.

## MACHINE FOR WINDING THREAD ON PLATES.

No. 500,163. Patented June 27, 1893.

Fig. 1.

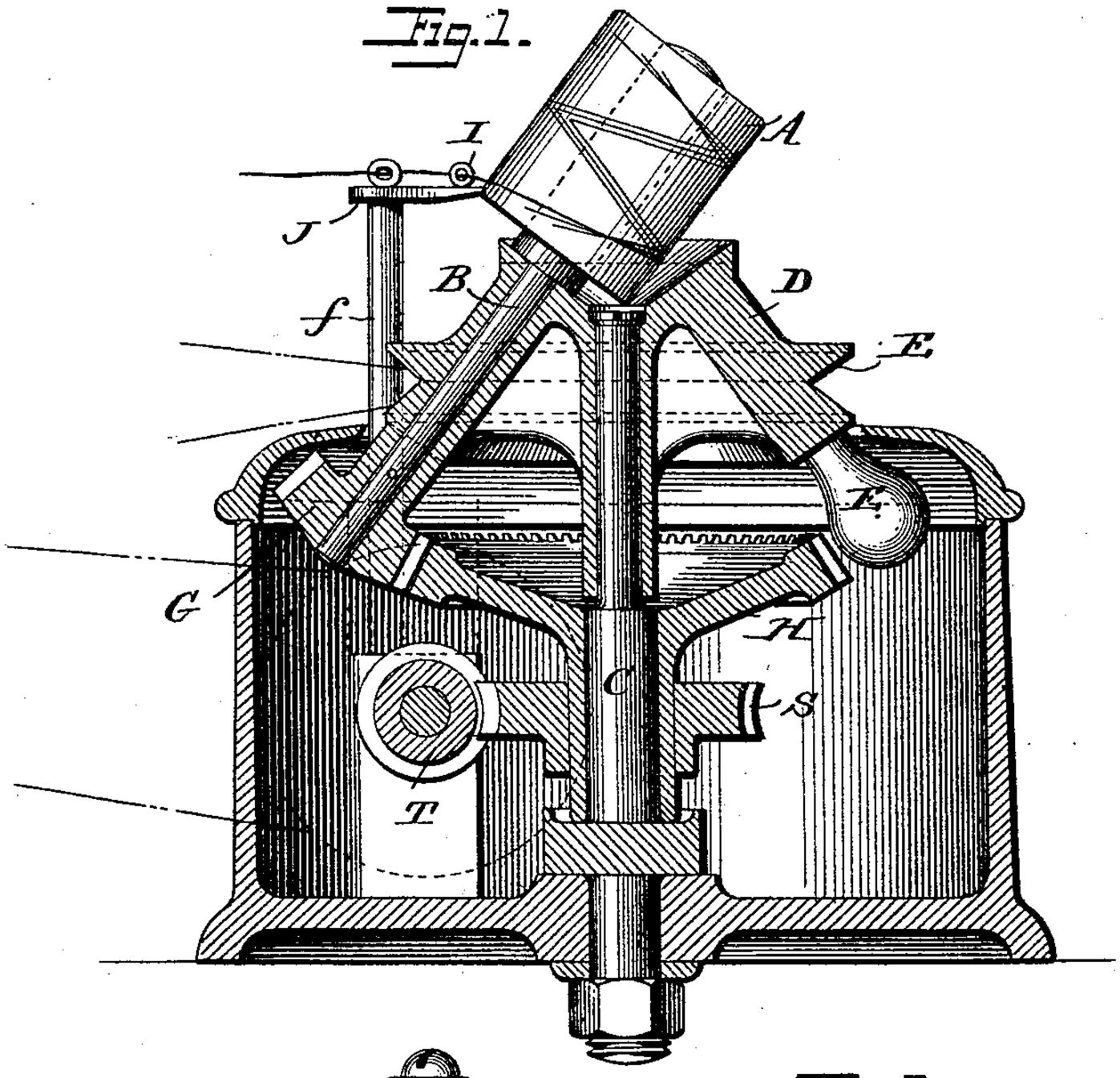
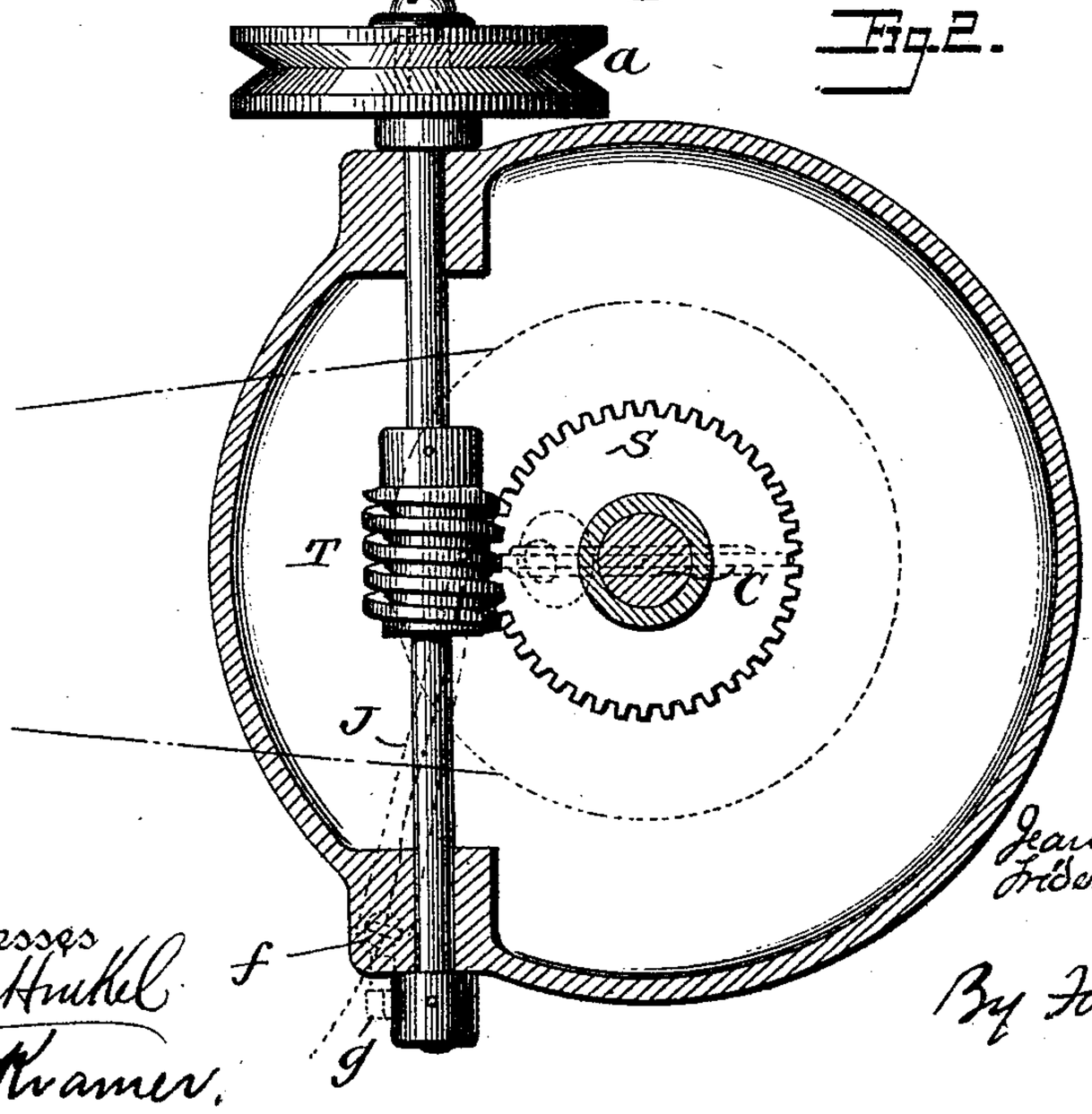



Fig. 2.

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# UNITED STATES PATENT OFFICE.

JEAN CHARLES SPAÇH AND FRÉDERIC ALBERT SPACH, OF ROTHAU, GERMANY, ASSIGNORS, BY MESNE ASSIGNMENTS, TO JOSEPH R. LEESON, OF NEWTON, MASSACHUSETTS.

## MACHINE FOR WINDING THREAD ON PLATES.

SPECIFICATION forming part of Letters Patent No. 500,163, dated June 27, 1893.

Application filed October 28, 1892. Serial No. 450,278. (No model.) Patented in Belgium October 19, 1885, No. 70,551; in France October 20, 1885, No. 171,758; in England November 23, 1885, No. 14,343, and in Germany November 26, 1885, No. 35,389.

*To all whom it may concern:*

Be it known that we, JEAN CHARLES SPACH and FRÉDERIC ALBERT SPACH, manufacturers, subjects of the Emperor of Germany, residing at Rothau, in Alsace, Germany, have invented a new and useful Machine for Winding Thread on Plates, (for which we have obtained patents in Belgium, No. 70,551, bearing date October 19, 1885; in France, No. 171,758, bearing date October 20, 1885; in Great Britain, No. 14,343, bearing date November 23, 1885, and in Germany, No. 35,389, bearing date November 26, 1885,) of which the following is a specification.

Our invention relates to a machine whereby any kind of thread may be wound on holders, as plates, in coils of greater or lesser length and in very exact juxtaposition; these two conditions being obtained in our system with threads of different thickness by means of a very easy regulation, which conditions could heretofore only be obtained by means of complicated and expensive machines very difficult to regulate. Our system has, moreover, the advantage of allowing a very high speed, seeing that it only includes continuous rotary motions whereby we obtain very economically an article of very fine appearance, as will be more easily understood on reference to the accompanying drawings, in which—

Figure 1 is a vertical section of our machine; and Fig. 2, a transverse sectional view of same.

Similar letters refer to similar parts in both views.

The machine is arranged as hereinafter set forth to allow, as above stated, of obtaining the following results, viz.: first, to vary the length of travel of the thread, that is to say the length of tube or card covered by the latter; second, to regulate with great preciseness the spacing of two neighboring threads, according to the size of the thread to be wound.

The holder A, to be covered by the thread, is mounted on a slanting axis B endowed with a rotary motion of its own, and which travels at the same time around a central axis C. To this end, the slanting axis B is rigidly connected to a socket D provided with a counter-weight E revolving freely on the central shaft and rotated by a pulley F, and belting, and to the lower part thereof, that is to say at the end opposite the card, is keyed a pinion G engaging a toothed wheel H mounted on the central shaft.

On the side of the card, at the level of the point of intersection of the two axes, is arranged an eyelet constituting a guide I, through which passes the thread, and which can be adjusted in a perpendicular plane to any desired position, as hereinafter explained. This guide is mounted on the end of an arm J pivoting around its other end. These parts are so arranged, if the movable axis is set in motion, its two rotary motions combined will produce a winding, the length whereof will be determined by the position of the guide. In order to vary this length, it will be understood that the guide has only to be at a different elevation as above set forth, the length becoming greater as it is set lower, and vice versa. This may be done by adjusting the guide support rod *f* in its bearing in a socket in the frame and securing it by a set screw *g*. On the other hand, the length covered will include a greater or less number of coils, which will therefore be more or less near to or far from each other according to the number of turns taken by the card between the extreme positions occupied in relation thereto by the guide depending on the proportion of the number of teeth in the two gear wheels G and H, seeing that the number of coils produced in one travel will be equal to the number of revolutions effected by the movable axis on itself while it turns once around the fixed axis; there will be two coils if it makes two revolutions, three coils if it makes three revolutions, and so on.

If the ratio of the numbers is not represented exactly by an integral number, the difference will produce the advancement of the thread, and the greater this difference, the more each thread will be separated from the one next to which it comes into position. This difference must therefore be variable at will according to the diameter of the thread in order always to obtain an exact juxtaposition.

This result we obtain in a precise way and with great ease by giving a very slow movement of rotation to the central gear wheel we have up to the present supposed to be fast, and to this end it is provided with a helicoidal wheel S operated by an endless screw T, constituting devices for imparting an independent or increment of motion to the holder around its axis. The screw T, is driven from a pulley *a*.

The number of teeth in the two gear wheels should preferably be prime numbers to each other, which prevents the same teeth of the pinion being always in engagement with the same teeth of the wheel, thus reducing wear. This also produces the advancement of the thread, as can be understood, but of an invariable quantity for a given pair of gear wheels, and would therefore not allow of regulating the machine for all sizes of thread.

Without limiting ourselves to the precise construction and arrangement of parts shown, we claim—

1. The combination in a thread winding machine of a rotary shaft supporting the thread holder, a thread guide at one side of said shaft and between the planes passing through the ends of the holder to lay the thread on the cylindrical part of the cop only, and independent devices for imparting an increment of rotary motion to the holder around its axis substantially as and for the purpose described.

2. The combination in a thread winding machine of a winding shaft, holder for supporting the thread, means for imparting rotary motion to said shaft, a thread guide at one side of the winding shaft and between the planes passing through the ends of the holder, and independent devices for varying the extent of rotation of the shaft around its axis as each layer of thread is wound on the cylindrical part of the cop, substantially as set forth.

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Witnesses:
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