Oct. 26, 1926. 1,604,276

A. M. GILLESPIE

SINGEING OR GASSING MACHINE

Filed Jan. 12, 1923 2 Sheets-Sheet 1

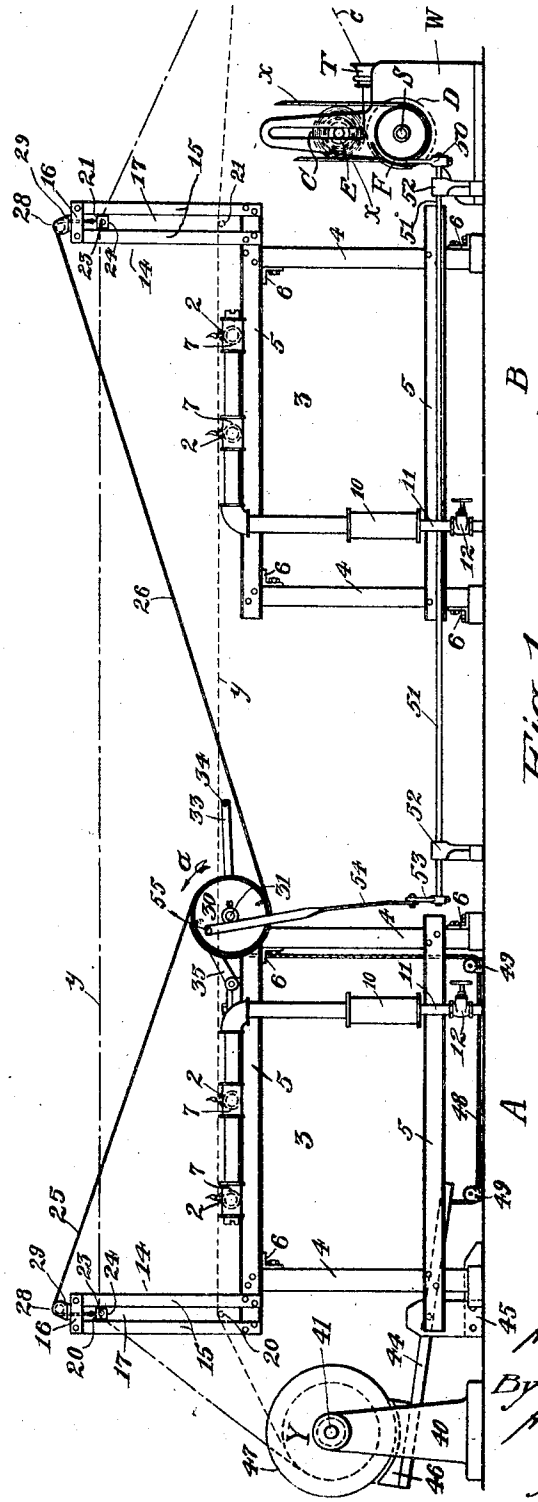


Fig. 1.

Inventor:
Andrew M. Gillespie
By Symington and White
Attorneys.

Oct. 26, 1926. 1,604,276

A. M. GILLESPIE

SINGEING OR GASSING MACHINE

Filed Jan. 12, 1923 2 Sheets-Sheet 2

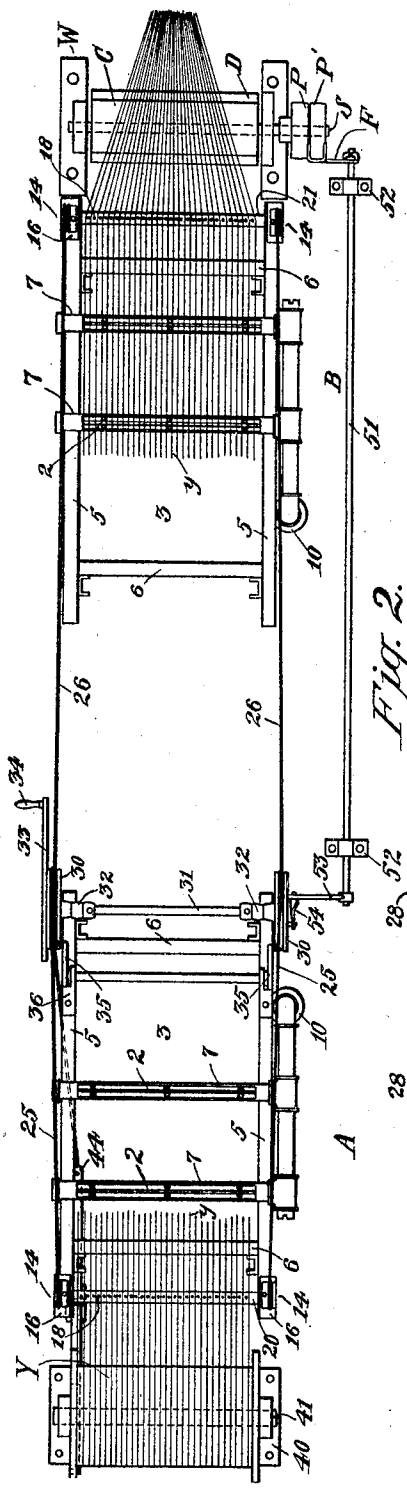


Fig. 2.

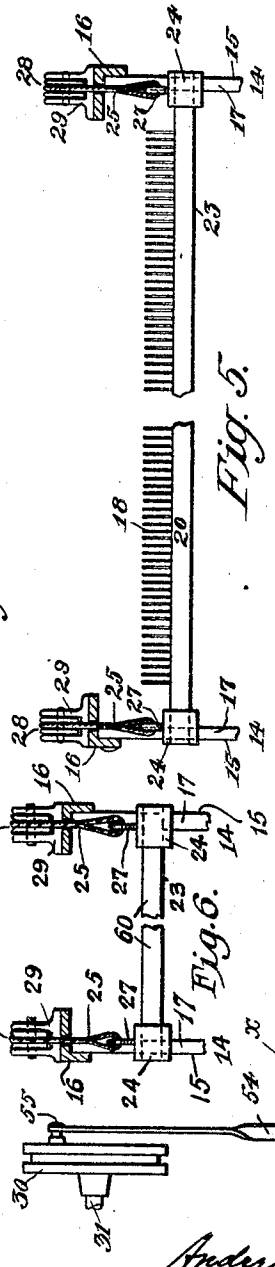


Fig. 5.

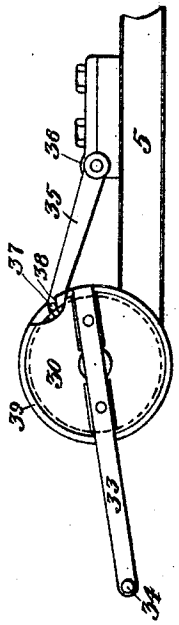


Fig. 4.

Fig. 6.

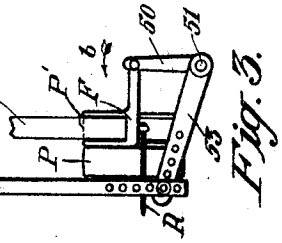


Fig. 3.

Inventor:
Andrew M. Gillespie
By
Armington Orr White
Attorneys.

Patented Oct. 26, 1926. 1,604,276

UNITED STATES PATENT OFFICE.

ANDREW M. GILLESPIE, OF COVENTRY, RHODE ISLAND.

SINGEING OR GASSING MACHINE.

Application filed January 12, 1923. Serial No. 612.273.

This invention relates to improvements in singeing or gassing machines for singeing yarns, threads and fabrics to remove the lint, fluff and loose fibers therefrom.

One object of the invention is to provide an improved machine in which a web of yarns or a sheet of fabric may be traversed through or across the flames from suitable gas-burners to subject the material to the gassing or singeing operation.

A particular object of the improvement is to provide means for arresting the travel of the yarns or other sheet when occasion requires, and for concurrently removing the material from proximity to the burners so that the yarns or fabric will not be scorched or burnt from excessive exposure to the flame.

Another object of the improvement is to provide means for starting the machine and simultaneously returning the yarns or fabric into proximity with the burners to continue the singeing operation as before.

Another object of the improvement is to provide a machine in which the sheet of yarns or other material is so manipulated that when it is removed from the burners and then returned into proximity therewith the portion of the sheet which has traveled forward after being withdrawn from the flame will still be subjected to the gassing operation to insure that the whole length of the sheet will be properly singed.

Further objects of the improvement are set forth in the following specification which describes a preferred embodiment of the invention as illustrated by the accompanying drawings. In the drawings:

Fig. 1 is a side elevation of my improved gassing machine;

Fig. 2, a plan view of the same;

Fig. 3, an enlarged detailed view of the stopping-mechanism of the machine;

Fig. 4, an enlarged detailed view of the control-device for the stopping-mechanism of the machine;

Fig. 5, an enlarged view of the slidable reed or comb employed on the machine for lifting the yarns away from the burners, and

Fig. 6, an enlarged view of the rod or roller employed for lifting the sheet away from the burners when the apparatus is applied to use for singeing cloth instead of yarn.

Referring to the drawings the present embodiment of the invention as herein shown comprises, in general, a series of burners; means for traveling or feeding a sheet of yarns or other textile material across the burners; means for arresting the feeding operation; and means for automatically withdrawing the material from proximity to the burners upon the stopping of the machine.

As illustrated in Fig. 1, a plurality of gas-burners 2 are supported on a framework 3 which may consist of suitable legs or standards 4, longitudinal side-rails 5, and lateral cross-struts or stringers 6. The framework 3 may be constructed from channel-bars and angle-irons jointed together with rivets, and is preferably made in two parts or sections A and B. Each section carries its own set of burners 2 which usually consist of suitable tubes or pipes 7 extending laterally across the upper side-rails 5 of the frame 3. A plurality of the burner-pipes 7 are employed on each section A and B of the framework 3, being spaced apart in parallel relation, and in the present drawings I have illustrated four pipes in all, although a greater or less number may be used if desired. Each set or group of pipes 7 is connected by suitable fittings to a gas and air intake or mixing-chamber 10, into which leads the gas or other fuel feed-pipe 11. A suitable valve or shut-off 12 is provided for controlling the supply of fuel, and the gas and air are mixed in the chamber 10 and carried to the burners 2 under pressure to be ignited in a "Bunsen" flame. The burners 2 may consist of a series of small openings spaced at short intervals along the pipes 7, but preferably, the pipes are slitted along the top and the opening thus formed covered with wire gauze.

At the forward and rearward ends of the frame work 3 are vertical uprights or standards 14 comprising opposite pairs of parallel bars 15 fastened at the bottom to the side-rails 5 and connected at the top by cross-pieces or angle-irons 16. The uprights 14 are designed to provide vertical ways or tracks 17 for the ends of two combs or reeds 20 and 21 which are arranged to slide up and down therein. Referring to Fig. 5, the combs or reeds 20 and 21 may consist of cylindrical rods or tubes 23 having rows of teeth or dents 18 arranged along the top, and provided at their ends with block-like shoes 24 which are fitted to slide in the ways 17 in the

standards 14. The reeds 20 and 21 are raised and lowered on the standards 14 by means of pairs of cords or chains 25 and 26 fastened to eyes 27 on the shoes 24. The cords 25 pass over sheaves or pulleys 28 journaled in bearing-brackets 29 mounted on the cross-pieces 16 at the top of the standards 14. At their opposite ends the cords 25 and 26 are attached to the peripheries of a pair of flanged wheels or drums 30 to adapt them to be wound thereon to raise the reeds 20 and 21 in their ways, see Fig. 1. The drums 30 are mounted fast on the ends of a shaft 31 extending across the top of the framework 3 and journaled in bearings 32 fastened to the side-rails 5.

A crank-arm 33 on one of the drums 30 is provided with a handle 34 from which both drums may be manually rotated, and a pawl 35, shown in detail in Fig. 4, is pivoted on a bearing 36 on the frame 3 with its end carrying a pin 37 adapted to enter a notch 38 in the rim of the flange 39 on the drum. The notch 38 is located in such position on the circumference of the drum 30 that when the cords 25 and 26 have been wound up to raise the reeds 20 and 21 to the top of the standards 14 the pawl will engage the notch to hold the drums from turning back. In this way the drums are locked in position to maintain the reeds raised, and when it is required to lower them again the drums may be released by lifting the pawl out of the notch.

The combs or reeds 20 and 21 support the web or mat of yarns *y* to direct the latter across the top of the burner-pipes 7 and through or in proximity to the flames issuing from the burners 2. The yarns *y* may be taken from individual spools, cops or bobbins arranged on a suitable creel, as commonly used in the art, or in other instances the threads or yarns may lead from a single spool or beam Y as illustrated in Figs. 1 and 2. In either case the relatively large number of yarns or filaments *y* are spread out in a flat web or mat, with the individual threads kept separate and prevented from snarling or tangling by the teeth or dents 18 between which they draw. It is to be noted at this point, however, that my improved apparatus is adapted for singeing or gassing sheet materials such as textile fabrics or the like, and for such uses the toothed reeds 20 and 21 are replaced by smooth rods or rollers 60, shown in Fig. 6, across which the cloth will draw without obstruction.

The spool or beam Y carrying the material to be singed or gassed may be mounted to rotate in a suitable cradle or holder and, as shown in Figs. 1 and 2, I provide for this purpose a pair of standards 40 having bearings for the gudgeons of the spool or for a shaft or axle 41 extending axially through its barrel. I also provide braking-means for arresting the rotation of the spool when the travel or feed of the material is interrupted during the operation of the machine to piece up the yarns or for other purposes.

As shown in Fig. 1, a brake-lever 44 is pivoted on a bracket 45 fastened to the floor, the lever being provided at its end with a shoe 46 lined with friction-material adapted to contact with the rim of one of the flanges 47 on the spool Y. The brake-lever 44 may be operated manually by pressing the foot thereagainst, but preferably it is connected to be moved from the drums 30 which raise the combs or reeds 20 and 21. For this purpose I may employ a cord or chain 48 fastened to the free end of the brake-lever 44 and leading through sheave-blocks 49 to the periphery of one of the drums 30. This arrangement provides that when the material is raised away from the burners, upon the arrest of its feed or travel with respect thereto, a braking action will be applied to the spool or beam Y to prevent it from running ahead under its momentum to unreel a loose length of yarns.

For feeding the material through the machine to draw it across the burners 2, any suitable type of reeling or winding machine may be used as generally employed for this purpose. When the material to be treated consists of yarn or thread it is usually wound on a ball-warper to prepare it for further processes after the singeing operation. Figs. 1 and 2 illustrate a well-known type of warping machine W in which the yarns are gathered together or contracted into a rope or "chain" *c* and wound helically on a mandrel or tube E to build up the cylindrical ball or package C. The yarns *y* lead off from the comb or reed 21 in fan-shape, as illustrated in Fig. 2, and passing around a suitable drum or pulley (not herein shown) are gathered together in the chain *c* which is guided back and forth along the mandrel E by a traversing trumpet T. The ball C is rotated by peripheral contact with a drum D which is driven from a shaft S carrying tight and loose belt-pulleys P, P'. The operation of the winder is controlled in the usual manner by shifting the belt *x* from one pulley to the other by means of a shipper-fork F, see Fig. 3.

Referring to Figs. 1 and 3, the stopping and starting of the warper or other winding or reeling machine is controlled concurrently with the raising and lowering of the yarns by means of suitable instrumentalities such as those now described. The belt-shipper F slides on a rod R and is shifted by means of an arm or lever 50 fast on the end of a rod or rocker-shaft 51 which is mounted in bearings 52 and extends along the side of the frame 3. On the opposite end of the shaft 51 is an arm or lever 53 connected by a rod or link 54 to a crank pin 55 on the side of

one of the drums 30. It will be obvious from the above description that when the drums 30 are turned from the crank-handle 34, to raise the reeds 20 and 21, the connection-rod 54 will be operated to swing the arm 53 to rock the shaft 51. The rocking of the shaft 51 acts to move the lever 50 to slide the shipper-fork F to shift the belt x from the tight to the loose pulley, to stop the winding machine and the machine is started from the reverse operation of these elements.

The method of operation of the complete apparatus is as follows: The yarns or threads y are led off from the spool or beam Y through the reed 20 and thence across the top of the frame 3 to the reed 21. From the reed 21 the yarns lead out and around a guiding-pulley (not shown) and thence back to the warper W in which they are gathered together in the chain c and traversed by the trumpet T to feed them to the ball C. In Fig. 1 of the drawings the dot-and-dash lines illustrate the yarns y as raised away from the burners 2, the reeds 20 and 21 being shown in position at the top of their standards 14. Assuming that with the parts in the relation here shown the machine is at rest, the drums 30 will be locked from turning by the engagement of the pawl 35 with the notch 38, and the forward end of the brake-lever 44 will be depressed with its brake-shoe 46 frictionally engaged with the flange 47 of the beam Y. At the same time the crank-pin 55 will be in such position that the connecting-rod 54 will hold the shaft 51 with the shipper-fork F opposite the loose pulley P′ so that the belt x runs on the idler without driving the warper W.

The operator takes his position at the side of the machine within convenient reach of the crank-handle 34, and to start the operation of the mechanism the pawl 35 is released from the drum 30 and the crank 33 turned in the direction indicated by the arrow a in Fig. 1. As the drums 30 are rotated in this direction the cords or chains 25 and 26 are unwound to lower the reeds 20 and 21 to the bottom of the ways 17 on the standards 14 where their shoes 24 will rest on the side-rails 5 of the framework 3. It is to be understood that meanwhile the burners 2 have been lighted, and with the reeds 20 and 21 in their lowermost position the yarns y will be directed thereacross through the flames from the burners, as indicated by the dotted lines in Fig. 1. As the drums 30 are turned back to lower the reeds 20 and 21 the brake-lever 44 will be released to free its shoe 46 from the flange 47 on the beam Y, to allow the latter to turn freely, and meanwhile the connecting-rod 54 will be moved from the crank-pin 55 to rock the shaft 51 in the direction indicated by the arrow b in Fig. 3. This rocking action of the shaft 51 operates the arm 50 to slide the belt-shipper F to the left, as viewed in Fig. 3, to shift the belt x from the loose pulley P′ to the tight pulley P and in this manner the warper W is started to operate to draw the yarns through the machine.

As the yarns y pass over the burners and through the flames at a rapid rate of travel the loose motes, fluff and projecting fibers are ignited and burnt off so that the material is singed and cleaned to present a more uniform and smoother appearance before being wound into the ball C. When a yarn or thread breaks it is necessary to stop the machine to piece up the ends, and more frequent stoppages are also required at intervals in the travel of the yarns to insert lease threads through the web in accordance with the usual practice. When it is desired to stop the machine, for these or any other purposes, the operator simply reverses the procedure above described by turning the crank 33 in the direction opposite to that indicated by the arrow a in Fig. 1. This action causes the drums 30 to be rotated to wind on the cords 25 and 26 to raise the reeds 20 and 21, whereby the sheet of yarns y will be lifted away from the burners 2 to prevent the material from being scorched or burnt after its travel through the flames has been arrested. As the yarns y are raised or lifted away from the flames the turning of the drums 30 causes the connecting-rod 54 to rock the shaft 51 and arm 50 to carry the belt-shipper F to the right as viewed in Fig. 3. This action shifts the driving-belt x onto the loose pulley P′ to stop the warper W and the travel or feed of the yarns is immediately arrested concurrently with their being raised away from the burners. As the draft on the yarns is discontinued at the warping or winding machine the brake-lever 44 is operated, in the manner as before explained, to apply a braking-action on the flange of the spool or beam Y, and in this way the beam is restrained from running ahead under the effect of its momentum so that the tension on the yarns will not be unduly slackened. This last step in the automatic operation of the machine. is most important as preventing the tension on the yarns being slackened to such an extent that the material will sag down into close proximity to the burners and become scorched or burnt.

It is to be understood, of course, that the burners 2 remain lighted continuously during the operation of the machine, for by removing the yarns from proximity thereto there is no need for shutting off the fuel supply or covering the flames with guards or shields. The purpose of arranging the burners in two or more sets or groups is twofold and makes for an important advantage in the operation of the device as now ex-

plained. In the first place, the arrangement whereby the burners may be placed with one group considerably advanced with respect to the other set provides that when the machine has been stopped if the yarns are traveled beyond the first set of burners after they are raised away therefrom, when they are lowered again at the starting of the machine the unsinged portions of the material will still be brought into contact with the flames from the second set of burners. This provision eliminates the chance of any portion of the yarns escaping the gassing operation during the progress of the material through the machine.

Another advantage resulting from the arrangement of the burners in groups on the two separate sections A and B of the frame 3 is that there is less danger of overheating or scorching the yarns as they pass through the flames. When the burners are grouped in a single series of closely spaced units, as has heretofore been the common practice, the heat from four or more rows of flames is usually so intense that the yarns are apt to be scorched, dried and weakened to such an extent that they break and fall into the flames, sometimes setting the whole sheet or mat afire and causing much damage and waste of material. With the present improved arrangement I have found that while the singeing operation is in every respect as efficient as with the usual close grouping of the burners, there is much less liability of over-singeing, scorching or burning the yarns. With the present improved apparatus I am able to treat very fine delicate filaments where heretofore the singeing process has been fraught with great danger of damage and loss to such light gossamer materials.

I am aware that it is old in the art to provide means for gassing or singeing textile materials by passing them through or over flames for a set of burners. Heretofore, however, it has usually been considered necessary to extinguish or cover the flames from the burners when the travel of the yarns is arrested to piece up ends and insert leases; or, in other cases, to remove the flames from contact with the yarns by shifting the burners bodily away from proximity thereto. As far as I know the present disclosure is the first machine in which the mat of yarns is bodily shifted to remove the material from contact with the flames, and this arrangement makes for a most important improvement in the art. Where heretofore the covering, shielding or shifting of the burners has entailed the use of complicated and cumbersome mechanism, flexible connections for the burner-pipes and heavy loads to be raised, in the present invention the means for raising the yarns from the burners is extremely simple, compact and very easily operated. Furthermore, there is no danger of the leakage of gas through the flexible couplings or frequently-operated shut-off valves. Stated briefly, the present improved apparatus is much more simple and economical to manufacture; more convenient and easy to operate; and has greater capacity in operation with less danger of injury or damage to the material being treated.

While I have herein illustrated only one preferred embodiment of the invention it is to be understood that various modifications may be made in the structure and arrangement of the apparatus without departing from the spirit or scope of the appended claims. Therefore without limiting myself in this respect, I claim:

1. In a singeing machine, the combination with the burners, of means for longitudinally traveling a sheet of textile strands across the burners to expose it to the flames therefrom, a plurality of spaced supports for guiding the sheet to maintain it in proximity to the burners, and means for moving said supports to shift the sheet laterally toward and away from the burners.

2. In a singeing machine, the combination with a plurality of burners, of means to travel a sheet of yarns across the burners, guiding-beams arranged fore and aft of the burners to adapt the sheet of yarns to feed thereacross, and means to move said guiding-means to carry the sheet of yarns a sufficient distance away from the burners to remove them from exposure to the heat from the flames.

3. In a singeing machine, the combination with a plurality of burners, of means to travel a sheet of yarns in a horizontal plane above the burners, a plurality of guiding-means for directing the sheet in parallelism with the burners, and means for moving said guiding-means to a location remote from their normal position whereby to bodily shift the whole sheet of yarns to remove it from exposure to the heat from the burners.

4. In a singeing machine, the combination of a frame, horizontal burners mounted on the frame, horizontal guiding-means arranged fore and aft of the burners on the frame for guiding a sheet of yarns in a plane above the burners, means to draw the sheet of yarns across the guiding-means, and means to raise the guiding-means a sufficient distance above the burners to remove the yarns from exposure to the heat from the flames.

5. In a singeing machine, the combination of a frame, burners supported in horizontal position on the frame, uprights at the ends of the frame, horizontal bars slidable on the uprights and adapted to guide a sheet of yarns across the burners, and means to slide the bars on the uprights to raise the

sheet of yarns a sufficient distance from the burners to remove them from exposure to the heat from the flames.

6. In a singeing machine, the combination of a frame, a series of burners on the frame, vertical ways on the frame, reeds slidable on the ways, and means connected to raise and lower the reeds in unison.

7. In a singeing apparatus, the combination of a frame, a pair of reeds slidable in vertical ways on the frame, burners arranged between the reeds, a rotatable yarn beam, braking-means for the beam, a warping-machine for drawing the yarns off from the beam through the reeds and across the burners, means for raising the reeds to lift the yarns away from the burners, means connected therewith to arrest the operation of the warping-machine, and means actuated concurrently therewith to operate the braking-means to check the rotation of the beam.

8. In a singeing machine, the combination of a plurality of burners arranged in separate groups with one group spaced a considerably greater distance from the next adjacent group than the distance between the individual burners, means to feed a sheet of yarns across the burners whereby the material is singed by one group of burners, allowed to cool and subsequently singed by the next group of burners, means for guiding the sheet of yarns in its travel across the burners, and means for shifting the guiding-means to withdraw the whole sheet of yarns from exposure to the flames from the burners.

In testimony whereof I affix my signature.

ANDREW M. GILLESPIE.