(No Model.) 4 Sheets—Sheet 1.

C. W. COOPER.

APPARATUS FOR FORMING GLUE INTO SHEETS.

No. 521,945. Patented June 26, 1894.

FIG. 1.

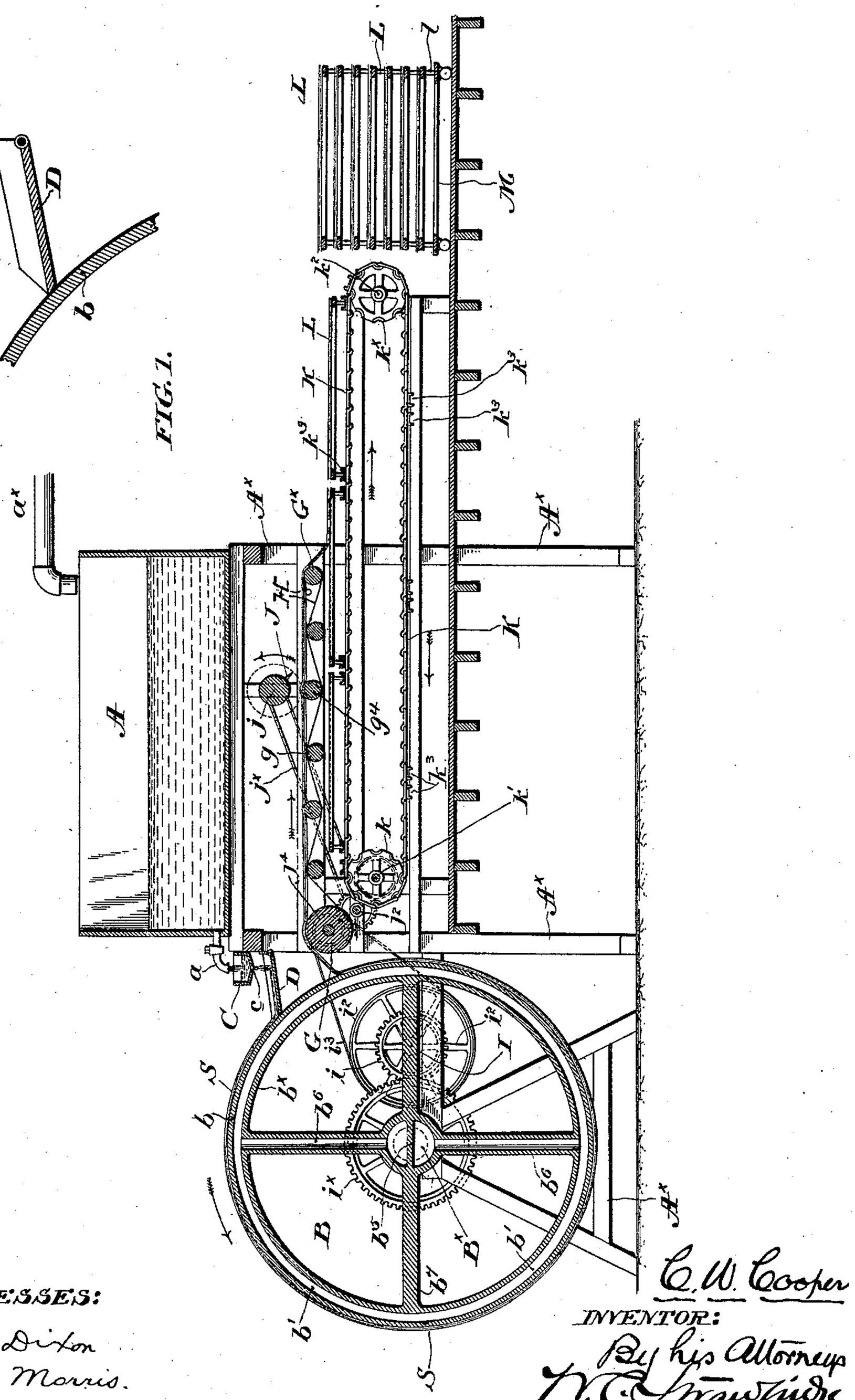

FIG. 2.

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C. W. COOPER.

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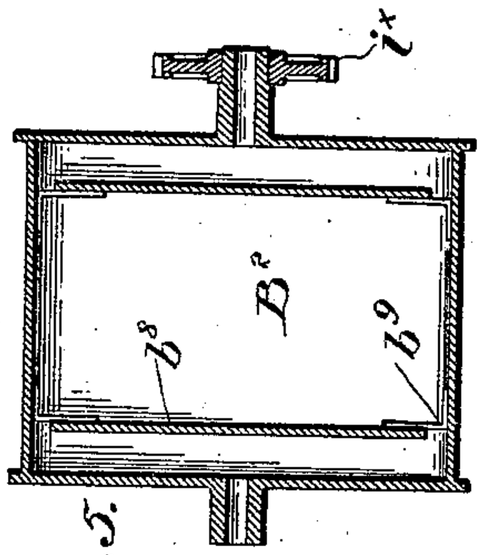

FIG. 5.

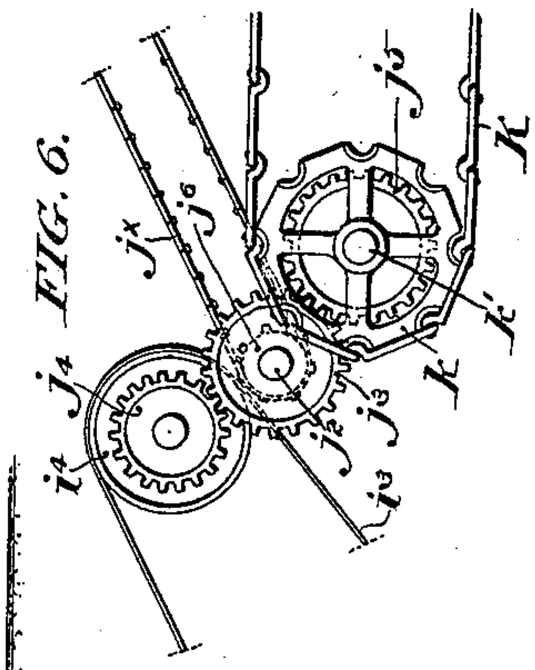

FIG. 6.

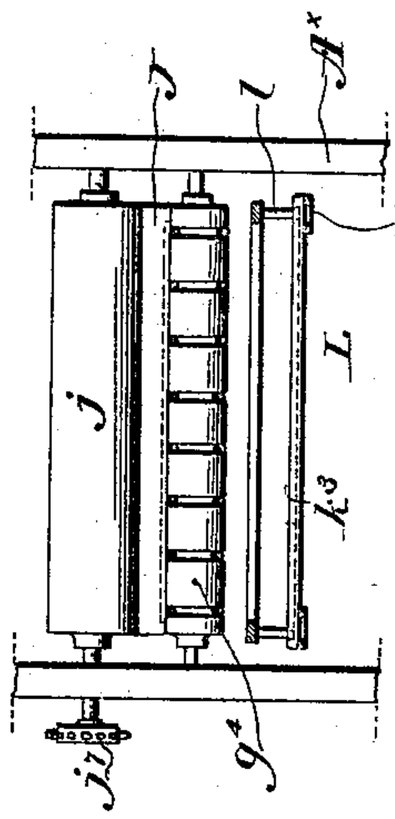

FIG. 4.

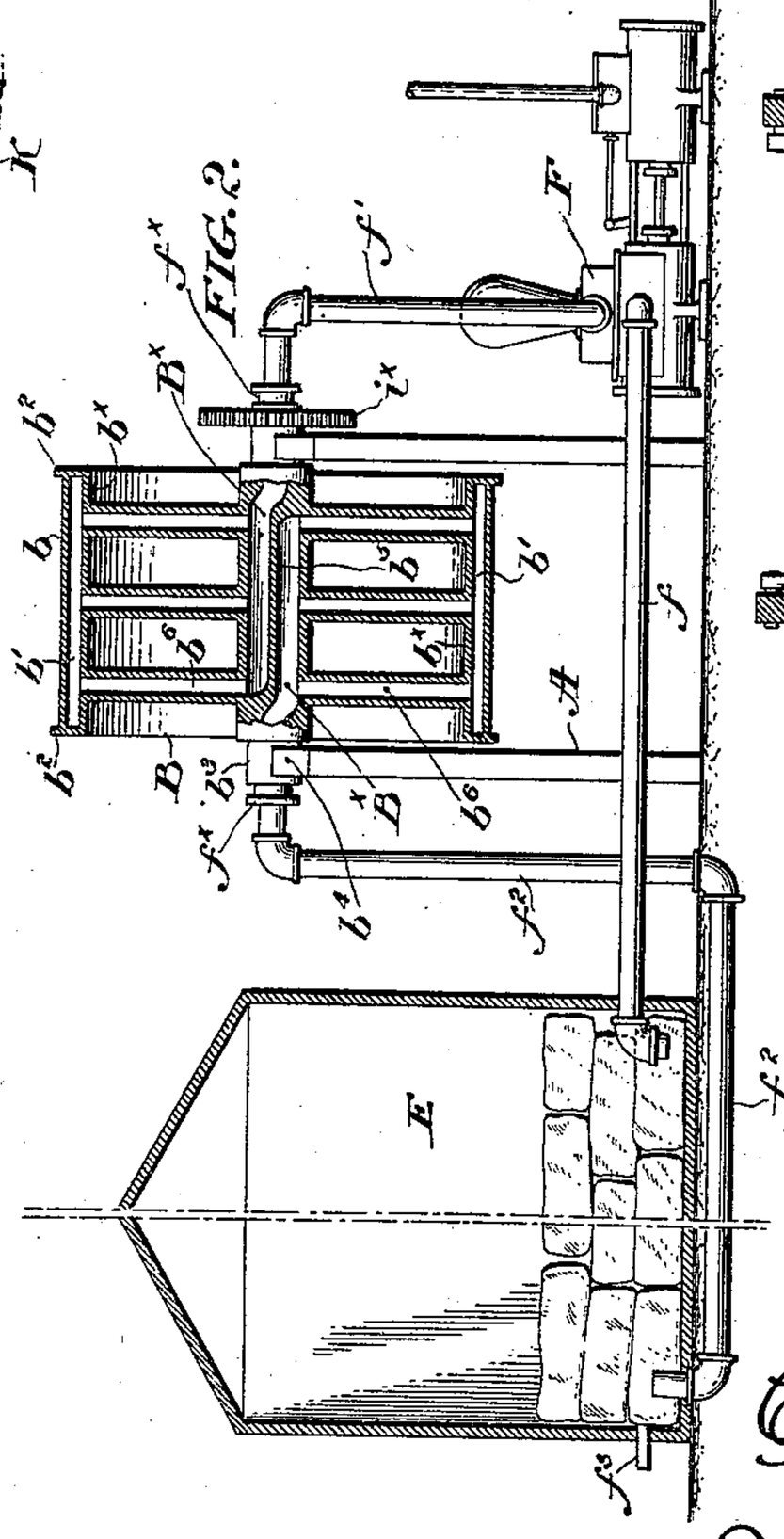

FIG. 2.

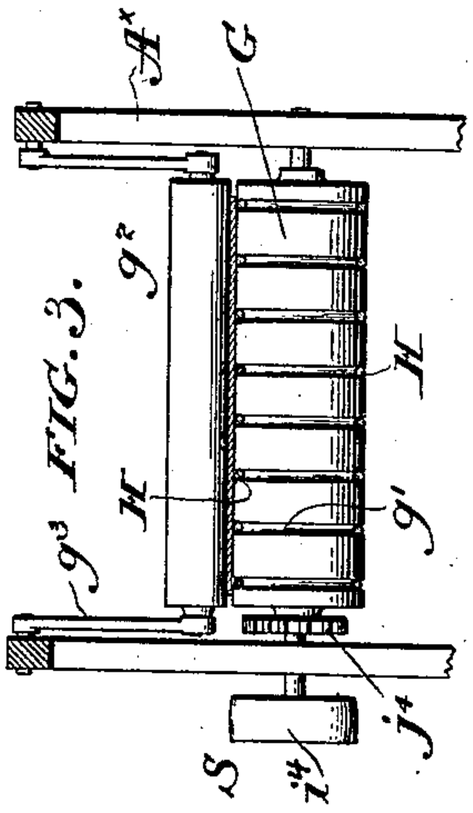

FIG. 3.

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APPARATUS FOR FORMING GLUE INTO SHEETS.

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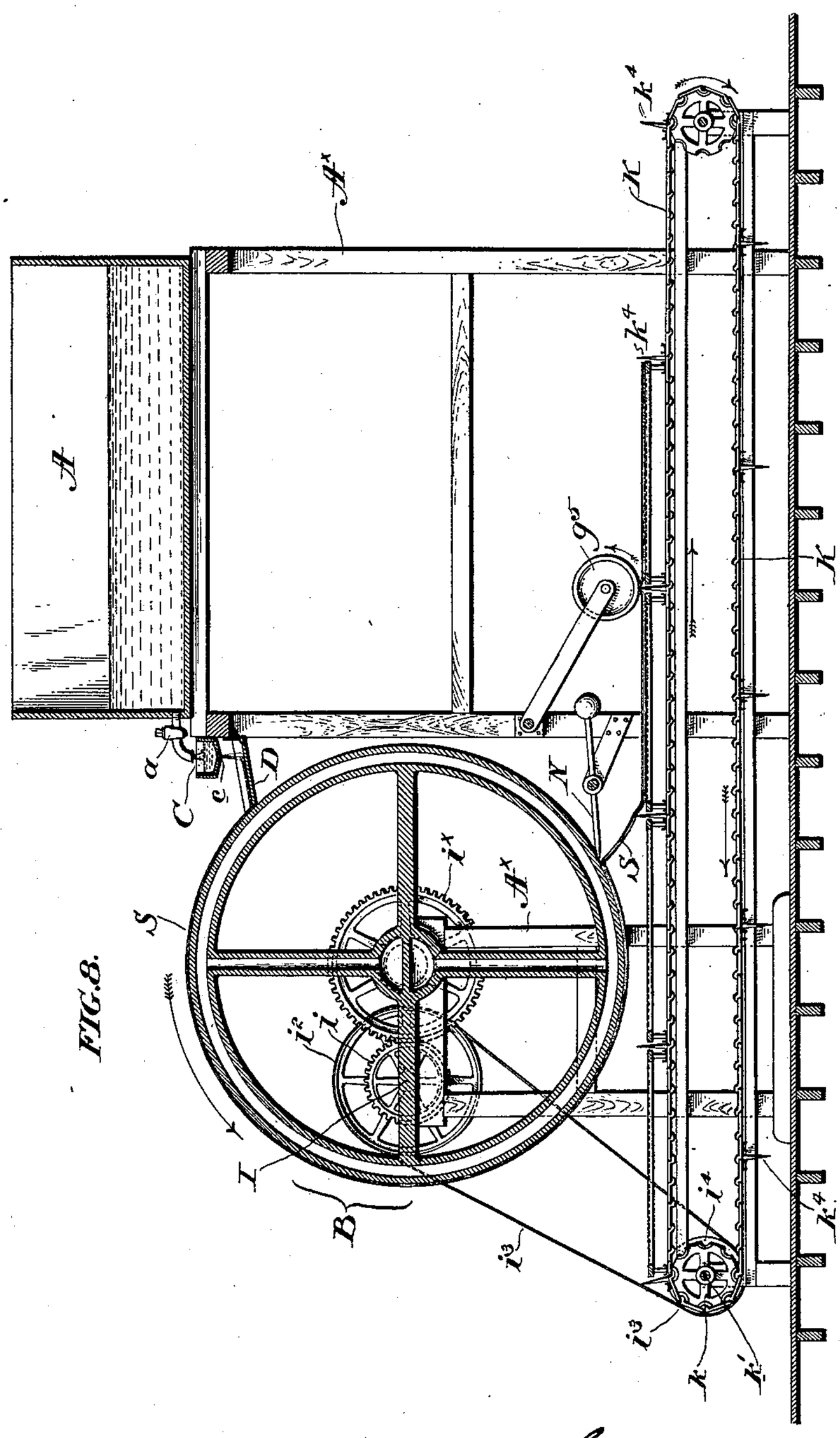

FIG. 8.

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C. W. COOPER.

APPARATUS FOR FORMING GLUE INTO SHEETS.

No. 521,945. Patented June 26, 1894.

FIG. 10.

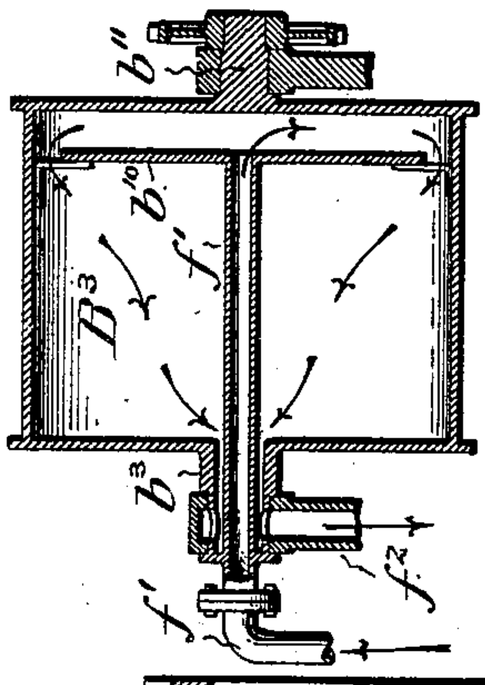
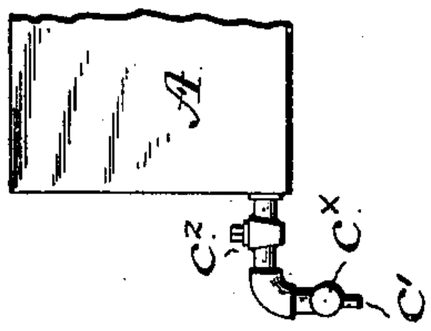


FIG. 9.

FIG. 11.

FIG. 12.



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UNITED STATES PATENT OFFICE.

CHARLES W. COOPER, OF NEW YORK, N. Y.

APPARATUS FOR FORMING GLUE INTO SHEETS.

SPECIFICATION forming part of Letters Patent No. 521,945, dated June 26, 1894.

Application filed June 15, 1891. Serial No. 396,291. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. COOPER, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in the Manufacture of Glue, of which the following is a specification.

My invention relates especially to operations connected with the formation of glue into sheets of jelly suitable for drying, and comprehends improvements in machinery for effecting such operations in an economical and efficient manner.

My invention comprehends improvements in the operation of forming glue into sheets of jelly for the purpose of being dried as heretofore conducted, and reduces the cost of manufacture between the periods of the rendering and the drying of the glue.

Machinery embodying my improvements is represented in the accompanying drawings and hereinafter described, the particular subject matter claimed as novel being hereinafter definitely specified.

In the drawings, Figure 1 is a central vertical longitudinal sectional side elevation through a preferred form of machine embodying my improvements. Fig. 2 is a central vertical transverse sectional elevation through the cooling cylinder shown in Fig. 1, and through an ice chamber employed in connection therewith,—an associated pump and pipe connection being shown in elevation. Fig. 3 is a fragmentary end elevational view of the driving drum and of the sheet carrying apron, the view being taken from the left hand end of Fig. 1. Fig. 4 is a similar view taken from the right hand end of said Fig. 1, of the knife shaft knife and knife drum, showing also in transverse section the endless net carrying chains and one of the nets. Fig. 5 is a transverse central vertical sectional elevation through a modified form of cooling cylinder. Fig. 6 is a fragmentary side elevational detail of a train of gearing which I find it convenient to employ for the actuation of the knife shaft the sheet carrying apron and the net carrying chains. Fig. 7 is a fragmentary side sectional detail to an enlarged scale of the inclined chute, and of a portion of the cooling cylinder. Fig. 8 is a central vertical longitudinal side sectional elevation through a modified form of apparatus embodying my improvements. Fig. 9 is a view similar to Fig. 8, through another modified form of apparatus likewise embodying my improvements. Fig. 10 is a transverse central vertical sectional elevation, through a modified form of cooling cylinder. Fig. 11 is an end elevational view of a modification of the trough employed in connection with the reservoir and adapted to supply liquid glue to the chute. Fig. 12 is a side elevational view of the same.

Similar letters of reference indicate corresponding parts.

Referring now first to the first seven figures of the drawings, A is a tank or reservoir provided with a suitable outlet faucet a, for containing liquid glue fed to it in any preferred manner, as, for instance, through the supply pipe $a^{\times}$. This tank is supported in any suitable manner, as, for instance, upon the frame work $A^{\times}$.

B is a cooling cylinder, preferably formed as a casting having a smoothly turned peripheral face. This cylinder is conveniently formed with two concentric cylindric webs, of which the outer, b, is the glue receiving and carrying surface, and the inner, $b^{\times}$, a web concentric with the outer web, and disposed sufficiently apart from it to occasion the formation between the webs of an annular cooling and circulating chamber b' laterally inclosed by radial flanges b^2 having peripheral extension from the inner to beyond the outer web so as to form edges to prevent the liquid glue applied to the surface of the outer web from escaping laterally from off it.

$B^{\times}$ is a hollow shaft formed as a part of the cooling cylinder, upon trunnions b^3 or extensions of which, the cylinder is mounted for rotation in suitable bearings b^4. The shaft is internally longitudinally divided by a partition b^5 into two chambers which in the construction under discussion respectively communicate with the respective trunnions, and one of which, through a series of hollow spokes b^6, communicates with the annular cooling chamber, and the other of which through a corresponding series of hollow spokes similarly communicates with said cooling chamber at a point preferably diametrically opposite to the point of communication of the

spokes first referred to. It is obvious therefore that cooling fluid (liquid or gaseous) admitted through one trunnion will be caused to pass to the cooling chamber, to circulate throughout it, and to escape from it through the other trunnion. Solid spokes b^7 conveniently complete the structure of the cooling cylinder as a whole.

C is a glue distributing trough, preferably of a length correspondent with the breadth of the face of the cooling cylinder, conveniently longitudinally disposed in parallelism with the axis of the said cylinder, and supported upon the frame-work in such relation to the reservoir as to receive through the outlet faucet a a supply of liquid glue. In the bottom of this trough are a series of discharge orifices c, which may be in the form of depending nozzles of uniform size and equally spaced longitudinally, through which the liquid glue escapes from the trough upon an inclined chute D the lower or outer edge of which is of the breadth of the carrying face of the cooling cylinder and rests thereupon preferably at a horizontal line not more than forty-five degrees below the top of the cylinder.

A closed pipe $c^\times$ having the depending nozzles c' and communicating through a suitable regulating valve c^2 with the reservoir A, may, as shown in Figs. 11 and 12, be substituted for the trough C.

The inclined chute, as clearly shown in Fig. 7, is preferably hinged at its upper edge to the frame-work so as to rest as to its lower edge by its own weight upon the surface of the cylinder. The chute is inclosed at its sides.

The cooling cylinder upon the external surface of which the liquid glue is deposited from the reservoir through the medium of the trough and chute, is of the construction already explained in order to permit of the continuous passage or circulation through it of ice water or cooling fluid, and in Fig. 2 I have indicated a convenient device for establishing and maintaining such a circulation. This device is conveniently composed of a chamber E, water tight at the bottom and adapted to contain ice, and of a pump F adapted through a suction pipe f leading out from the lower part of said chamber to suck the ice water from said chamber and force it through the force pipe f' into one of the trunnions of the cooling cylinder through the cooling chamber of which it circulates and through the other trunnion of which it is, after its circulation, forced into a discharge pipe f^2 leading back into the ice chamber. The suction pipe should start from the bottom or the lower portion of the ice chamber. The discharge pipe may deliver its contents either into the lower part of the ice chamber as shown or above the ice. The force pipe into and the discharge pipe from the cylinder make tight communication with the trunnions of the cylinder by the stuffing boxes $f^\times$. The pump may be of any preferred character. A drain pipe f^3 is provided for the escape of the surplus water as it accumulates from the melting of the ice.

G is a driving drum or roller, suitably housed for rotation at the proximate end of the frame-work of the machine below the trough and chute, and in axial parallelism with and near the periphery of the cooling cylinder.

$G^\times$ is a driven drum or roller, parallel with the driving drum, but preferably of smaller diameter and disposed at the distant end of the framework. Its upper or carrying face is in the construction under discussion shown as on the same level with the upper face of the driving drum. Intermediate between these drums are a series of idler rolls g in axial parallelism with each other and with both the driving and the driven drums. Both the driving and the driven drums, and, if desired, the idler rolls, are circumferentially channeled with a series of correspondent grooves g' (see Figs. 3 and 4) which receive a series of endless cords or tapes H, together forming an endless sheet-carrying belt or apron conveniently led in the manner shown in the drawings around the driving drum the idler rolls and the driven drum, and which prevent the projection of said cords above the surfaces of the drums and rolls.

Many devices for imparting motion to the driving drum and the cooling cylinder may be resorted to. I find it convenient to provide a motor shaft I deriving its motion from any suitable source of power and equipped with a toothed driving pinion i in engagement with a toothed driven spur wheel $i^\times$ applied to one of the trunnions of the cooling cylinder and adapted to drive it, and also equipped with a pulley i^2 from which a belt i^3 runs to the driving drum G or to a driven pulley i^4, Fig. 6, applied to its shaft to drive said driving drum.

The foregoing is simply, as stated, a convenient connective driving gear which may be replaced by other driving mechanism. Whatever gear be employed, it should be of such character as to speed the periphery of the driving drum in slight excess of that of the cooling cylinder.

g^4 is what I term a knife drum, it being, as shown in Fig. 4, grooved in correspondence with the driving and the driven drums to permit the passage of the cords with respect to it but below its surface. Immediately above the knife drum is mounted a rotating knife J, conveniently formed as a knife blade radially projecting from the surface of a shaft j mounted in suitable bearings in axial parallelism with the knife drum, the edge of the knife being parallel with the axis of its shaft. As the knife shaft j is caused to rotate, the knife or blade is caused at intervals to come down upon the upper surface of the knife drum. The rotation of the knife shaft may be conveniently effected in many ways. I find it easy to effect it by an endless chain

$j^{\times}$ passing over a chain wheel j^{7} Fig. 4, on the knife shaft j, and taking its motion from a chain wheel j^{6}, Fig. 6, on an idler pinion shaft j^{2} upon which shaft is also mounted an idler toothed pinion j^{3} in engagement with a master pinion j^{4} upon the shaft of the driving drum, as shown in Figs. 1 and 6. The idler toothed pinion j^{3}, taking its motion from said master pinion, also serves to transmit it to a chain wheel pinion j^{5} upon a chain wheel shaft k' housed in the framework, and upon the respective ends of which are mounted a pair of counterpart chain wheels k which correspond in their dimensions and mountings to a counterpart pair of counterpart chain wheels $k^{\times}$ upon a shaft k^{2} in parallelism with the shaft k' but at the distant end of the framework. The lateral distance apart of the wheels forming the respective pairs of chain wheels k $k^{\times}$ is preferably correspondent with the breadth of the face of the cooling cylinder.

The shafts of all the rolls, pinions, drums, and wheels, hereinbefore referred to, are in parallelism.

The pairs of chain wheels k $k^{\times}$ carry two parallel endless net-carrying chains K, which at uniform intervals are provided with adjacent parallel pairs of transverse guttered carrying bars k^{3}, so spaced as to be adapted to receive or have slid into them, the depending legs l of the net frames or nets L,—the arrangement being such that as each net frame is successively applied to the carrying bars of the net carrying chains it is closely behind the preceding frame or net. The longitudinal distance apart of the carrying bars of the endless net carrying chains bears relation to the length of the nets, the latter being such as convenience for handling may dictate.

To the end that each sheet of glue may, in the operation of the machine, whereof hereinafter, be of the length of the nets, the edge of the knife is at such a distance from the center of the knife shaft and the revolutions of the knife shaft are so speeded as to occasion the descent of the knife upon the knife drum at intervals of time correspondent with those which in the operation of the machine elapse between the longitudinal passage of the front and back edges of a net past a given fixed point, for instance, the knife drum of the machine. In other words, the rotation of the knife is timed to coincide with the travel of the nets. During the momentary interval of contact of the knife with the knife drum the sheet glue passing over the drum upon the breast of the sheet carrying apron, is transversely severed.

M is a net wagon or truck arranged and adapted to be brought up to the distant chain wheels, and to receive a series or stack of nets from the chains, as shown in Fig. 1. It will be observed that, as stacked, the nets rest upon each other through the intervention of their depending legs whereby a circulation of air between the nets constituting a stack is permitted.

Having thus described machinery embodying my improvements, its operation is as follows: Glue, while still warm and in the liquid state, is supplied to the reservoir, and the pump is then set in action to occasion a circulation of the cooling fluid into and out of the cooling cylinder, with the result that the carrying face of said cylinder is cooled and maintained in a cold condition so long as the pump is kept in action to maintain the circulation through the cylinder, and at the same time the motor shaft is caused to rotate and drive the cylinder in the direction of the arrow. The sheet-carrying endless apron, the knife shaft, and net-carrying endless chains, will also through the connective driving gearing all be caused to move in the direction of the arrows respectively shown as applied to them, and will be maintained in motion. The outlet faucet from the tank being then opened sufficiently to give the proper supply, the liquid glue will flow into the trough and thence upon the chute in constant streams which will merge together in flowing over the chute and form a sheet of uniform thickness distributed evenly across the face of the chute and evenly across the carrying face of the cooling cylinder, by the revolution of which it will be advanced, and by the contact with which it will be gradually chilled so as to cause it to set to a sheet of jelly of sufficient cohesive strength to admit of the subsequent operations without its being torn apart. The edge of the chute D is made to rest upon the cylinder on a line much higher than the axis as heretofore described, in order that the inclination of the periphery from a horizontal line where the glue is received will not be so great as to prevent it from being carried forward and upward without the necessity of a tight contact to prevent leakage downward between the edge of the chute and the face of the cylinder or the necessity of any contact at all between the sides of the chute and the cylinder. The delivery of the glue high enough on the cylinder to obviate the necessity of having a tight contact of the glue delivering device with the cylinder, or any contact at all of its sides with the cylinder, or of having the cylinder dip into a vessel containing the liquid glue,—is one of the features of my invention that distinguishes it from others having the same general purpose, in which the glue is either taken up by the cylinder from a tank placed below it and into which it dips, or in which the cylinder takes the glue from a delivering device placed about level with or lower than the axis, and which, because it is so placed, requires to be tightly pressed against the face of the cylinder, and sometimes to have packing arrangements to prevent leakage. By delivering the glue high on the cylinder where its tendency to run backward is less, a thicker sheet of glue can be taken onto the cylinder and hence upon

the nets, than when the glue is delivered lower down where the tendency to run backward is greater. The greater the thickness of the sheets upon the nets, the greater will be the yield of dry glue for the same cost of handling an apparatus, and hence the less will be the cost of production.

At the commencement of the operation of the apparatus, when the cooling cylinder has performed such sufficient revolution as to bring the advance edge of the jellied sheet of liquid glue upon its surface, around to a point about opposite to the driving drum,—an attendant, standing in a favorable position, reaches over the drum, and, while the apparatus continues in motion, dexterously parts or detaches the advance edge of the sheet from the cooling cylinder and overlays it upon the drum, the adhesion of the sheet to the surface of the drum being sufficient to occasion the initial stripping, which is thereafter continuous. In practice, the speed of the moving parts being under complete control, the apparatus is slowed down during the performance of the operation above referred to.

The advance edge of the sheet of glue having been led off of the face of the cooling cylinder on to the driving drum and carrying face or breast of the endless cord apron, the friction of the glue upon the drum and cords will be sufficient to give it the necessary adhesion to them, to enable them in moving forward, to strip the glue in a continuous sheet from the cylinder as long as the operation is kept up. As the chilled sheet adheres slightly to the face of the cooling cylinder, some tension is required to strip it off, and the sheet being elastic this tension stretches it somewhat. If, therefore, the periphery of the driving drum should move no faster than that of the cooling cylinder, the glue, being stretched as it is received on the drum, would not be pulled off of the cylinder as fast as it would be carried upward by it in adherence to its surface, and the line of parting between the sheet and the cylinder would in consequence be gradually carried upward until the sheet would encounter the under face of the chute, elevate it, and foul with the liquid glue. To obviate this result which would manifestly render the operation of the machine impractical, the driving drum is speeded to an extent sufficient to cause its surface to move sufficiently faster than the surface of the cooling cylinder to insure a tension adequate to strip the sheet from the cylinder before it reaches the chute. The movement of the sheet-carrying apron occasions the advance of the sheet from the driving drum to between the knife shaft and knife drum, and its further passage beyond them from off the apron to and upon the carrying face of the nets, which, in the travel of the net-carrying chains, are caused to successively present themselves beyond the driven drum and in position to receive the advance portions of the sheet in the forms of sections of uniform length, correspondent with the length of the nets and formed by the dividing action of the knife, the timing of the cuts of which is such, as explained, that each cut is made in the portion of the sheet lying between the adjacent edges of the successive nets in place upon the carrying chains. The nets are applied to the carrying chains one after another by attendants, who, standing at the side of the machine, slip them on the chains transversely of the direction of their travel,—the depending flanges of the net frames being, as already explained, engaged with the carrying bars of the chains, an operation easily performed while the chains are in motion, as soon as the operators become dexterous. Each net with the divided sheet upon it, as it reaches the end of the carrying chains, is manually removed by operators and placed upon a net-carrying wagon, until a stack has been formed which is removed upon said wagon, and succeeded by another stack erected upon another wagon run into the place of the first wagon.

The subsequent operation of drying the sheets of glue upon the nets by air at normal temperature or artificially heated, is the usual operation with which those skilled in the art are familiar.

Such being a description of a good form of machine embodying my improvements, I have in Fig. 8 represented a type of variation in which the endless sheet-carrying apron is dispensed with and the sheet of glue stripped from the cooling cylinder and deposited directly upon nets in place of upon the net-carrying chains. In this construction the relative arrangement of the reservoir, trough, chute, and cooling cylinder, are the same as in the construction hereinbefore referred to, but the sheet is stripped from the cylinder by the aid of a counter-balanced pivoted stripper N bearing against the face of the cylinder and possessed of an edge so dull as not to cut the sheet. In this construction the endless net-carrying chains are arranged below the cooling cylinder and provided at intervals,—being those between adjacent carrying bars,—with transverse knives k^4 of such height as to project slightly above the carrying faces of the nets when in place upon the chains, and to serve in conjunction with a pivoted knife drum g^5 to occasion the transverse severance of the sheet into sections correspondent with the length of the nets, the weight of the knife drum alone being sufficient to occasion the complete severance of the sheet. In this construction the motor shaft I is provided with a driving pinion i engaged with a driven spur wheel $i^\times$ upon the shaft of the cooling cylinder, and also with a pulley i^2 from which a belt i^3 passes to a pulley i^4 upon the shaft k' of the chain wheel k. Other driving mechanism may, of course, be substituted for this gearing.

In Fig. 9 I have represented yet another type of variation in which the endless sheet-carrying apron employed in the construction

represented in Fig. 1, is arranged at a sharp downward incline, instead of being in parallelism with the net-carrying aprons as in the construction represented in Fig. 1. The object of this arrangement which is not in itself essentially different from that of Fig. 1, is to permit of the arrangement of the net-carrying aprons in the manner represented in the apparatus of Fig. 8, that is to say below the cooling cylinder, to the end that in an apparatus of the character of that of Fig. 8 the nets may be introduced beyond or in advance of the cooling cylinder instead of beneath the sheet-carrying apron. In this construction, the gear for driving the cooling cylinder, the sheet-carrying apron, and the knife drum, is essentially the same as in Fig. 1, but the net-carrying aprons are driven by a belt O applied to a pulley $O^{\times}$ on the shaft k' of the chain wheels, which belt derives its movement from a pulley O^2 on the motor shaft I.

In Fig. 5 I have represented as a substitute for the cooling cylinder B of the apparatus of Figs. 1 and 2, a hollow drum B^2 constituting a tight cylindric tank adapted to revolve on hollow trunnions and provided with internal disks, shields, or diaphragms, b^8, of less diameter than the interior diameter of the drum, and so concentrically supported by radial brackets b^9 as to occasion the deflection of a fluid entering one trunnion to the periphery of the drum and through or across the interior thereof before it can escape from the opposite trunnion.

In Fig. 10 I have further represented, as a substitute for the other forms of cooling cylinder, a hollow drum B^3 in which the force pipe f' and the discharge pipe f^2 are both arranged to open through a single trunnion b^3, the force pipe passing axially through the drum and discharging beyond, a disk or diaphragm b^{10} corresponding to one of the diaphragms in the drum of Fig. 5. In this construction the other trunnion becomes a solid gudgeon, b''.

In any form of cooling cylinder selected for employment, it is of the essence of the invention that provision be made to permit of the continuous circulation of the cooling medium into and out of it.

By the term cylinder as applied to the cooling drum, I include any prism or drum of polygonal circumference wherewith the operation herein described would be practicable.

The cooling fluid which in the practice of my invention I employ, may be naturally cold water. In warm weather I prefer to use ice water, but in colder weather water naturally cooled by the atmosphere is more economical. The cooling may also be caused by the circulation into and out of the cylinder of a gaseous fluid or volatile liquid which during its circuit outside of the cylinder is put under pressure and divested of the heat thereby developed, and which when released from pressure inside the cylinder thereby becomes cold,—in the case of a gas by simple expansion, or in case of a volatile liquid by its evaporation,—in either case according to principles in common use for refrigerating purposes.

Whenever ice is employed, it is important for economical reasons that the fluid cooled by it (which is more conveniently the water of the melting ice itself) should be continuously used in the manner I have described, and that only the surplus water from the melting of the ice should be allowed to escape, so that the whole capacity of the ice to absorb in melting (except losses by radiation, &c.) will be utilized in cooling the glue. If upon the other hand, a continuously new supply of water should be first passed through the ice, then through the cylinder, and then be finally discarded at a temperature lower than it had at its introduction into the ice receptacle, the melting of the ice that would be required to reduce the temperature of the water at its introduction into the ice receptacle to that at its discharge from the cylinder, would be waste that would be saved by using the same fluid repeatedly. The same economical considerations apply when other artificial refrigerating apparatus is employed, that is to say, the fluid for transmitting the heat from the cylinder to the refrigerator, should be the same fluid continuously used whenever its temperature at its discharge from the cylinder is lower than that at which it would enter the refrigerator in the case of a continuously new supply. These considerations, manifestly, have no application when naturally cold water is used. Whatever, however, the medium may be, it is of the essence of the invention that it be caused to circulate into and out of the interior of the cooling cylinder, in order to maintain the carrying face of said cylinder constantly cold.

I employ the term "glue" generically, to include gelatine and compounds composed principally of glue or gelatine.

It is proper to state that a pump is probably the best device for occasioning circulation of the cooling fluid through the cooling cylinder and to and from the chamber in which the cooling medium, whatever it may be, is contained, but that other devices may be employed to occasion such circulation,—and also to state that while I prefer to employ ice as the refrigerating material for cooling water as the preferred cooling fluid, yet that other refrigerating materials or processes may be employed for the cooling of the water or other fluid in a chamber of the character of the ice chamber E, or in another vessel, receptacle or reservoir being the equivalent for the purpose, of the chamber E. It may also be added that while I prefer to employ in connection with the net-carrying apron the sheet-carrying apron shown in Fig. 1, yet that said sheet-carrying apron is not of the essence of the invention; and further that while the preferred means for supplying liquid glue to the carrying surface of the cylinder are the tank trough and chute set forth, yet that other devices

may be employed as their equivalents; and, still further, that while the driving drum shown in Figs. 1 and 3, is a convenient means for stripping and for carrying-off from said cylinder the sheet of glue, yet that other devices operative in a similar manner may be substituted in its stead. In like manner it may be remarked that the rotating knife as a mechanism for dividing the sheet transversely into sections may be replaced by a vertically moving or reciprocating knife or its equivalent.

As already stated, the cylinder must be so constructed that the water or other cooling medium may be introduced into and withdrawn from it in the liquid or gaseous state while it is revolving, but the precise form in which the chamber or passages are embodied is not of the essence of the invention.

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

1. In a machine for forming glue into sheets of jelly, the following elements in combination:—a hollow revoluble cooling cylinder through which a fluid refrigerant is caused to circulate,—a feed for supplying liquid glue to the carrying surface of said cylinder whereon said glue is congealed into a sheet,—and a surface which travels at a speed superior to that of the peripheral surface of the cylinder and strips the sheet from said cylinder,—substantially as set forth.

2. In a machine for forming glue into sheets of jelly, the following elements in combination:—a hollow revoluble cooling cylinder through which a fluid refrigerant is caused to circulate,—a feed for supplying liquid glue to the carrying surface of said cylinder whereon said glue is congealed into a sheet,—and a cylindriform surface axially parallel with the cooling cylinder, which travels at a speed superior to that of the carrying surface of the cylinder and strips the sheet from said cylinder,—substantially as and for the purposes set forth.

3. In a machine for forming glue into sheets of jelly, the following elements in combination:—a hollow revoluble cooling cylinder through which a fluid refrigerant is caused to circulate,—a feed for supplying liquid glue to the carrying surface of said cylinder whereon said glue is congealed into a sheet,—a cylindriform surface axially parallel with the cooling cylinder, which travels at a speed superior to that of the carrying surface of the cylinder and strips the sheet from said cylinder,—cutting mechanism for dividing the sheet transversely into sections,—and traveling nets for carrying off said sections,—substantially as and for the purposes set forth.

4. In a machine for forming glue into sheets of jelly, the following elements in combination:—a hollow revoluble cooling cylinder through which a fluid refrigerant is caused to circulate,—a feed for supplying liquid glue to the carrying surface of said cylinder whereon said glue is congealed into a sheet,—a roller axially parallel with the cooling cylinder, which travels at a speed superior to that of the carrying surface of the cylinder and strips the sheet from said cylinder, and which serves to drive a sheet-carrying apron,—a sheet-carrying apron upon which the sheet stripped from the cooling cylinder is delivered,—cutting mechanism for dividing the sheet transversely into sections,—and traveling nets for carrying off said sections,—substantially as set forth.

5. In a machine for forming glue into sheets of jelly, the following elements in combination:—a hollow revoluble cooling cylinder through which a liquid refrigerant is caused to circulate,—a feed for supplying liquid glue to the carrying surface of said cylinder whereon said glue is congealed into a sheet,—a cylindriform surface axially parallel with the cooling cylinder, which travels at a speed superior to that of the carrying surface of the cylinder and strips the sheet from said cylinder,—cutting mechanism for dividing the sheet transversely into sections,—and an endless net-carrying apron adapted upon its carrying face to be provided with a series of removably applied nets to receive the divided sections,—substantially as set forth.

6. In a machine for forming glue into sheets of jelly, the following elements in combination:—a hollow revoluble cooling cylinder through which a fluid refrigerant is caused to circulate,—a feed for supplying liquid glue to the carrying surface of said cylinder whereon said glue is congealed into a sheet,—a roller axially parallel with the cooling cylinder, which travels at a speed superior to that of the carrying surface of the cylinder and strips the sheet from said cylinder, and which serves to drive a sheet-carrying apron,—a sheet-carrying apron upon which the sheet stripped from the cooling cylinder is delivered,—cutting mechanism for dividing the sheet transversely into sections,—traveling nets for carrying off said sections,—and connective driving gearing which occasions the predetermined associated movements of the cooling cylinder, the stripping roller, the cutting mechanism, and the traveling nets,—substantially as set forth.

In testimony that I claim the foregoing as my invention I have hereunto signed my name this 6th day of June, A. D. 1891.

CHAS. W. COOPER.

In presence of—
PETER COOPER HEWITT,
EDWD. COOPER.