

No. 681,229.

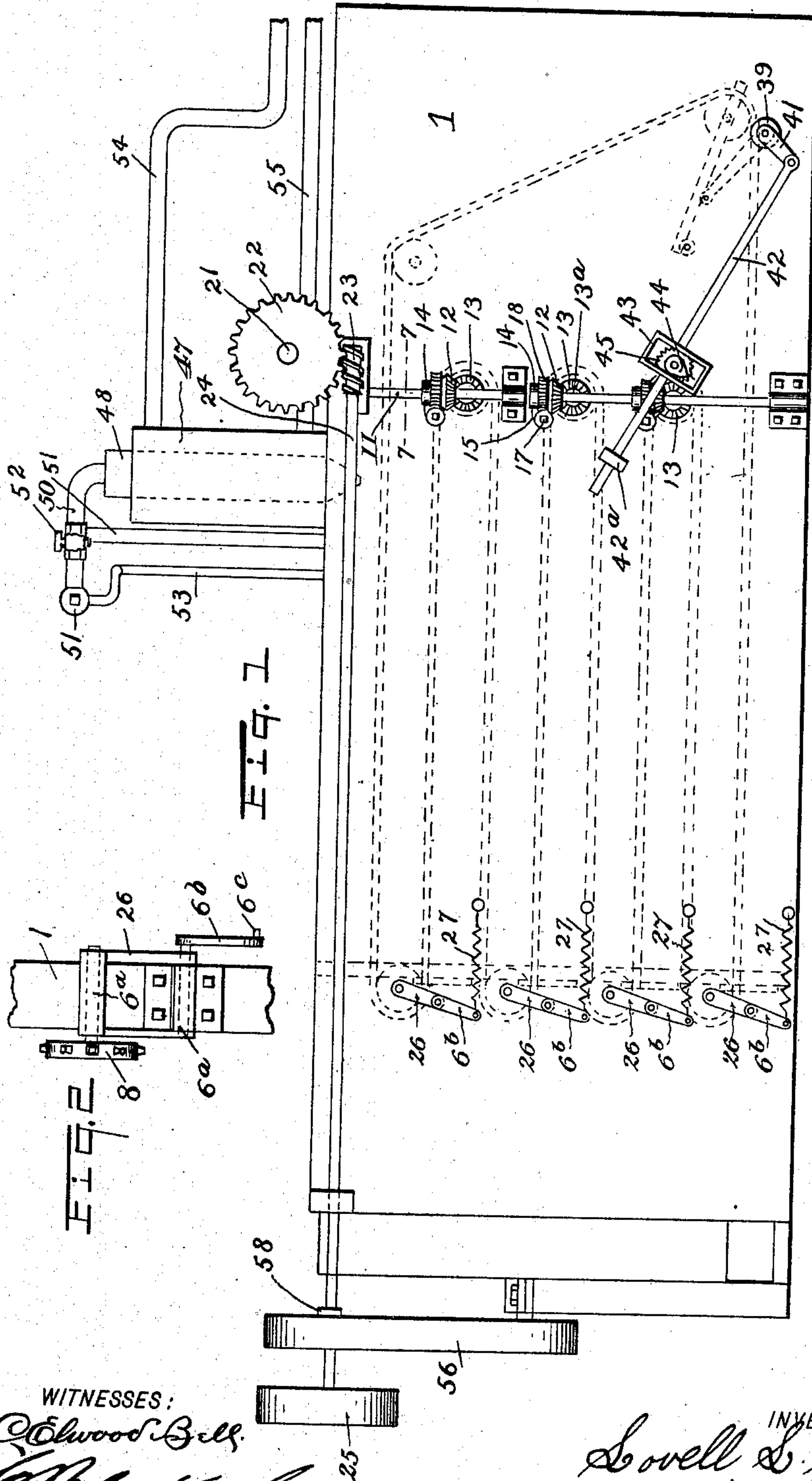
Patented Aug. 27, 1901.

L. L. KELSEY.
APPARATUS FOR MAKING GLUE.

(Application filed Apr. 25, 1900.)

(No Model.)

4 Sheets—Sheet 1.



WITNESSES:

Edwood Bell
Blakeslee

INVENTOR

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No. 681,229.

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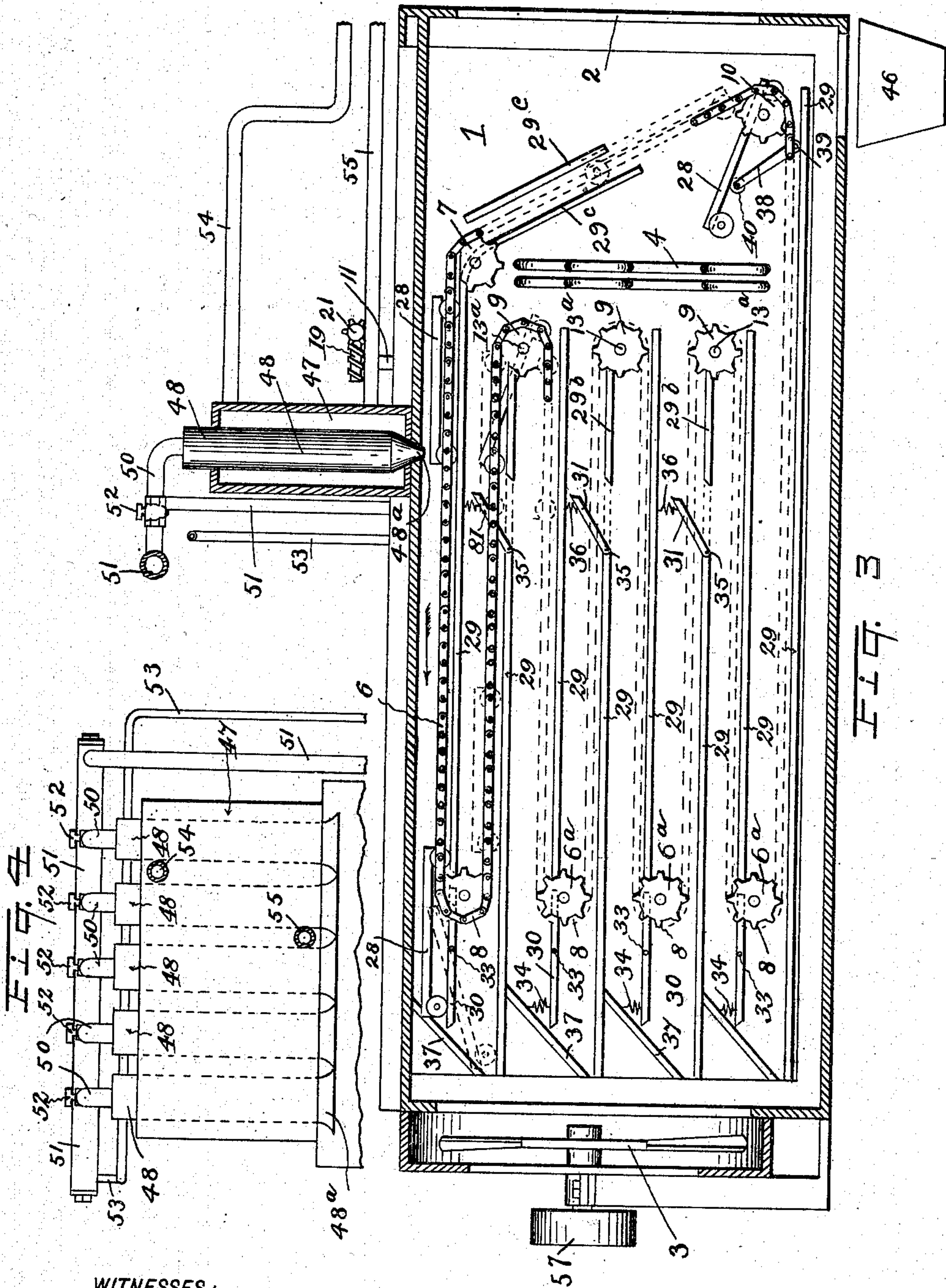
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(No Model.)

4 Sheets—Sheet 2.



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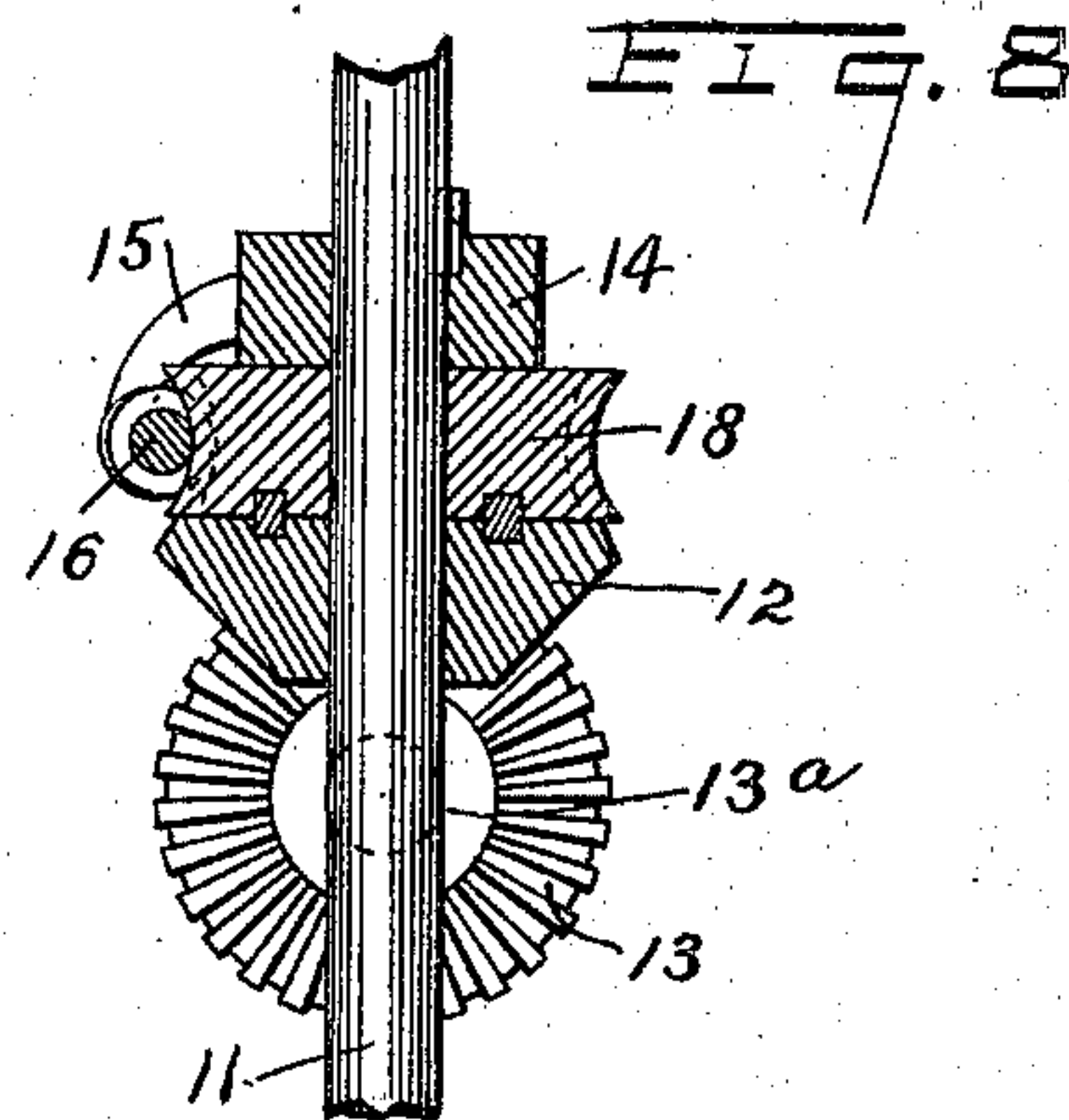
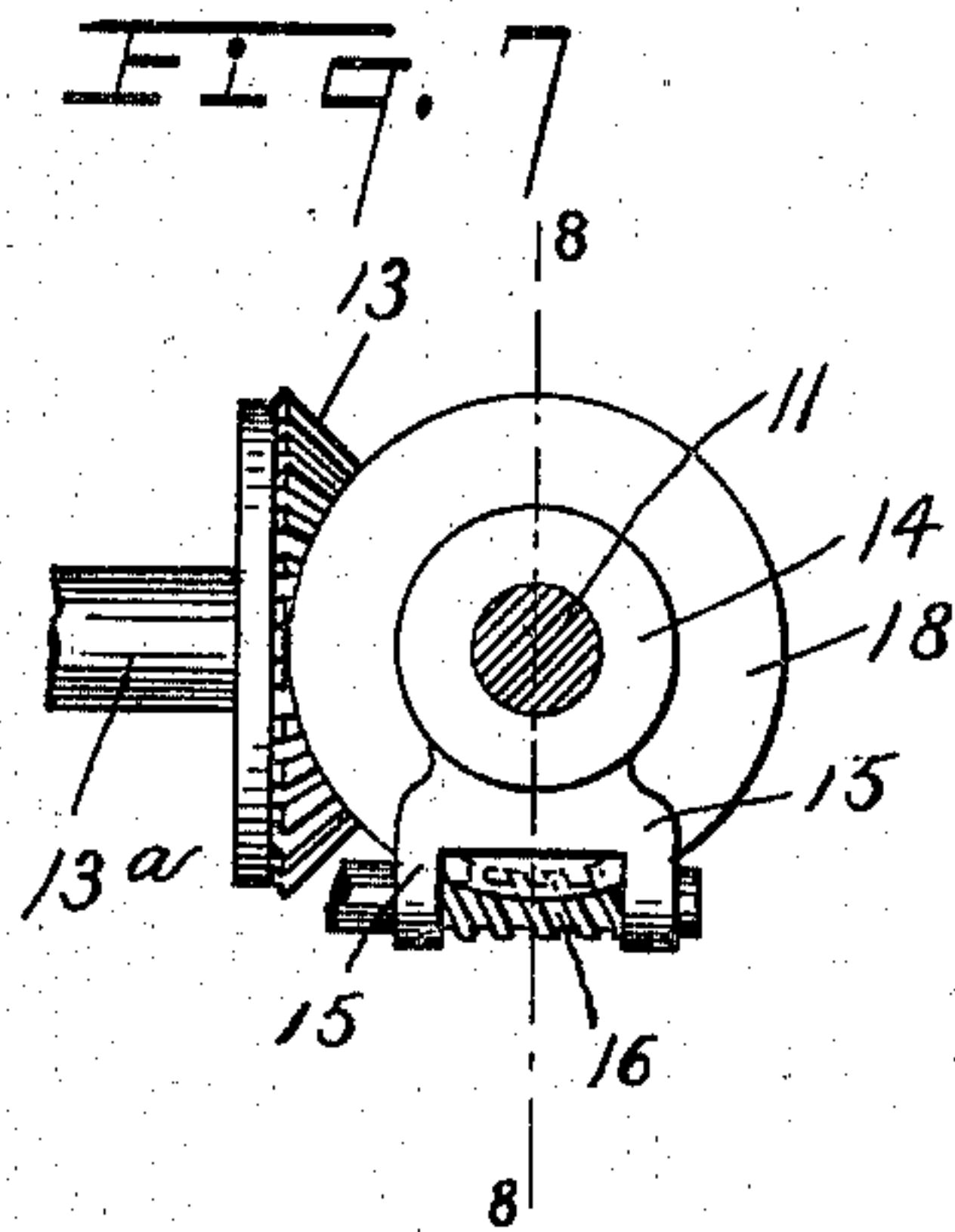
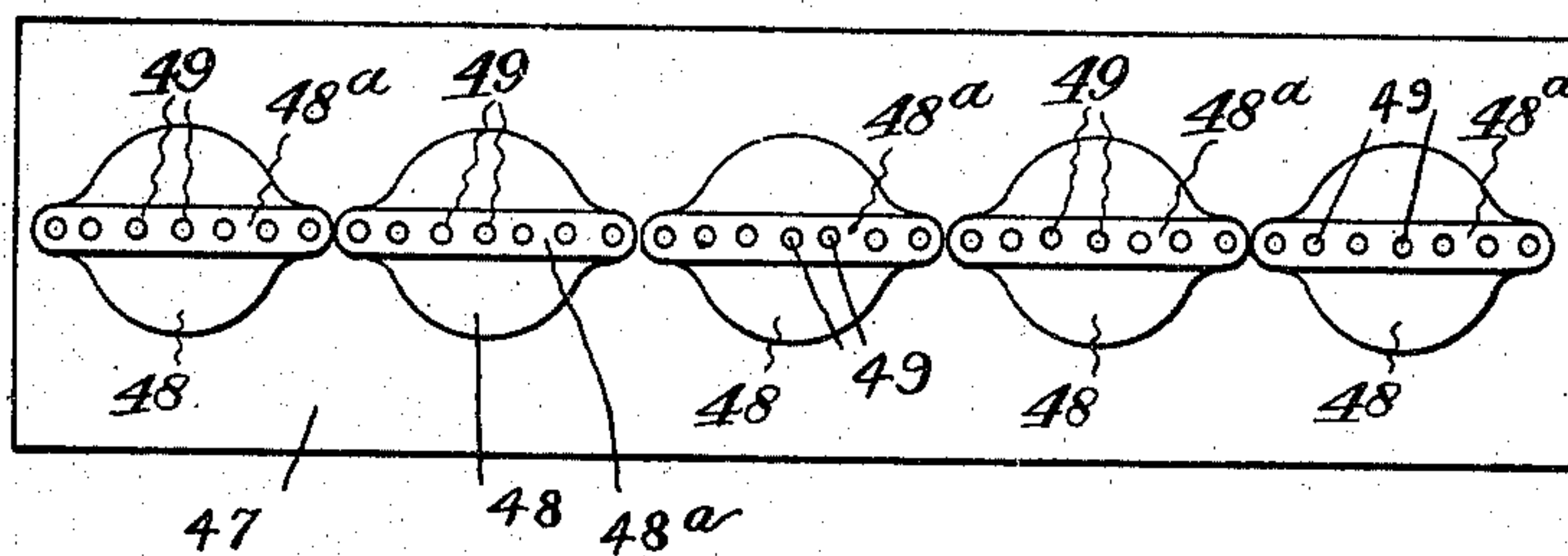


FIG. 9



WITNESSES:

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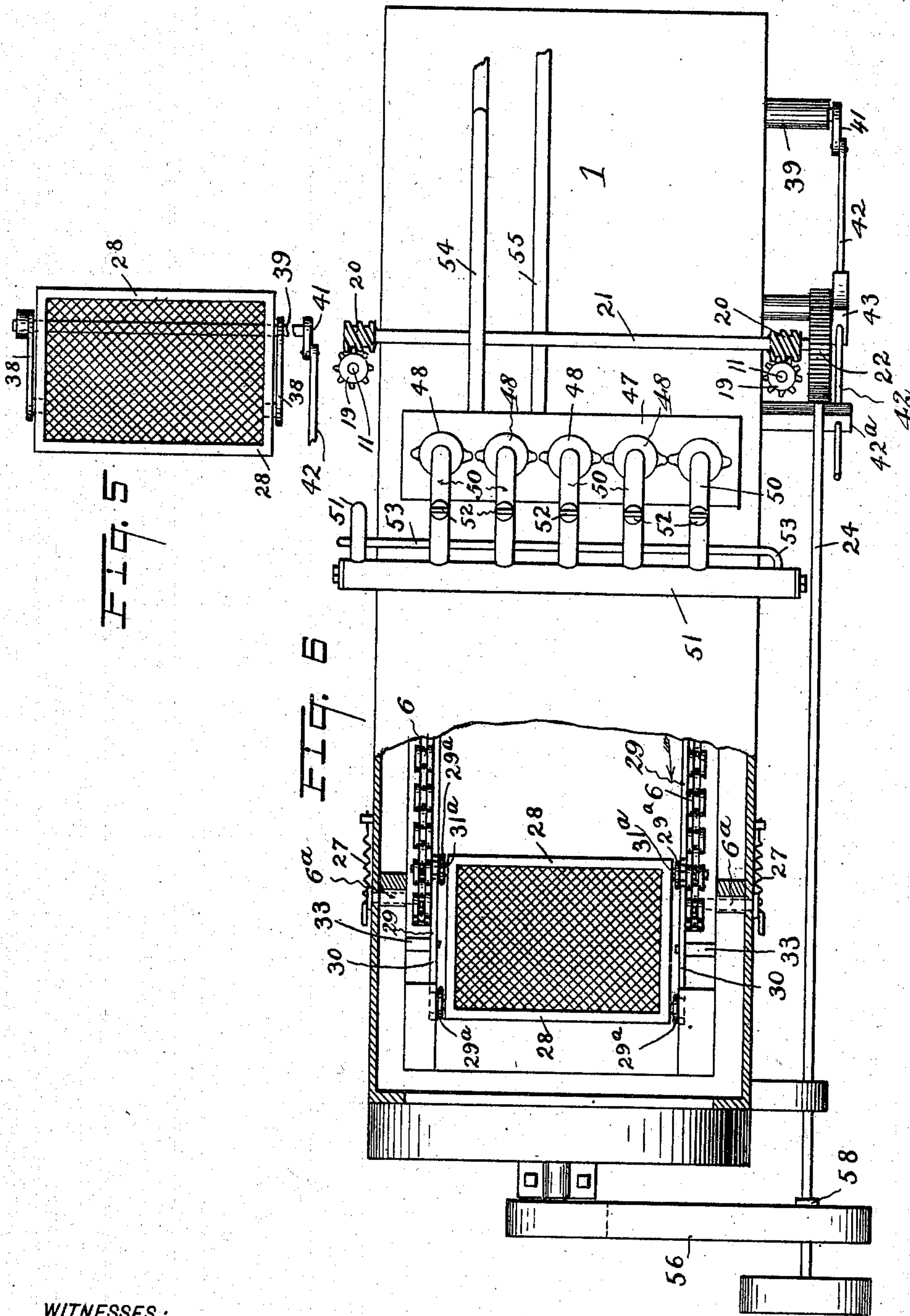
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(Application filed Apr. 25, 1900.)

(No Model.)

4 Sheets—Sheet 4.



WITNESSES:

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UNITED STATES PATENT OFFICE.

LOVELL L. KELSEY, OF GUILFORD, CONNECTICUT, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO FEDERAL GLUE COMPANY, OF JERSEY CITY, NEW JERSEY.

APPARATUS FOR MAKING GLUE.

SPECIFICATION forming part of Letters Patent No. 681,229, dated August 27, 1901.

Application filed April 25, 1900. Serial No. 14,205. (No model.)

To all whom it may concern:

Be it known that I, LOVELL L. KELSEY, a resident of Guilford, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Apparatus for the Manufacture of Glue, of which the following is a full, clear, and exact description, such as will, when taken in connection with the accompanying drawings, which form a part thereof, enable those skilled in the art to which the invention pertains to make and use the same.

My invention consists in the construction and arrangement of parts hereinafter described.

In the accompanying drawings, which form part of this specification, and in which like reference characters denote like parts in the several views, Figure 1 represents a side elevation of an apparatus embodying my invention; Fig. 2, an end elevation of a portion thereof upon an enlarged scale; Fig. 3, a longitudinal sectional elevation of the apparatus, part thereof being shown in full lines; Fig. 4, an end view, partly in section, of a part thereof; Fig. 5, a plan view of a further part thereof upon an enlarged scale; Fig. 6, a plan view of the apparatus, partly broken away and in section; Fig. 7, a detailed horizontal section on line 7 7 of Fig. 1, showing a regulating mechanism which forms part of my invention; Fig. 8, a vertical section on line 8 8 of Fig. 7, and Fig. 9 a bottom plan view of the discharge portion of the feeding mechanism.

My invention relates to the manufacture of glue or other gelatinous substances or compounds, and has for its object to provide an apparatus whereby time, labor, and extent of plant may be economized and whereby the resultant article of manufacture is much improved in its commercial and industrial aspects, all with relation to the present state of the art.

The present invention comprises two sections, which combine to reduce the liquid stock to permanent marketable form. The first section consists of feeding and treating elements and agencies whereby the stock is

transformed into semiliquid or jelly-like attenuated strips, rods, or lengths, and the second section consists of carrying and treating agencies, which receive the attenuated strips, rods, or lengths and discharge them in hard, solid, dry, and permanent form ready for use. The subject-matter of the second section, *per se*, constitutes the subject of a separate application, Serial No. 34,525, filed by me in the United States Patent Office October 26, 1900.

It is well known that glue and similar substances or compounds in the transformation therefrom the liquid or soft to the solid or hard form solidify from the edges of the mass inwardly and that this solidifying requires in the present state of the art an extended subjection to normal or effectually-altered atmospheric conditions, necessitating in a plant of any considerable size an extensive drying-department and careful attention. These requirements of the present methods involve expense and outlay in a variety of respects and are approximately obviated by the present invention. The principle of the present invention involves the relatively minute subdivision of a mass of liquid glue-stock into portions, which, due to certain agencies, preferably low thermal conditions, are reduced to jelly-like or semimobile attenuated rods, pencils, or lengths, which are finally dried and hardened. This minute subdivision of the mass of the stock increases the surface area thereof, with the result that the drying or hardening process is greatly shortened. The resultant article of manufacture is manifestly more easily reducible to liquid or molten glue than is hard glue in sheets or blocks of greater mass, and is hence an improvement commercially and industrially.

In a preferred form of the apparatus constituting the present invention the finished glue is caused to assume a pencil-like and preferably approximately cylindrical form, which prevents "caking" or massing of the glue when melting the same for use, as interestices are formed between the separate pieces or lengths of glue through which the heat and heated solvent readily circulate.

A further feature of my invention consists in a feeding device by which the glue is reduced to proper consistency and automatically fed to the drying and hardening agencies in strips or lengths of substantially uniform diameter in cross-section, so that the drying of the glue may be more readily effected and the necessity for subsequent pulverizing for melting obviated.

The present application aims to cover a preferred form of apparatus for the purposes hereinabove briefly enumerated.

In another application filed simultaneously herewith for patent for improvements in the manufacture of glue, Serial No. 14,206, I have described and claimed separately the process of reducing the liquid glue to attenuated semimobile form and finally dry-finishing the same, which is accomplished by the apparatus herein described, and also claimed the improved product which results therefrom.

Referring more particularly to the drawings, I have shown at 1 a casing having at one end a duly-proportioned air-inlet opening 2, and preferably provided at its other end with any suitable exhaust-fan 3, assuring air-circulation through the casing to draw off moisture, fumes, or volatile matters arising within the casing. The air-current is maintained at proper low temperature—approximately 40° Fahrenheit—and is given the desired dryness by the precipitation of the moisture as dew or frost by means of suitable refrigerating appliances within the casing adjacent to the air-inlet 2—such, for instance, as one or more ammonia-circulating coils, (indicated at 4 in Fig. 3 of the drawings.)

As herein shown, the net-carrier whereby the drying glue is moved to and fro throughout the casing 1 comprises two endless link belts 6 6, arranged one at each side of the casing and running over suitable sprocket-wheels, which guide the carrier mainly in a to-and-fro course. Beginning at a predetermined point the belts 6 run over wheels 7 and thence forward to the upper wheels of two series of vertically-arranged wheels 8 at or near the other end of the casing, around which they pass backward to the upper wheels of two series of vertically-arranged wheels 9 in the opposite part of the casing, thence forward again to the next lower wheels of series 8, backward to the next lower wheels of series 9, thence forward to the next lower wheels of series 8, &c., until from the bottom wheels of series 8 the belts travel to wheels 10, whence they pass upward and, preferably, at an incline to the wheels 7. The series of wheels 9 are driving-wheels for the endless belts 6, and the series of wheels 8 and wheels 7 and 10 are idlers which merely support and guide the belts.

At each side of the casing is journaled a vertical shaft 11, carrying miter or bevel gears 12, engaging miter or bevel gears 13 on the shafts 13^a of the carrier-belt wheels or sprockets 9, which are stub-shafts journaled in the

sides of the casing 1. The bevel-gears 12 are not fixed to the shafts 11, but are loosely mounted thereon, so that, if desired, they may be adjusted on the shafts 11. Above the gears 12 and on the shafts 11 are rigidly secured or keyed collars 14, with laterally-depending arms 15, forming bearings for worms 16, which may be rotated in their bearings by means of squared or angular projecting ends 17. The worms 16 mesh with worm-wheels 18, loosely mounted on the shafts 11 above the bevel-gears 12, the worm-wheel 18 being rigidly connected or formed integral with the bevel-gears 12. The rotation about the shafts 11 of the lateral arms 15, carrying the worms 16, will rotate the worm-wheels 18 and gears 12, with the shafts, while the turning of the worms 16 will rotate the gears 12 independently of the shafts, if desired. If there is any undue slackness of a part of one of the link belts 6 between two adjacent driving-sprockets 9 relative to the remainder of the chains, it may be overcome by the rotation of one of the worms 16 and through it of its associated bevel-gears 12, which will slightly change the relation of the particular driving-sprocket 9 to the remainder of the series thereof. Similarly the two link belts 6 may be relatively adjusted to bring two predetermined points thereof into step. The two vertical shafts 11 have upper worm-gears 19 19, engaged by worms 20 20 on a transverse shaft 21, carrying a gear-wheel 22, engaged by a worm 23 on a main shaft 24, rotated by a belt running to its pulley 25 from any source of power. To prevent undue slackness of the endless link belts 6, the idler-sprockets of the series 8 at both sides of the casing are journaled each in individually-swinging yoke-levers 26, fulcrumed to the casing at 6^a, and having arms 6^b, to which are attached at 6^c suitable springs 27, normally throwing the sprockets 8 forward against the bight of the belts 6, thereby keeping the entire belts normally tight under all conditions of use. This construction is shown in detail in Fig. 2.

The above-named driving-gearing is proportioned to give a slow uniform travel to both link belts 6 6 within the casing. The disposal of the carrier in a to-and-fro course over the wheels 7 to 10 affords a very large path of travel through a comparatively small casing 1 for the glue-carrying nets 28, which are operated by the belts 6, as immediately hereinafter described.

The nets 28 may have any approved open-bottomed or foraminous construction and are preferably provided with two pairs of wheels 28^a, running on tracks 29 with their pivoted switches 30 31, and which tracks range along the sides of the casing 1. Each net is pivoted at or near one edge, preferably by the axles 31^a of one pair of its wheels to the opposite link belts 6 6, and the tracks and their switches are arranged in parallel planes beneath the belts, allowing the nets to oscillate through the open switches in taking succes-

sively-lower planes or levels in the casing 1. As shown, the switches 30 are pivoted at 33 to the casing, and springs 34 hold them closed and in alinement with the tracks 29. The switches 31 are pivoted at 35, and springs 36 hold them inclined and normally opened or away from the ends or detached portions 29^b of the tracks 29. The belts move in the direction denoted by the arrows adjacent thereto, and as each net 28 passes under the glue-feeding device 48 it receives a load of glue, and the slowly-traveling link belts 6, by their pivotal connections with the net, advance until the forward part of the net runs upon the upper switches 30 and strikes inclined guides 37, preferably provided in the casing. These guides cause the forward ends of the net to positively lower one end of the switch 30, and I provide openings at the other ends between the switches and tracks, so that when the rear end of the net, with the net-pivot 31^a, reaches its farthest forward position the rear net-wheels or pivots slip through the openings at the rear of the switches, and the net then takes the next lower tracks 29. Upon the release of the switches the openings are closed by the springs 34 operating upon the switches. The net is now actuated backward on the lower tracks 29 and strikes and downwardly closes the switches 31 therein against the tension of springs 36, which automatically open them again as the net passes by and about at the time the net-pivots 31^a have reached their extreme limit of backward movement around the upper drive-wheels 9. As the pivots and rear end of the net are lowered to the next tracks 29, about the ends of the last-said tracks 29 and carried forward again by travel of the belts, the free or forward end of the net passes through the openings in the tracks provided by the raised switches 31, and the net is now pushed forward again and upon the lower tracks 29, and so on until the net passes upon the lowermost track 29, along which it runs until its pivots 32 are about to pass the idler-wheels 10. By this time the glue on the net has been thoroughly dried by its long slow travel through the regulated temperature of the casing and is ready for discharge from the net. The guides 37 are not essential, as the nets by their gravity alone may open the switches 30 to reach the next lower tracks 29, and as the inclination of the net while descending from one part of the track 29 to the next lower is slight the glue will remain in place on the nets.

The discharge of the glue from the net is affected automatically, and as herein shown is accomplished by a pair of arms 38, fixed to a rock-shaft 39 and preferably having anti-friction-rollers 40 acting beneath opposite side parts of the net. The shaft 39 has a rigid arm 41 coupled to a rod 42, guided in suitable bearings 42^a on the casing 1 and having a yoke 43, on which acts a cam 44, fixed to a shaft carrying a gear 45, driven by one of the gear-wheels 13. When the shaft 39 is

rocked at proper time by this mechanism, the net 28 is swung upwardly at its free rear part, which is held up long enough to cause the now rising link belts 6 to advance the net upon inclined parts 29^c of the tracks over which the belts carry the net until it passes the idlers 7 and again takes its first-named position under the feeding devices to receive its next load of glue. It will be understood that during the upward tilting of the net by the arms 38 and its travel upon the tracks 29^c the glue which has been dry-finished is discharged by gravity from the net and falls into a receptacle 46. Any suitable agencies (not shown)—such as agitators, beaters, or strippers—may be used to facilitate this discharge. I prefer to make the inclined tracks 29^c as steep as possible to assure gravity-discharge of the glue, while avoiding backward tilting of the nets. In practice the nets will as closely as possible follow each other, and the endless link-belt carrier may have any desired number of driving and idler wheels.

I shall now treat of the subject-matter proper of the present invention.

A box or jacket 47 is mounted on the chamber or casing 1, in which are a series of hollow vessels 48, vertically disposed in juxtaposition across the top of the chamber or casing 1. The vessels 48 project beneath the jacket 47 into the interior of the casing, and the lower ends of 48^a are flared laterally in one direction while contracted in the other, and in the long narrow bottoms thus formed, Fig. 9, are a series of small perforations 49. (Clearly shown in Fig. 9.) The vessels 48 are otherwise entirely inclosed, except where at the top enter individual feed-pipes 50, connected to a main feed-pipe 51, receiving liquid glue from a suitable pump. (Not shown.) The individual feed-pipes 50 are provided with regulating-valves 52, while from the end of the main feed-pipe 51 extends an overflow-pipe 53, carrying the overflow of liquid glue to the vat or other receptacle from which it is pumped. The jacket 47 may be charged with necessary refrigerating agencies (received through the supply-pipe 54 and removed through the discharge-pipe 55) to surround the vessels 48 and properly induce the desired consistency of the glue or other substance under treatment therein.

The exhaust-fan or blower 3 is operated by a belt 56, leading from its pulley 57 to a pulley 58 on the main driving-shaft 24 of the apparatus.

By my invention the fluid glue-stock is forced in fluid mobile form and customarily heated into the feed vessels 48, and therein is brought to a predetermined consistency by influence of a cooling mixture within the jacket 47 and fed by the force of the fresh glue being supplied by a force-pump out through the apertures 49 in the form of long narrow attenuated pencil-like strips or lengths directly onto the nets 28. The glue in the form of strips is of sufficient consistency

to retain its form without running, and is therefore quickly dried on the nets, which are moved slowly through a long course and an atmosphere of regulated temperature (and humidity) by the carrier and are then tilted to discharge the finished or properly-dried glue. The entire operation is continuous and automatic, requires very little labor of attendants, and dispenses with the tedious stacking of loaded nets in a drying-alley, and the apparatus occupies comparatively little room. Furthermore, the finished glue is a commercially superior article in point of quality, as it is entirely free from moisture and has uniform density, and being in strip or pencil form can be most easily dissolved, as initially stated, without the necessity of previous pulverizing.

The refrigerating or cooling elements serve to precipitate the moisture in the drying glue, in the form of dew or frost, and the cross-section of each of the strips, pencils, or lengths of glue is so small that an extremely-speedy drying or hardening thereof results.

By means of the apparatus above described it is possible to manufacture glue in a marketable form in all seasons of the year and in all climes and zones.

I do not limit myself to the specific form and arrangement of parts herein specified, as it is manifest that I may considerably vary and modify the same in adapting my invention to different conditions of use without departing from the spirit of my invention and the terms of the following claims. It is also manifest that the disclosed apparatus for drying and "hardening" the formed glue, while preferable, may still be widely varied from in carrying out my invention.

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

1. An apparatus of the class described, comprising a holder into which the stock is introduced in liquid form, means for reducing the stock in the holder to jelly-like or semi-mobile consistency and without previous independent "jellying" of the stock, said stock being discharged from said holder by the pressure of the incoming stock, and means for minutely subdividing the stock issuing from the holder into permanent form, substantially as and for the purpose set forth.

2. An apparatus of the class described, embodying a vessel provided with a plurally-apertured outlet, means for feeding stock to said vessel in fluid form and simultaneously forcing the same through said apertured outlet, and means for reducing the stock to proper consistency while in the vessel and without previous independent jellying of the stock; the stock being discharged from said vessel in minutely-subdivided and permanent form.

3. An apparatus of the class described, comprising a vessel provided with a plurally-apertured outlet, means for keeping the stock at proper consistency while in the vessel and

without previous independent "jellying" of the stock, and means for feeding the stock to said vessel in fluid form and simultaneously forcing the same through said apertured outlet.

4. In an apparatus of the class described, a jacket, means for maintaining a predetermined temperature therein, an apertured holder arranged within said jacket, and means for feeding liquid stock to said holder under pressure whereby the stock issues from said holder in permanent subdivided form and of jelly-like consistency.

5. In an apparatus of the class described, a holder provided with an inlet-end portion and a transversely-contracted and laterally-flared outlet-end portion having a plurality of perforations formed therein, and means for passing a mass of stock through said holder whereby the stock issues from said holder in strips or pencils of jelly-like consistency.

6. In an apparatus of the class described, a holder provided with an inlet-end portion and a transversely-contracted and laterally-flared exit-end portion having a plurality of perforations formed therein, and means for passing a mass of glue-stock therethrough whereby said glue-stock issues from said holder in strips or pencils of jelly-like consistency, substantially as described.

7. An apparatus of the class described, comprising a vessel provided with a plurally-apertured outlet, means for feeding glue-stock to said vessel and simultaneously forcing the same through said apertured outlet, and means for altering the consistency of the glue-stock during its passage through said vessel whereby it issues from said apertured outlet in permanent subdivided form.

8. In an apparatus of the class described, a holder provided with an inlet-end portion and a transversely-contracted and laterally-flared exit-end portion having a plurality of perforations formed therein, a jacket surrounding said holder, means for maintaining predetermined thermal conditions in said jacket, and means for passing a mass of liquid glue-stock through said holder, whereby said glue-stock issues from said holder in strips or pencils of jelly-like consistency, substantially as described.

9. An apparatus of the class described, comprising means for maintaining a continuous feed of the mobile stock, separator means through which the stock is fed and whereby the stock is minutely subdivided in mass, and means for altering the consistency of the stock during its passage through the separator means whereby the stock issues from the separator means in permanent subdivided form.

In witness whereof I have hereunto set my hand this 18th day of April, 1900.

LOVELL L. KELSEY.

Witnesses:

CORNELIUS BLAKESLEE,
MARTHA R. LOCKWOOD.