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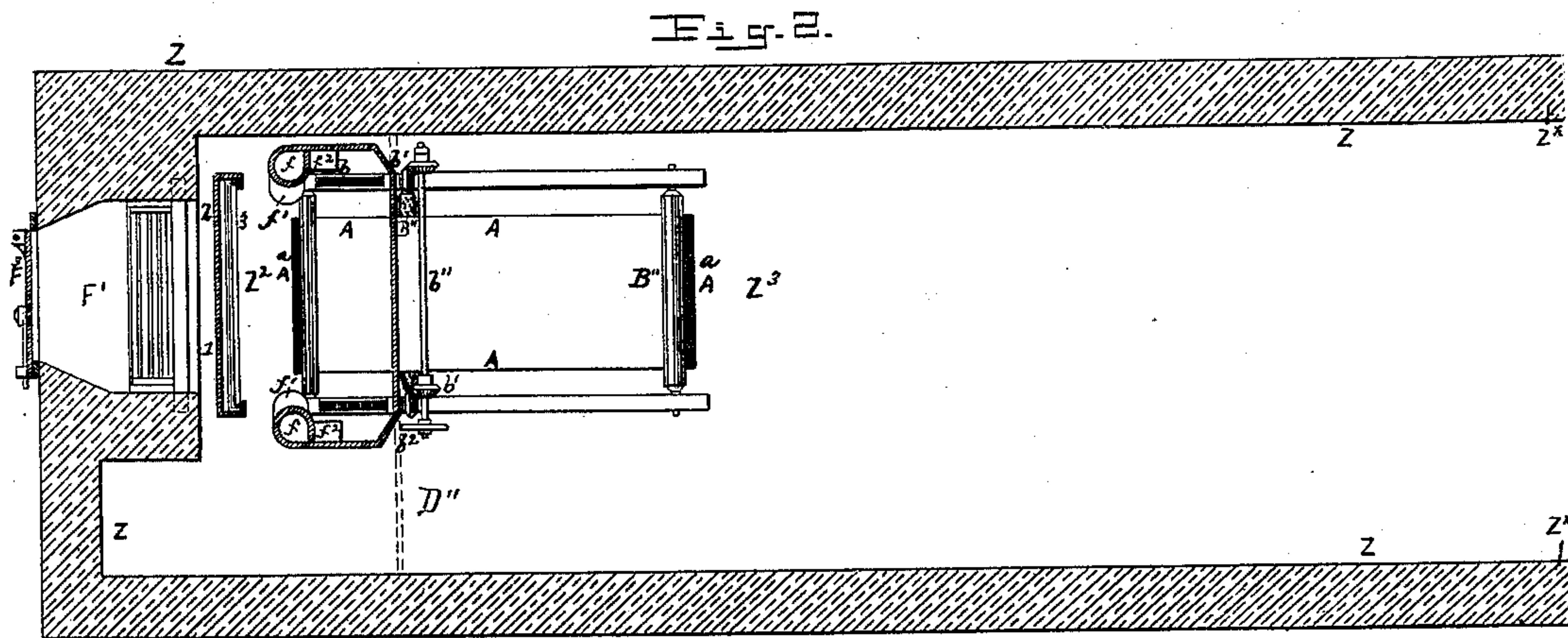
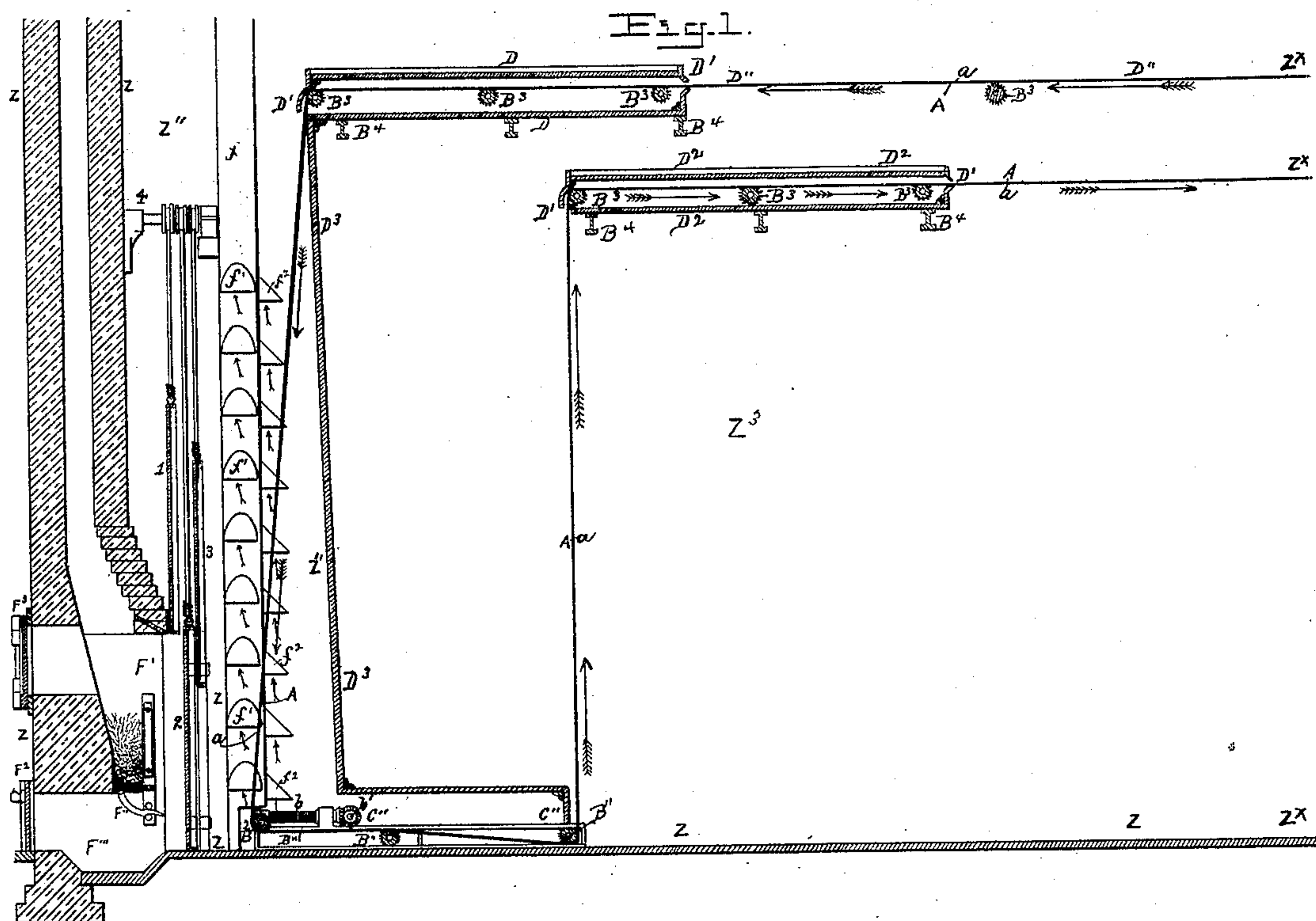
3 Sheets—Sheet 1.

R. DICK.

APPARATUS FOR MANUFACTURING WEB FABRICS.

No. 432,303.

Patented July 15, 1890.



WITNESSES:

George Baumann
E. J. Griswold

INVENTOR

Robert Dick

BY

Howland & Howland
his ATTORNEYS

(No Model.)

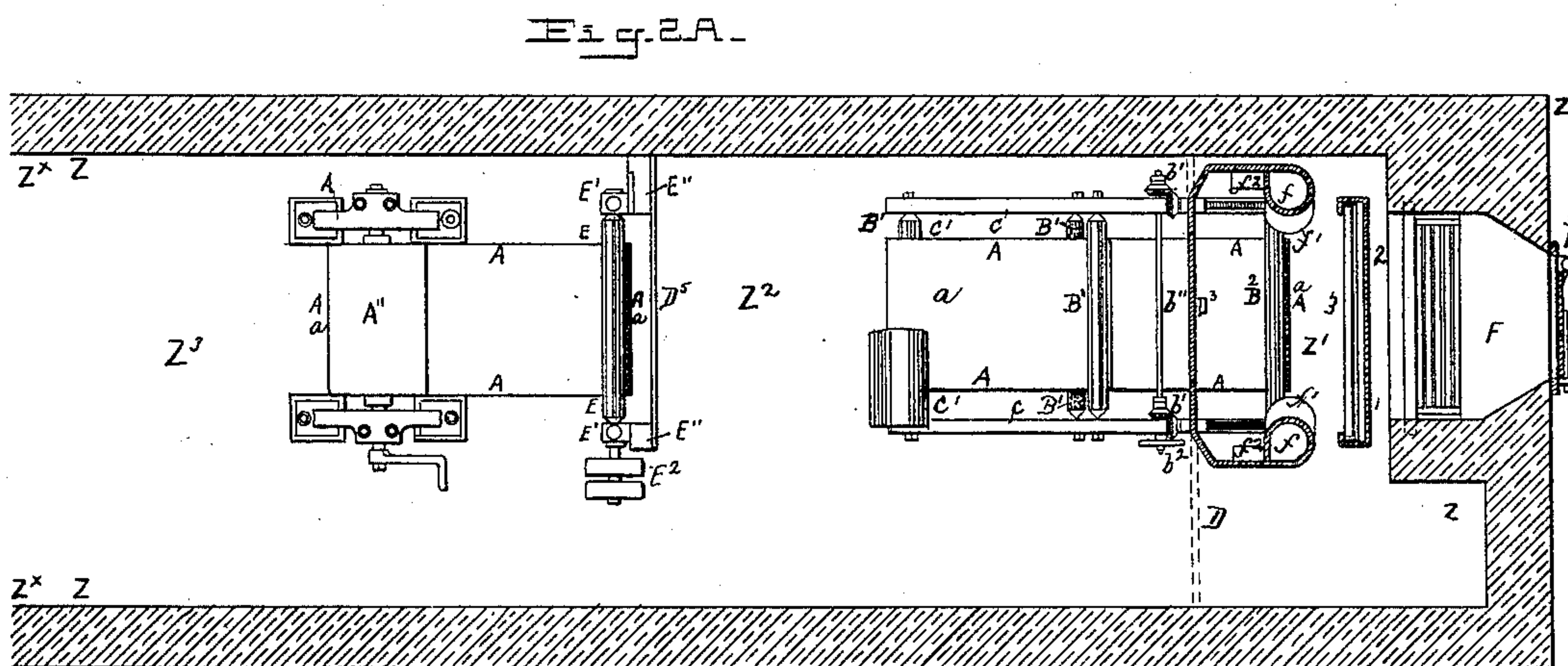
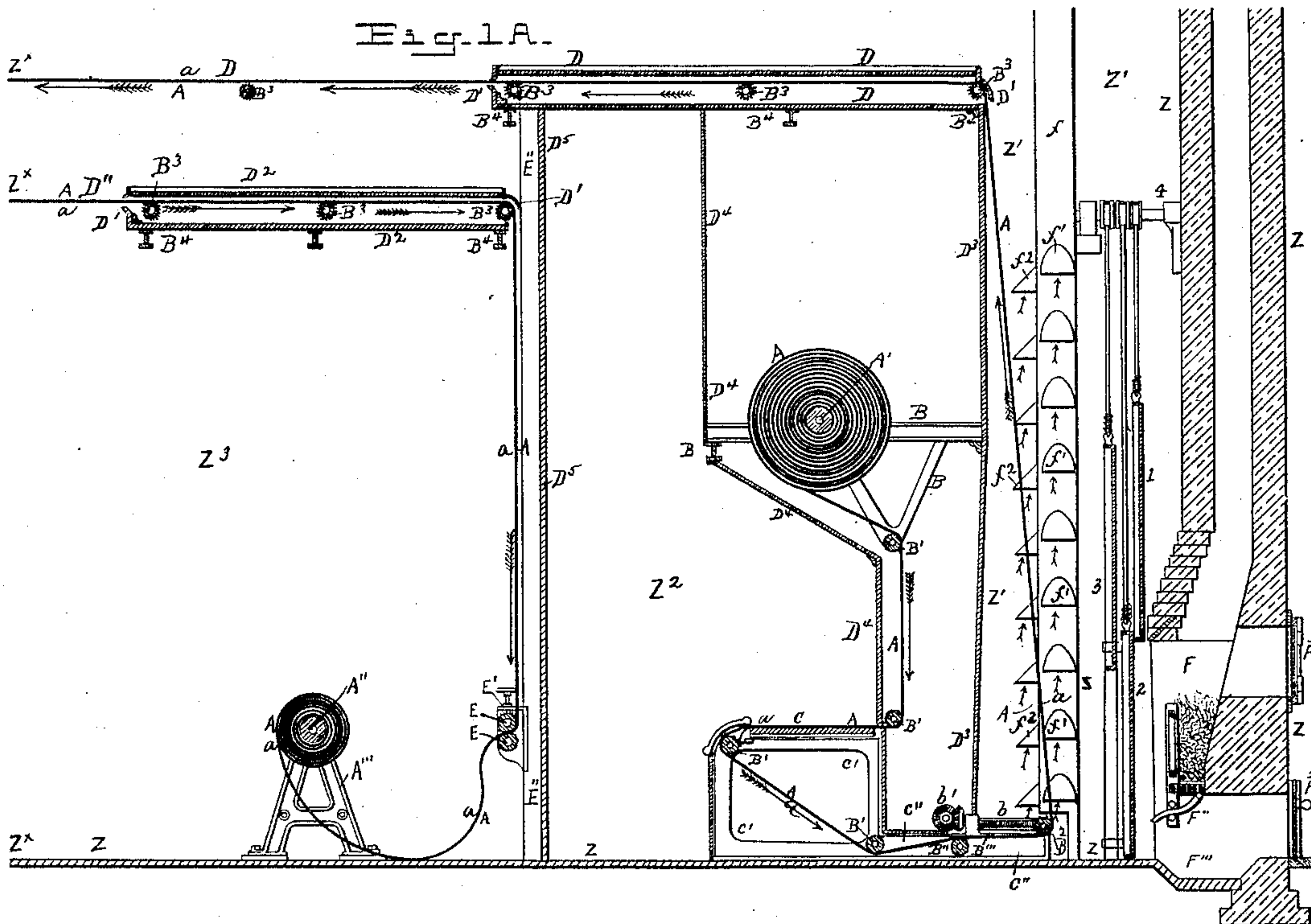
3 Sheets—Sheet 2.

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No. 432,303.

Patented July 15, 1890.



WITNESSES:

George Baumann
E. J. Griswold

INVENTOR
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Howson and Howson
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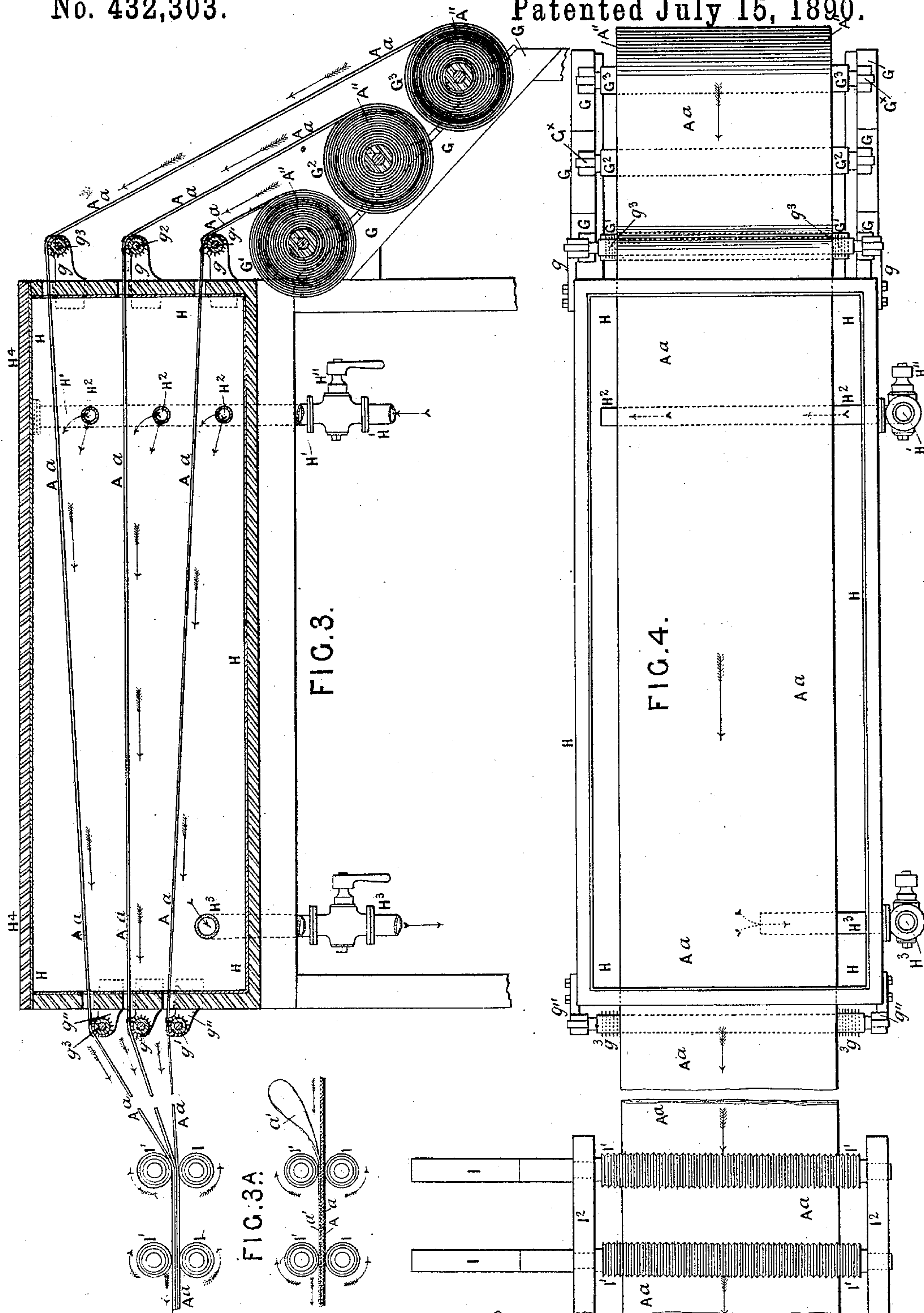
3 Sheets—Sheet 3.

R. DICK.

APPARATUS FOR MANUFACTURING WEB FABRICS.

No. 432,303.

Patented July 15, 1890.



Witnesses:
George Baumann
John Revell

By his Attorneys, *Inventor*
Horsman and Horsman, Robert Wick.

UNITED STATES PATENT OFFICE.

ROBERT DICK, OF GLASGOW, SCOTLAND.

APPARATUS FOR MANUFACTURING WEB FABRICS.

SPECIFICATION forming part of Letters Patent No. 432,303, dated July 15, 1890.

Application filed September 19, 1889. Serial No. 324,474. (No model.) Patented in England September 14, 1888, No. 13,285; in France April 4, 1889, No. 197,222, and in Belgium April 5, 1889, No. 85,717.

To all whom it may concern:

Be it known that I, ROBERT DICK, manufacturer, residing at Greenhead, Glasgow, in the county of Lanark, Scotland, a subject of the Queen of Great Britain and Ireland, have invented an Improved Apparatus for Manufacturing Web Fabrics, (for which I have obtained Letters Patent in Great Britain dated September 14, 1888, No. 13,285; in Belgium April 5, 1889, No. 85,717, and in France April 4, 1889, No. 197,222,) of which the following is a specification.

This invention has reference to and comprises a new or improved combination of the parts of a machine or apparatus for producing a composite water-proof new web fabric or fabrics consisting of a ply or plies of canvas or other woven or felt textile material coated on one or both sides with a layer or layers of dissolved gutta-percha, balata, or gutta-percha mixtures, and either with or without an intermediate layer or layers of prepared gutta-percha or gutta-percha mixtures.

In preparing this new composite web fabric the foundation textile web would be passed over rollers, preferably over a close or hot-air chamber, to heat it while the gutta-percha solution is being brushed over the outer surface, after which the fabric would be traversed in front of a hot fire or through a hot-air chamber to make the solution sink into the fibers and evaporate the naphtha or other spirit or solvent in the solution, after which it may be passed through a pair of rollers to press in the solution and equalize the surface, when it would be conducted through a long chamber, preferably having a circulation of air by a fan or other blower, to evaporate and carry off all the spirit and cool the web so prepared, and it would then be rolled loosely onto beams or spindles, as rolls, from which the winding beams or spindles could be removed and leave the rolls ready for further treatment or for sale and use as the new or improved web fabric of canvas or other foundation cloth and gutta-percha for the several purposes it is manufactured and suitable for. When both sides are to be so coated with the solution, as would generally be preferable, the

material might be again passed through the said heating, coating, and evaporating treatment and beamed into rolls having a coating of solution on both sides, or it might be two or more coatings by repassing the fabric in like manner through the said treatment and machine or apparatus. Then for very thick strong webs of this new material the webs so prepared of a single thickness while heated would have a thin layer of good or selected and prepared gutta-percha or balata or a mixture of these in a plastic heated state spread over the whole of one of the solutionized surfaces by and while passing both materials through between a pair of rollers.

In order that my said invention and the manner of performing or carrying the same into effect or practice may be properly understood, I have hereunto appended three explanatory sheets of drawings, in which the same reference letters and numerals are used to indicate corresponding parts in all the figures where shown.

Figure 1 and Fig. 1^a, which is a continuation of Fig. 1, show a sectional elevation of one arrangement of apparatus for preparing and finishing the new web water-proof material applicable for the manufacture of the soles of boots or shoes or for other purposes, and mainly showing the two ends of the apparatus with a great part of the center as broken away at Z^x Z^x; and Fig. 2 and Fig. 2^a, which is continuation of Fig. 2, show a sectional plan of the lower part of the apparatus corresponding to Fig. 1. Figs. 3 and 4 on Sheet 3 show a sectional side elevation and a plan, respectively, of the new or improved apparatus for making the web material into two, three, or more thicknesses of the single-prepared material.

Referring to Figs. 1, 1^a, 2, and 2^a, the cotton canvas or other woven or web material A, which I hereinafter generally term "canvas," is manufactured of any suitable width and prepared in rolls for the purpose of this invention, which are each mounted as used on a central bearing-block on a suitable fixed framing B at the starting end of the machine, from which it is led down round guide-rollers B' over the table C and through the close, dry,

or heated air-chamber C' over other rollers B' B'' at the lower part of the machine near the floor z within a well-ventilated fire-proof building Z . The dissolved solution of naphtha and balata, or balata and gutta-percha, or selected gutta-percha mixtures a is spread over the upper surface of the canvas as it is passing over the table C by hand and brushes. From the table-chamber C' the canvas A is led forward through a narrow channel at C'' over and under the rollers B'' B^2 , up in front of a red-hot fire F at one end of the building Z , all as indicated by the arrows, over an upper set of guide-rollers B^3 , carrying the cloth through close chambers D , with narrow slits at their ends D' , and over other rollers B^3 across open spaces D'' between these chambers D , so as to allow the naphtha or other solvent employed to be evaporated and carried off by ventilation at these spaces D'' . After the fabric A a has traveled the whole length of the building Z it is led down over other rollers near the ground-level B^2 B'' , through another narrow chamber C'' in front of a second fire F' at this end of the building to reheat the coated surface a , and passed up and along over rollers B^3 within a lower second set of chambers D^2 , similar to the upper ones D , with spaces D'' between them, until the fabric A a so coated reaches the first end of the building again, where it is brought down and through between two gripping and drawing rollers E , carried on journal-bearing frames at E' , bolted to standards E'' , the lower roller being driven by fast and loose pulleys at E^2 and a belt from motive shafts carried in the upper parts of the building. (Not shown in the drawings.) The loose web A a so coated and delivered from the rollers E is wound up loosely on center beams or rollers A'' , carried on bush-bearing frames A''' , secured to the floor z of the building and turned by a hand-crank on each spindle of the rollers A'' , or it might be by a friction-band from the pulley-shafts E^2 , which would slip when the slack web material A a was wound up. These rolls A'' of material so prepared might be removed from their journal-bearings for use or be lifted and replaced in the bearings at $A' B$ to be repassed through the machine and coated either on the same side or on the opposite side of the fabric one or more times, and then finally removed for use in rolls or otherwise to be passed through a rolling or pressing machine and made into several layers of canvas material and intermediate layers of the solution, and either with or without an intermediate layer of prepared selected gutta-percha or balata and gutta-percha, as will hereinafter be described in reference to Figs. 3 and 4 on Sheet 3. The close chambers D and D^2 at the upper part of the building are all made of plain sheet or corrugated iron and carried on transverse beams B^4 , which also support the bearing-blocks of the spindles of the carrying-rollers B^3 , and the parts $Z' Z''$ of the

building in front of the fires F F' are separated off by partitions of sheet-iron at D^3 over the close channels at C'' , where the fabric is conducted near the floor-level z , all so as to prevent the naphtha being evaporated by the fires off the coated surfaces a of the fabric, should it take fire, spreading into the main building, where it is traversed. Sheet-iron separating-partitions are also fitted at D^4 over the coating-table C and at D^5 between this coating-chamber and the main winding-up mechanism E to E^2 to prevent the fire from spreading along the whole building and traversing web material A a in it. This part of the building Z' is also thoroughly ventilated above through two round vertical sheet-metal flues f on each side of the traversing web material A a , with inverted entering conical inlet-spouts at f' f^2 on their lower sides and back surfaces, so as to carry off the evaporated naphtha up through these ventilating-flues f through the roof of the building, as indicated by the darts in these figures; and to prevent the naphtha vapor from being drawn in toward the fire or the fire blowing out toward the surface of the material being heated by the fire close sheet-metal and wire screens and sliding doors at 1, 2, and 3 are fitted close up near the front of the fire-grates F F' , carried on wire cords passed over overhead pulleys and spindles at 4, counterbalanced by weights at one side of the walls Z , these screens being of different fine material to allow the heat to radiate through from the fire, but prevent the flames or currents of air from passing, the screen nearest the fire being made in the form of a door or damper to shut off the fire completely when that is desired. The lower guide-rollers B^2 B^2 , over which the material passes nearest the fire, have their opposite end journal-bearing blocks mounted in guide-frames at B''' on traversing screw-spindles b , actuated by bevel-wheels b' from one transverse spindle b'' , carried in bearing-brackets supported on the opposite frames B''' and actuated at the front side of the machine by a hand-wheel b^2 , so as to shift the lower part of the coated surface a of the fabric nearest the fires F F' to or from these, according to the strength or heat of the fires for the time being.

The most of the guide-rollers, as B'' B^3 , are preferably made with wire or pin surfaces to guide the cloth without sticking to the coating material a and actuated by the fabric itself, or it might be by upper gearing in the building to traverse the fabric A a at the same speed as the drawing delivery-rollers E E by bands or wheels. (Not shown in the drawings.)

The fire-places F F' are preferably made with tilting grate-bars below and retaining hand-levers at F'' , so as to be able to discharge the fire at night, or when desired, down into a cement or other water-trough F''' in the ash-pit, preferably made with a cleaning-out door F^2 outside the building for re-

moving the ashes from time to time, as desired, and the upper part of the fire-place is also provided with a door F^3 for feeding in the fuel or cleaning out the upper part of the fire-place and chimney when that is desired, and the damper 1 put down to prevent dirt from getting into the fabric $A a$ being coated.

The sheet-iron partitions $D^3 D^3$ may be carried quite across between the walls of the building Z , as dotted in at D''' , with iron doors in these to separate off the evaporating and ventilating chambers $Z' Z''$, directly exposed to the fire, and so prevent the fire spreading into the coating-chamber Z^2 and body Z^3 of the building. In some cases, when the buildings are long enough to evaporate the naphtha or solvents used, the fabric $A a$ may be returned without passing down past the fires at the opposite end and return along the under chambers D^2 of the center treating-chamber Z^3 down to the delivery-rollers $E E'$ without a second heating.

To make a strong and thick kind of this new fabric, two or more single layers or webs prepared either with solution on both sides or with the addition of a thin layer of gutta-percha on one side, as hereinbefore described, would be joined together while in a heated state by passing them through between one or more pairs of rollers, putting the solutionized side of the one layer or thickness of the fabric next the heated layer of gutta-percha previously put on the other piece or thickness of fabric, so as to leave, when that was required, a thin layer of gutta-percha between each single or double ply of the canvas or other woven or textile web fabric used for the body material; or the plies of solutionized fabric so prepared may be put together in or over a heated stove or chamber while passing through between rollers and attached by their solutionized surfaces without the layers of gutta-percha between them.

One arrangement of apparatus for making this new web material, described in reference to Figs. 1 and 2 on Sheet 1, into two, three, or more thicknesses or plies of the single prepared material $A a$, as just described, is shown in diagram, sectional side elevation, and plan in Figs. 3 and 4 on Sheet 3, and consists in mounting two, three, or more rolls A'' of the single web fabric $A a$ (described as prepared and finished in the machine shown in Figs. 1 and 2 on Sheet 1) by their roll-spindles in journal-bearings at G^x in an angled frame G or other equivalent, three rolls A'' being shown at $G' G^2 G^3$ at one end of a close air-heating chamber H , each prepared web $A a$ being passed over guide-pulleys $g' g^2 g^3$, carried in bearing-brackets g at a considerable distance apart at the entering end of this heating-chamber H and at the delivery end over corresponding guide-rollers $g' g^2 g^3$ in the bearing-brackets g'' . Heated air is led into this chamber H , through the pipe H' , from an air-heating coil or chamber of a heating-furnace controlled by a tap H'' and led

along transverse horizontal pipes H^2 below each layer of the web material $A a$, with perforated or rose jets to direct the heated air up against the material and disperse it through the heating-chamber H , and a current is drawn off through the pipe and tap H^3 to keep up the heat within the chamber H , as indicated by the darts. The air from this pipe H^3 would be led back to the heating coil or chamber in the furnace through a small fan to keep up the current, and an escape-pipe with tap (not shown in the drawings) would be fitted at the lower and upper parts of this chamber H to draw off any moist vapor or liquid which might collect in it, and a hinged or portable lid H^4 would be fitted on this chamber H for getting access to the material in it. The guide-rollers $g' g^2 g^3$ would either be formed with small spikes to keep the hot gutta-percha material from sticking to them or they might be covered with some soft fabric moistened with water, which would effect the same purpose. The three webs of material $A a$ are led forward in a heated state from the chamber H and over the delivering guide-rollers, all as indicated by the arrows, and through between one, two, three, or more pairs of compressing, grooved, or, it might be, plain rolls $I I'$, carried in bush-bearing frames at I^2 , the bushes of the upper rollers I' being movable in their frames and regulated to their pressure and height off the lower rollers I by pinching-screws or pinching screws and springs in an ordinary manner to give the desired pressure to the rollers to compress the webs of material $A a$ passing through between them together to make one compact web material of the intermediate layers of the canvas and gutta-percha. After passing through these rollers the finished thick material would be carried along on endless webs or rolls until cold, when it would be coiled in rolls at the end of the long traversing web, all ready for use, of any desired thickness, according to the number of layers of canvas and gutta-percha put together for shoe-soles and other purposes as a substitute for leather. When a layer of selected gutta-percha or gutta-percha and balata a' is used between the layers of canvas, as hereinbefore stated, this is effected by passing the single web of prepared canvas and gutta-percha solution $A a$ through the machine shown in Figs. 3 and 4 on Sheet 3, just described; and in spreading by hand or feeding a layer of the said gutta-percha or balata a' in a hot plastic state over the heated canvas and gutta-percha solution $A a$ just as it enters the first set of rollers $I I'$, the upper roller I' of which would be so regulated as to press this plastic material a' in a uniform layer or thickness down onto the said web $A a$ as it is passed through the rollers, as indicated in Fig. 3 A on Sheet 3. The putting of these webs $A a a'$ so prepared together, as described in reference to Figs. 3 and 4, with the prepared side a' next the unprepared side a of its adjacent web, would give the alter-

nate prepared layer of gutta-percha and balata between the layers of canvas; and although these different thicknesses of the new web material have only been shown as pressed together through rollers I I' they might be cut into sheets or shapes of the objects desired and pressed together while in a heated, plastic, or limp state between flat plates or between shaping-molds in strong hydraulic, screw, or lever presses to suit the various thicknesses and purposes desired.

What I claim is—

1. The herein-described combination of parts for producing a composite web of coated fabric, said combination comprising a roll A' and a set of rollers for traversing the web, a coating-table over which the web passes, a fire or fires and screens in front thereof, with safety-chambers through which the web passes, delivery-rollers, and a receiving-roll, and means for adjusting the web nearer to or farther from the fire, all substantially as described.

2. The herein-described combination of parts for producing a composite web of coated fabric, said combination comprising a deliv-

ery-roll and a set of rollers for traversing the web, a coating-table over which the web passes, a fire or fires, and screens in front thereof, with safety-chambers through which the web passes, delivery-rollers, and a receiving-roll and ventilating-ducts for carrying off the solvent vapors, all substantially as described.

3. The herein-described combination of parts for making a composite web, and consisting of a close heating-chamber II, two or more delivery-rolls and traversing rollers, pipes for admitting heated air to and drawing it off from the chamber, and compressing-rollers on the delivery side of the chamber, all substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ROBERT DICK.

Witnesses:

W. RCH. THOMSON,

JOHN SIME,

Both of 96 Buchanan Street, Glasgow, Scotland.