

(No Model.)

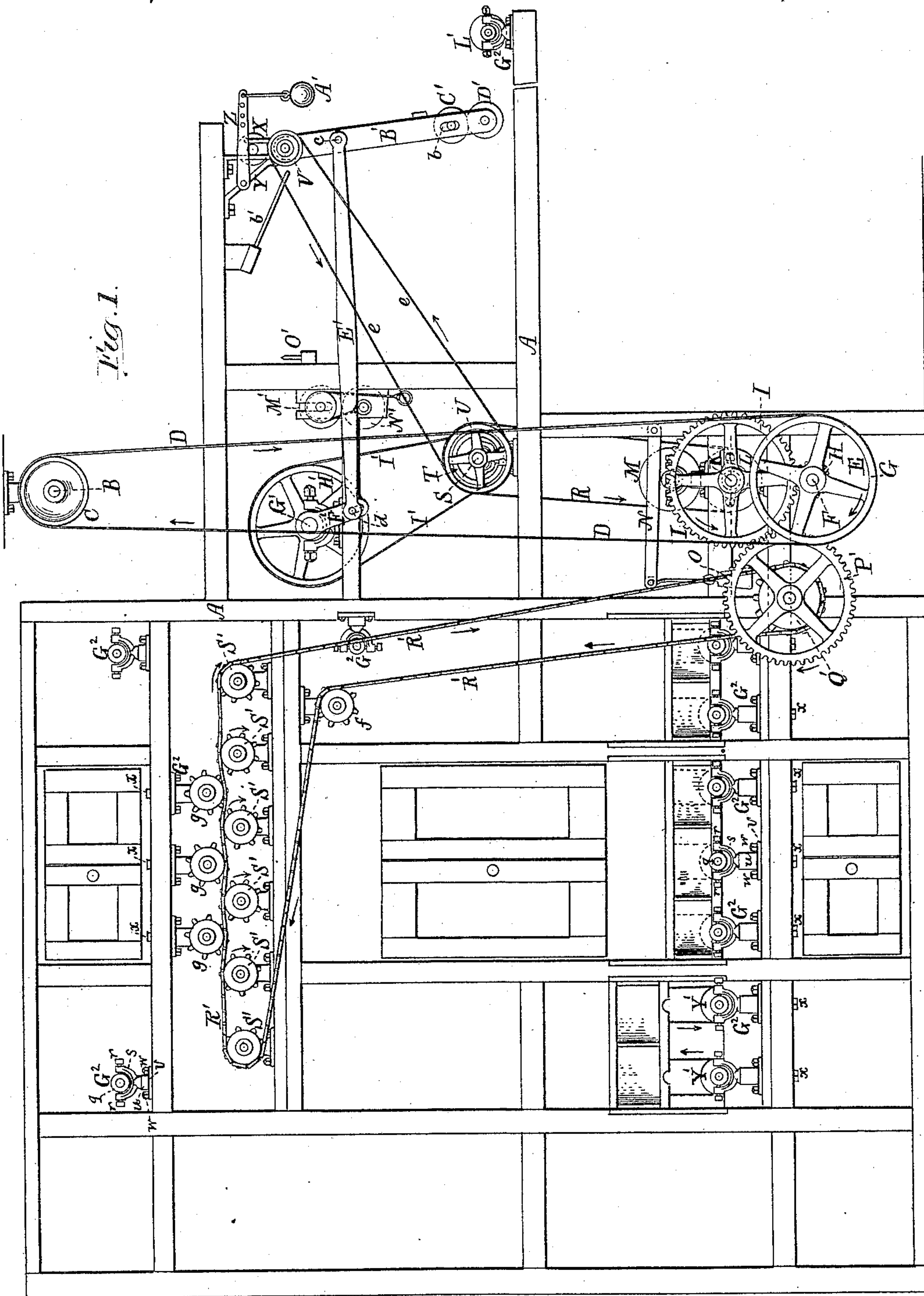
4 Sheets—Sheet 1.

B. STETSON.

MACHINE FOR DRYING YARNS, FABRICS, &c.

No. 444,860.

Patented Jan. 20, 1891.



Witnesses
A. J. Piper
W. E. Piper

Inventor
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(No Model.)

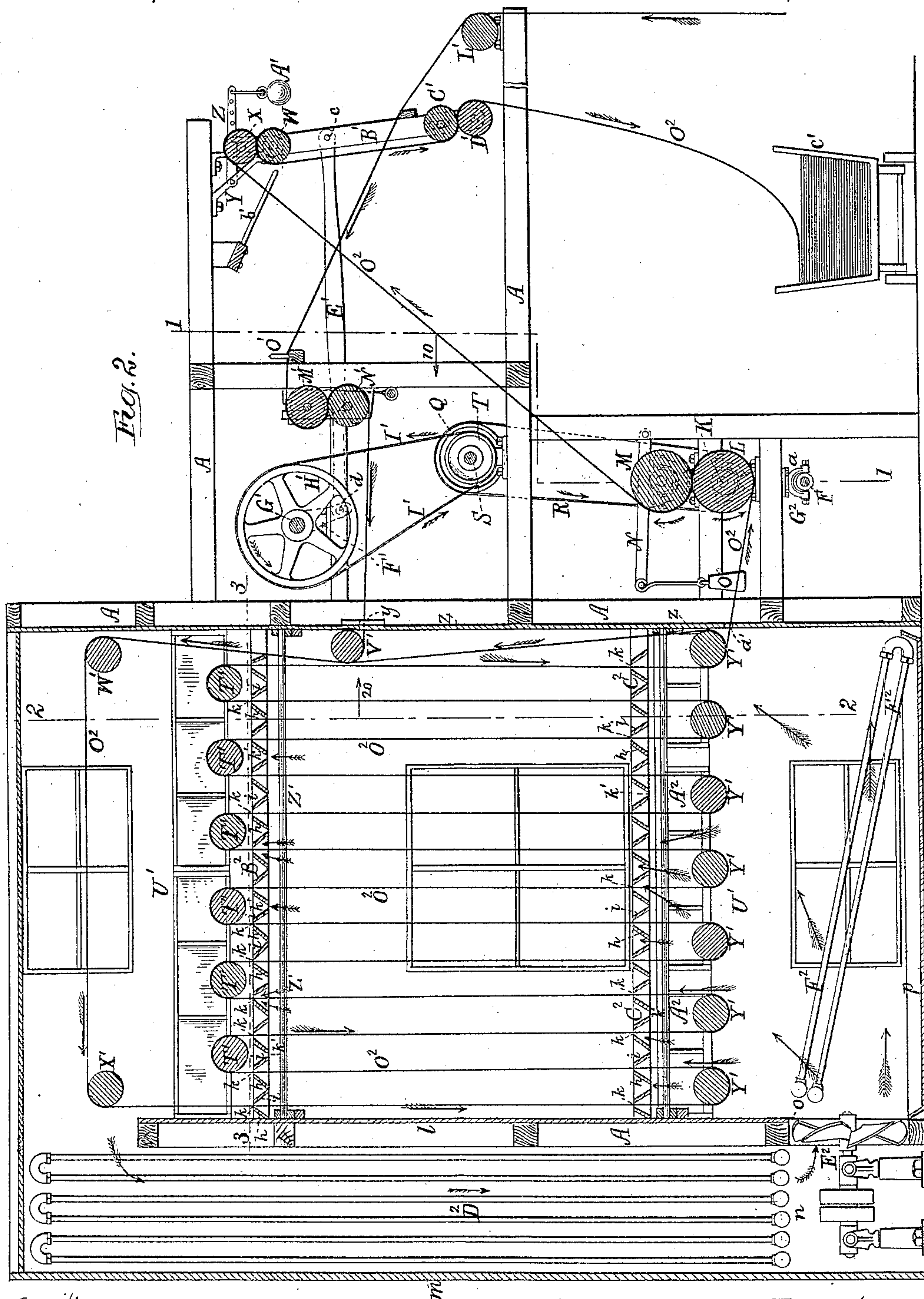
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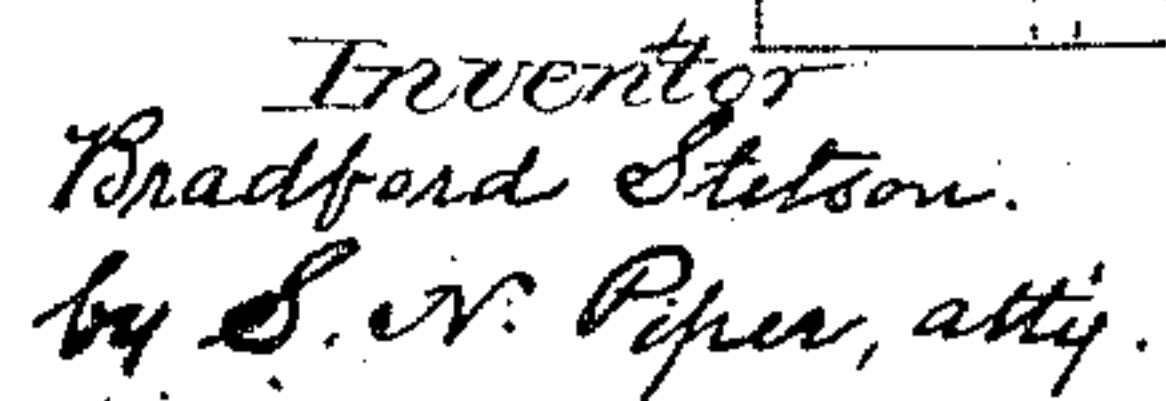
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Fig. 6.

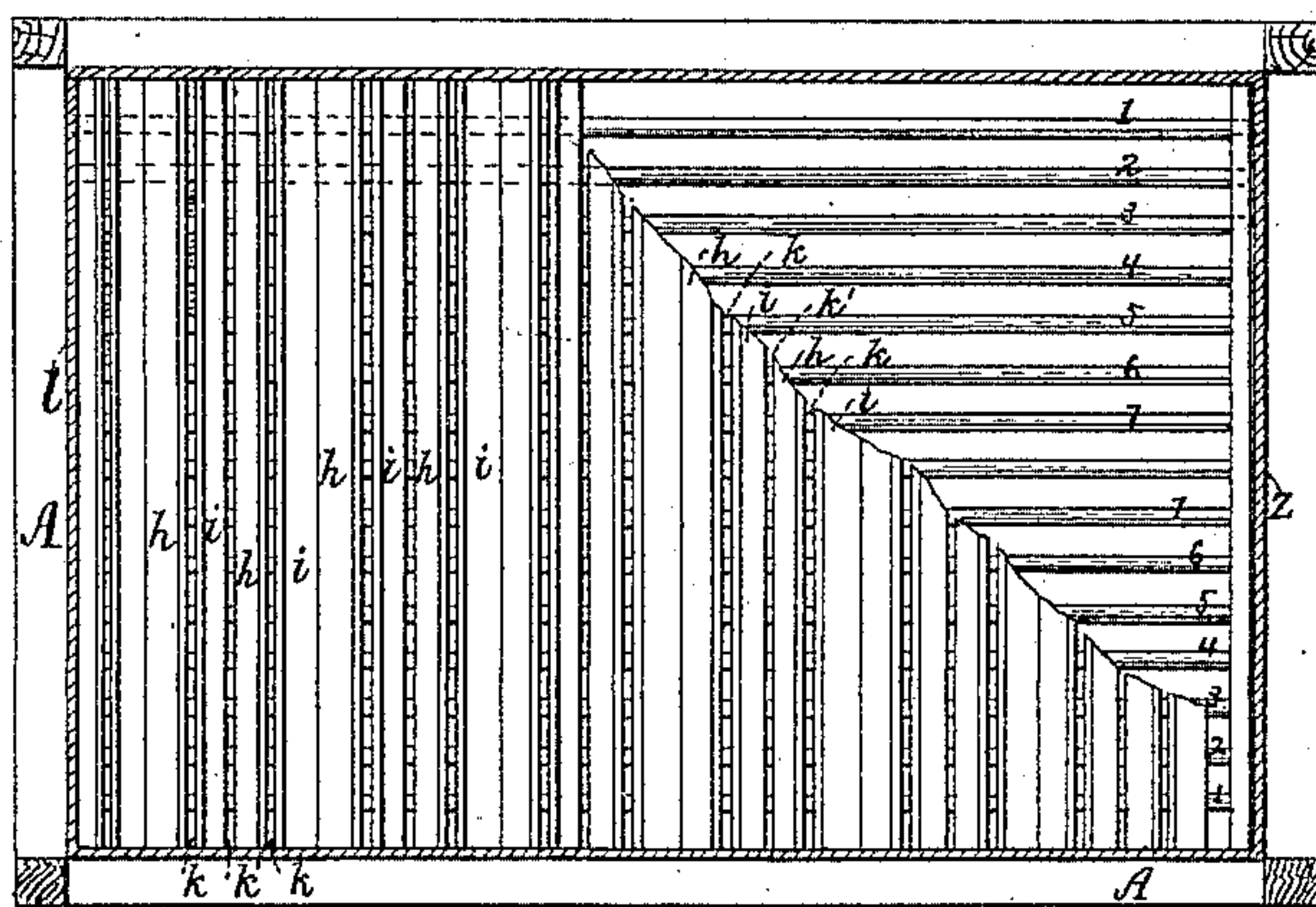


Fig. 7.

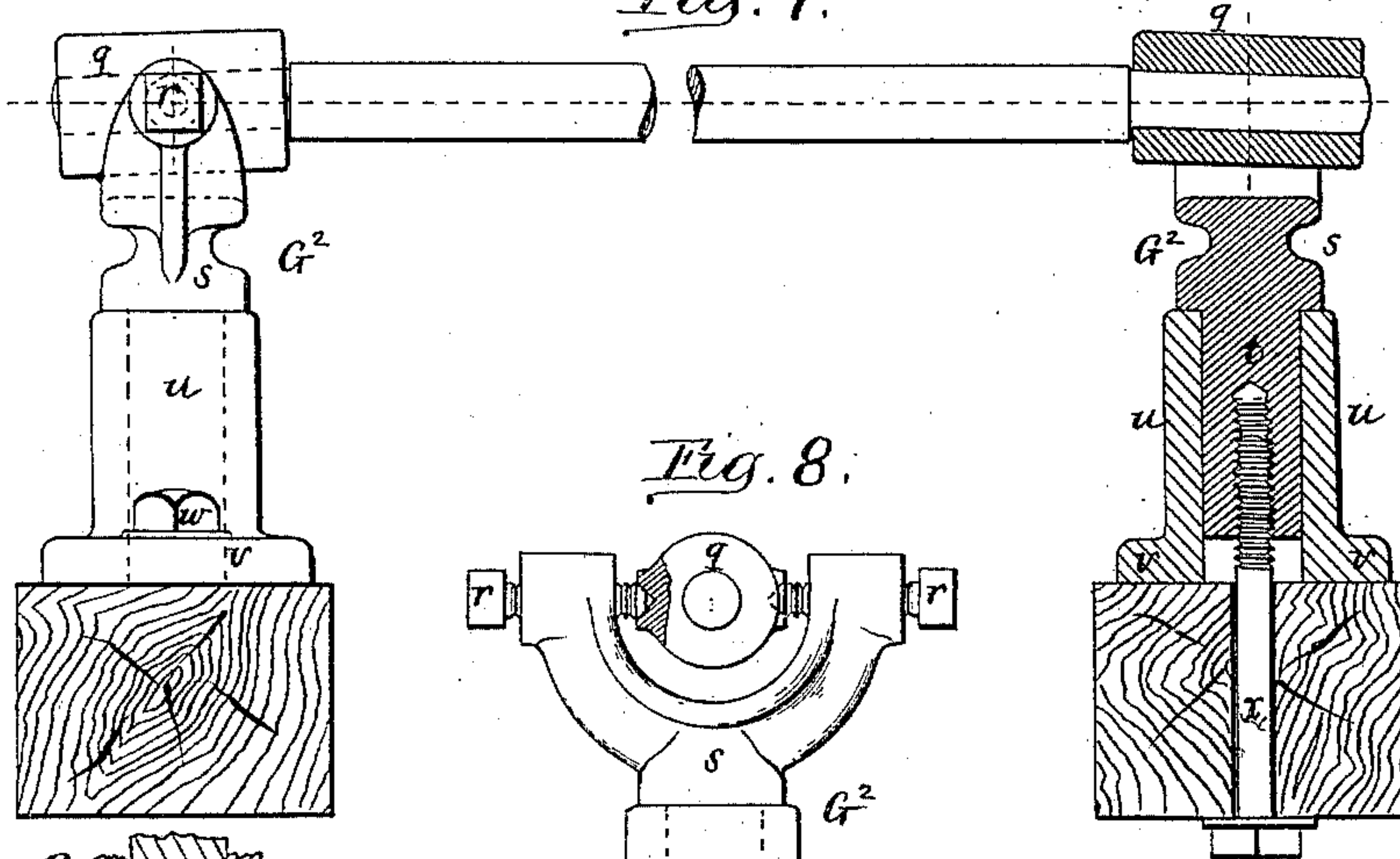


Fig. 8.

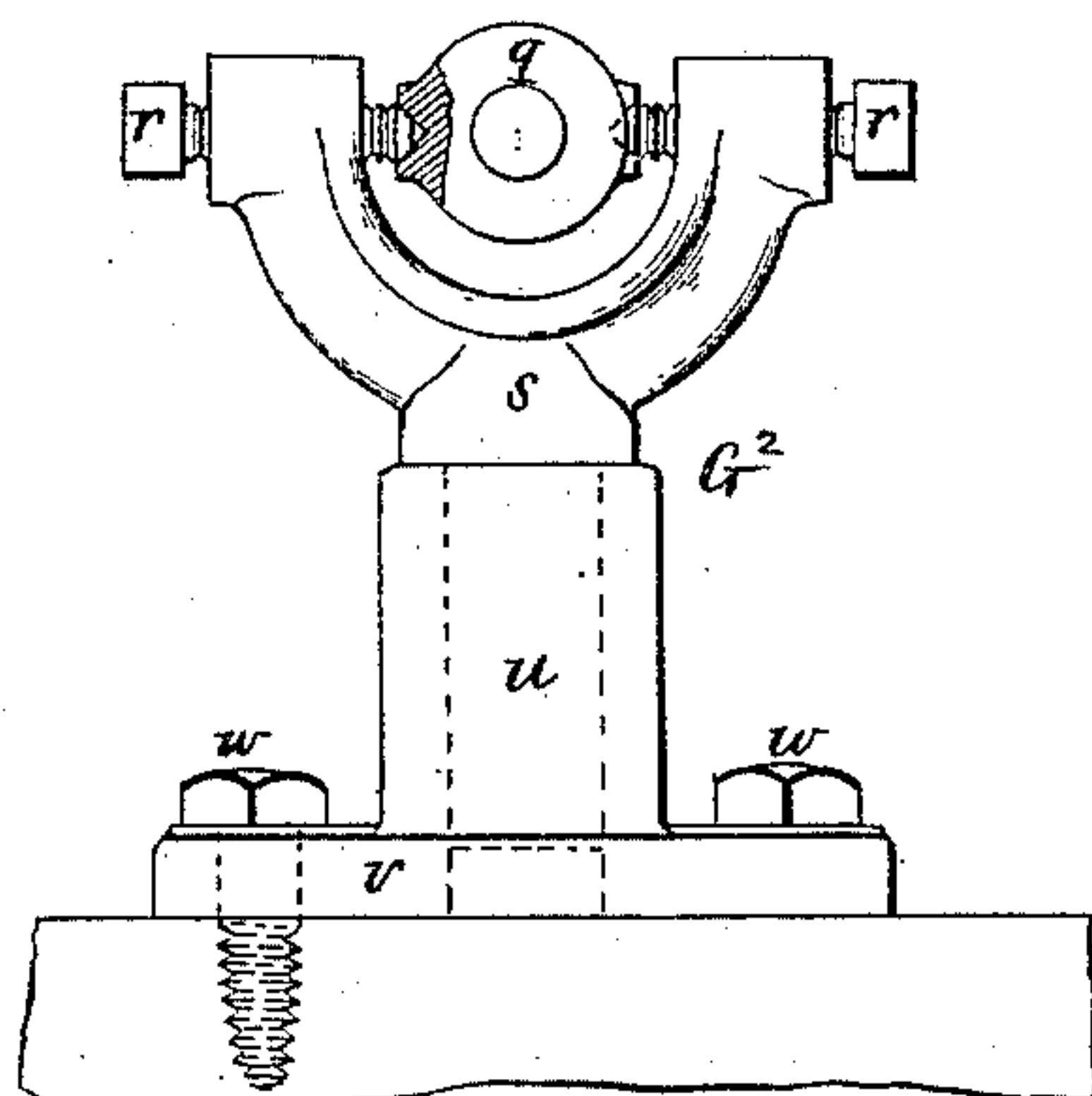
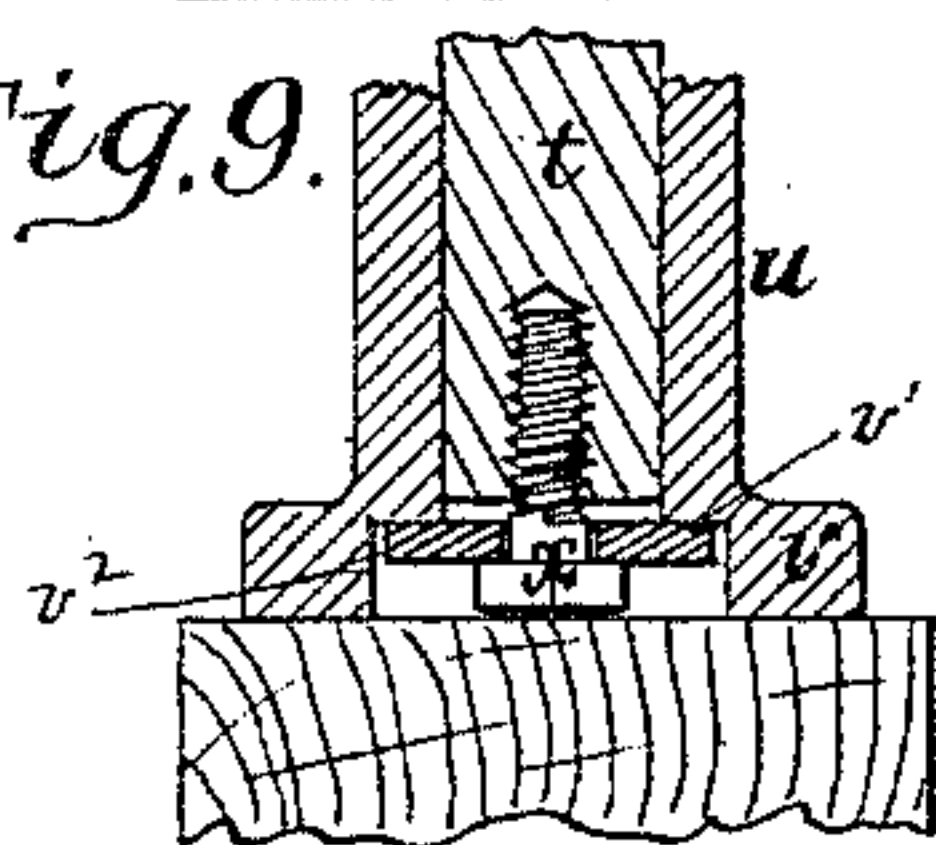


Fig. 9.



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UNITED STATES PATENT OFFICE.

BRADFORD STETSON, OF UXBRIDGE, MASSACHUSETTS.

MACHINE FOR DRYING YARNS, FABRICS, &c.

SPECIFICATION forming part of Letters Patent No. 444,860, dated January 20, 1891.

Application filed November 13, 1889, Serial No. 330,163. (No model.)

To all whom it may concern:

Be it known that I, BRADFORD STETSON, a citizen of the United States, residing at Uxbridge, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Machines for Drying Yarns, Fabrics, &c.; and I do 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, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

Figure 1 is a side elevation of my machine; Fig. 2, a vertical and longitudinal section thereof. Fig. 3 is a front end elevation thereof; Fig. 4, a vertical and transverse section on line 1 1 of Fig. 2, as seen when looking in the direction indicated by arrow 10; and Fig. 5 is a vertical and transverse section on line 2 2 of said Fig. 2, as seen when looking in the direction indicated by arrow 20. Fig. 6 is a horizontal section on line 3 3 of Fig. 2 of the drying-chamber, showing in top view the deflectors, and where portions of the latter are shown as broken away the separators are also shown in top view. Fig. 7 is a view, partly in section and partly in elevation, of a pair of the bearings used to support the shafts and rolls in said machine. Fig. 8 is a side view of one of said bearings. Fig. 9 is a median section of portions of the socket and journal of the fork of one of said bearings.

The nature of my invention is defined in the claims hereinafter presented.

The machine hereinafter described, and represented in the drawings, is intended specially for the drying of yarns in chains, or fabrics which do not require tentering.

In the drawings, the frame of the machine is shown at A, it being of suitable construction to support the main operative parts.

B is a driving-shaft from a pulley C, fixed to which power is conveyed by a belt D to a pulley E, fixed to the main shaft F of the machine, said shaft supported in bearings *a a*, secured to the frame, and is provided with a loose pulley G, as shown. (See Fig. 3.) A spur-pinion H, fixed to the shaft F, engages

with a gear I, fixed to the shaft K of the lower of two draw or nip rolls L M, supported as shown, the upper nip-roll M having arms N, which are pivoted to the frame and at their free ends provided with weights O, so arranged with its bearings as to create pressure of said upper roll against the lower roll L. To the other end of the shaft K of the said lower roll L is secured a pulley P, about which and a pulley Q a belt R runs. The said pulley Q is fixed to one end of a shaft S, provided with a pulley T at its middle and also a pulley U at its opposite end, which connects by a belt *e* to a pulley V, fixed to one end of the shaft of the lower of two pressure or nip rolls W X, supported in brackets Y, fixed to the frame. Arms Z, pivoted to the brackets and provided with weights A', bear on the bearings of the upper roll X and force it against the roll W. Pivoted on the journals of the said roll W are arms B' B', to the lower ends of which a roll D' is pivoted, and bearing on said roll is another roll C', whose journals are arranged in slots *b* in the arms B'.

Jointed to the arms B' at *c* are the outer ends of connecting-rods E', pivoted at their inner ends at *d* to cranks F', fixed to a shaft G', provided at its middle with a pulley H', connected by a belt I' to the pulley T on the shaft S, hereinbefore referred to. The said arms B' when the machine is in operation are swung back and forth on their pivot by the connecting-rods E' and cranks F', and operate to fold the yarns, as shown in Fig. 2.

To the front of the frame A a guide-roll L' is applied, and within the said frame are other nip and guide rolls M' N', in front of which are guides O' for the yarns.

Engaging with the gear I is a gear P', supported on a bearing extended from the frame of the machine, and fixed to said gear so as to revolve therewith is a sprocket-wheel Q', which is connected by a chain belt R' to a series of sprocket-wheels S', fixed on the journals of rollers T', arranged within the drying-chamber U' of the machine. Rollers V', W', and X' are arranged in the upper part of drying-chamber and a series of rollers Y' in the lower part of it, as shown in Fig. 2. Other sprocket-wheels *f* and *g* (see Fig. 1) are arranged with the belt R', as shown, to sup-

port it and keep it in engagement with the wheels S' .

Between the two series of rollers T' and Y' are arranged two series Z' and A^2 of bars, the said bars in each series being parallel to each other and extending lengthwise in a direction at right angles to the axes of the said rollers. These bars I term "separators." Furthermore, a series of deflectors B^2 are placed between the bars Z' and rollers T' , and another series of deflectors C^2 are arranged a short distance above the bars A^2 , (see Figs. 2 and 5,) said deflectors being disposed lengthwise in line with the axes of the said rollers. Each deflector is composed of two slats h and i , transversely inclined to each other, as shown, a space k being arranged between their top edges for the heated air in the chamber U' to flow through in its passage upward through the yarns, which also move through said spaces k in their passage through the drying chamber. The air on striking the inclined under surfaces of the slats h and i will pass in cross-currents against and through the yarns, this causing the air to do its work quickly and effectively. Other spaces k' are arranged between the bottom edges of the slats h and i , which are directly under the rollers T' , or are directly over the rollers Y' , for the air to circulate through.

A partition l extends across the drying-chamber, as shown, between which and the rear wall m of the machine is arranged a heater D^2 , the space n , between said partition and wall, communicating near its bottom at o with the lower part of the drying-chamber U' , a blower E^2 being arranged therein, as shown, to force the heated air from the said space n into the chamber U' and against a condenser F^2 supported therein over a trough p . (See Fig. 2.) The condenser is composed of a series of pipes communicating with each other, which are kept cool by a constant flow of cool water through them, and the moisture in the air as it comes in contact with the condenser will gather on the pipes, and the air on leaving the condenser will pass in a thoroughly dry state against the yarns. The journals of the shafts and rollers, except the nip-rolls $M' N'$ and $W X$ and the rolls $C' D'$, are represented as supported in bearings G^2 , constructed to swivel in vertical and horizontal planes, the boxes q , in which the said journals revolve, being sustained on pivots $r r$, screwed through the ends of the prongs of a fork s , said fork being provided with a journal t , supported in a socket u , having flanges v , slotted to receive screws w for confining it to the frame or to a bar fixed to the frame of the machine. The object of making the aforesaid bearings G^2 as described is to avoid friction resulting from springing of the shafts or warping of the rolls applied to said shafts, as in some cases wooden rolls are used, and were it not for the swivel-bearings for the shafts much grinding and wear to the journals and boxes would be the result. Said

bearings G^2 also permit of such adjustment as to admit of the continued use in the machine of a spring-shaft or a shaft with a spring-journal, and does away with the necessity of removing said shaft from its bearings to straighten it, which operation is a difficult one to do and often results in breakage of the shaft. When the said bearings are used to support shafts which when in operation will be subjected to an upward draft, as will the rolls Y' , (see Figs. 1 and 2,) or when said bearings are inverted, as they are shown in Fig. 1, to sustain the wheels f and $g g g$, I connect the fork s to its socket u by a bolt x , extended through the bar or the portion of the frame to which the socket u is fixed and screwed into the end of the journal t , as shown in Fig. 7; or I connect the fork to the socket, as shown in Fig. 9, in which the flange v is shown as chambered to form a shoulder v' , a washer v^2 being arranged in the chamber and against said shoulder, the bolt x passing loosely through the washer and being screwed into the journal t . In either case the fork will be prevented from being drawn out of its socket, but allowed to turn on its axis.

To the rollers or shafts in the machine, which will be subjected to no upward draft, no screw x is used to connect the fork s to its socket u . This permits of the ready removal of the said rollers or shafts from their bearings when occasion requires by lifting the journals t of the said forks s out of the sockets u .

The drawings represent the machine as adapted for drying two chains O^2 and P^2 of yarns simultaneously, said chains each being led over the guide-roll L' , (see Fig. 2,) next between guides O' and partially around and between the tension or nip rolls $M' N'$ and through the inlets $y y$ in the front z into the drying-chamber U' , they next passing partially about the roll V' therein, then upward between the separators 1 and 2 of the upper series Z' , (see Figs. 2 and 5,) next over the rolls W' and X' in the upper part of the chamber U' , next downward through a deflector of the upper series B^2 , (see Fig. 2,) next between the separators 1 and 2, before mentioned, also through a deflector of the lower series C^2 and between separators 1' and 2' of the lower series A^2 , next under the roll Y' nearest the partition l , and upward between the same separators in each series, as before, but through different deflectors in each series, and over the roll T' nearest the said partition l , and again downward, as indicated, this downward and upward course of the chains under the rolls Y' and over the rolls T' being repeated, as shown, said chains passing between separate deflectors in each series B^2 and C^2 each time they ascend and each time they descend, but are led between the same separators in each series Z' and A^2 until after they pass under the roll Y' , located next to the front Z , and upward between the separators 1' and 2'. Then they are led between

the separators 2 and 3 of the upper series Z', (see Fig. 5,) and next again upward over the rolls W' and X' and downward between the same deflectors, as before, but between the said separators 2 and 3 in the upper series Z' and the separators 2' and 3' in the lower series A', and after passing the second time under the roll Y' nearest the front Z and up between the said separators 2' and 3', they are next led between the separators 3 and 4 of the upper series Z', and again over the rolls W' and X', and so on, each chain being represented as passing through the machine and about the rolls W', X', Y', and T' seven times, and finally being led out of the drying-chamber U' through the outlets a' a', (see Figs. 2, 3, and 5,) from which they pass under and partially about the roller L and between it and the roller M, and from thence are led upward between guides b' to spread the chains farther apart, (see Fig. 3,) thence over the roll X and between it and the roll W and downward between the rolls C' and D' and farther downward into separate tubs, in which they are laid in folds by the folding mechanism, operated as herein before described, one of said tubs being shown at c' in Fig. 2.

From the foregoing it will be seen that by arranging the chains of yarns on the rollers within the closed drying-chamber U', motion being imparted to the said chains by the rolls T' and the intervening mechanism connecting them to the main shaft, as represented, and the air within said chamber, which is maintained at a high temperature, being impelled by the blower against the deflectors disposed with relation to the ascending and descending portions of said chains, as shown and described, the heated air impinging upon said deflectors will be caused to pass against and through the yarns in currents moving in opposite directions and crossing each other, which will greatly facilitate the drying of the yarns.

Yarns dried as hereinbefore explained are not liable to injury, as they are when dried through contact with the surfaces of heated rolls as heretofore.

What therefore I claim is—

1. The drying-machine, substantially as described, it consisting of the main shaft F, the pinion H, fixed thereto, the gear I, engaging the said pinion, the nip-rolls L M, the former fixed to the shaft of the gear I, the gear P', engaging the said gear I, the sprocket-wheel Q', fixed to the gear P', the chain belt R', sprocket-wheels S', series of rolls T', to the shafts of which the sprocket-wheels S' are fixed, the series of rolls Y', rolls V', W', and X', the adjustable bearings supporting the shafts and rolls, the closed drying-chamber U', having the partition l and the inlets y and outlets a', the deflectors and separators arranged in said chamber, as shown, in combination with the heater D², the blower E², and the condenser F², all arranged and to operate essentially as set forth.

2. In a drying-machine, the combination of the series of rolls T' and Y', the series of deflectors B² and C², and the drying-chamber, said deflectors being arranged with relation to the said rolls, as represented, the heated air impinging the deflectors being caused to pass in cross-currents against and through the chains of yarns as they move through the narrow space between said deflectors, as explained.

3. In a drying-machine, one or more series of deflectors and one or more series of separators, in combination with the drying-chamber and the several series of rolls for supporting in the drying-chamber one or more chains of yarns, said deflectors and separators being arranged in the drying-chamber and with relation to the rolls essentially as set forth and represented.

4. In a drying-machine, the combination, with the main shaft F, the pinion H, the gear I, and nip-rolls L M, of the pulley P, fixed to the shaft of the roll L, the shaft S, provided with the pulleys Q T U, the shaft G', having the pulley H', the bands R and I', the nip-rolls W and X, the band e, connecting the shaft S and roll W, the folder-arms B', pivoted on the journals of the roll W, and the rolls C' D', supported by said arms, the connecting-rods E', joining said arms B' and the cranks F', the said cranks fixed to the shaft G', all being supported and arranged as shown, and operating to fold the yarns as they are drawn from the drying-chamber, as explained.

5. The drying-machine, substantially as described, it consisting of the main shaft F, the pinion H, fixed thereto, the gear I, engaging the said pinion, the nip-rolls L M, the former fixed to the shaft of the gear I, the gear P', engaging the said gear I, the sprocket-wheel Q', fixed to the gear P', the chain belt R', sprocket-wheels S', series of rolls T', to the shafts of which the sprocket-wheels S' are fixed, the series of rolls Y', the rolls V', W', and X', the adjustable bearings supporting the shafts and rolls, the closed drying-chamber U', having the partition l, and the inlets y and outlets a', the deflectors, and separators arranged in said chamber, as represented, in combination with a heater D² and a blower E², all arranged and to operate substantially as explained.

6. In combination with the journals of the rolls and shafts of a drying-machine, the adjustable bearing G², consisting of the slotted flange v, the socket u, projecting therefrom, the fork s, pivoted in said socket, the pivots r r in the prongs of said fork, the box q, sustained by said pivots and adapted to swing in a plane at right angles to the axis of said fork, and the screw x, connecting the fork to the socket, the shoulder v', and washer v², as and for the purpose explained.

7. The adjustable bearing G², substantially as described, consisting of the slotted and chambered flange v, the socket u, projecting

therefrom, the fork *s*, supported in and adapted to turn in said socket, the adjustable pivots *r r* in the prongs of said fork, the box *q*, sustained by said pivots and adapted to swing
5 in planes at right angles to the axis of the fork, the screw *x*, connecting the fork to the socket, and the washer *v*², as and for the purpose explained.

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

BRADFORD STETSON.

Witnesses:

S. N. PIPER,
STEPHEN W. HARMON.