

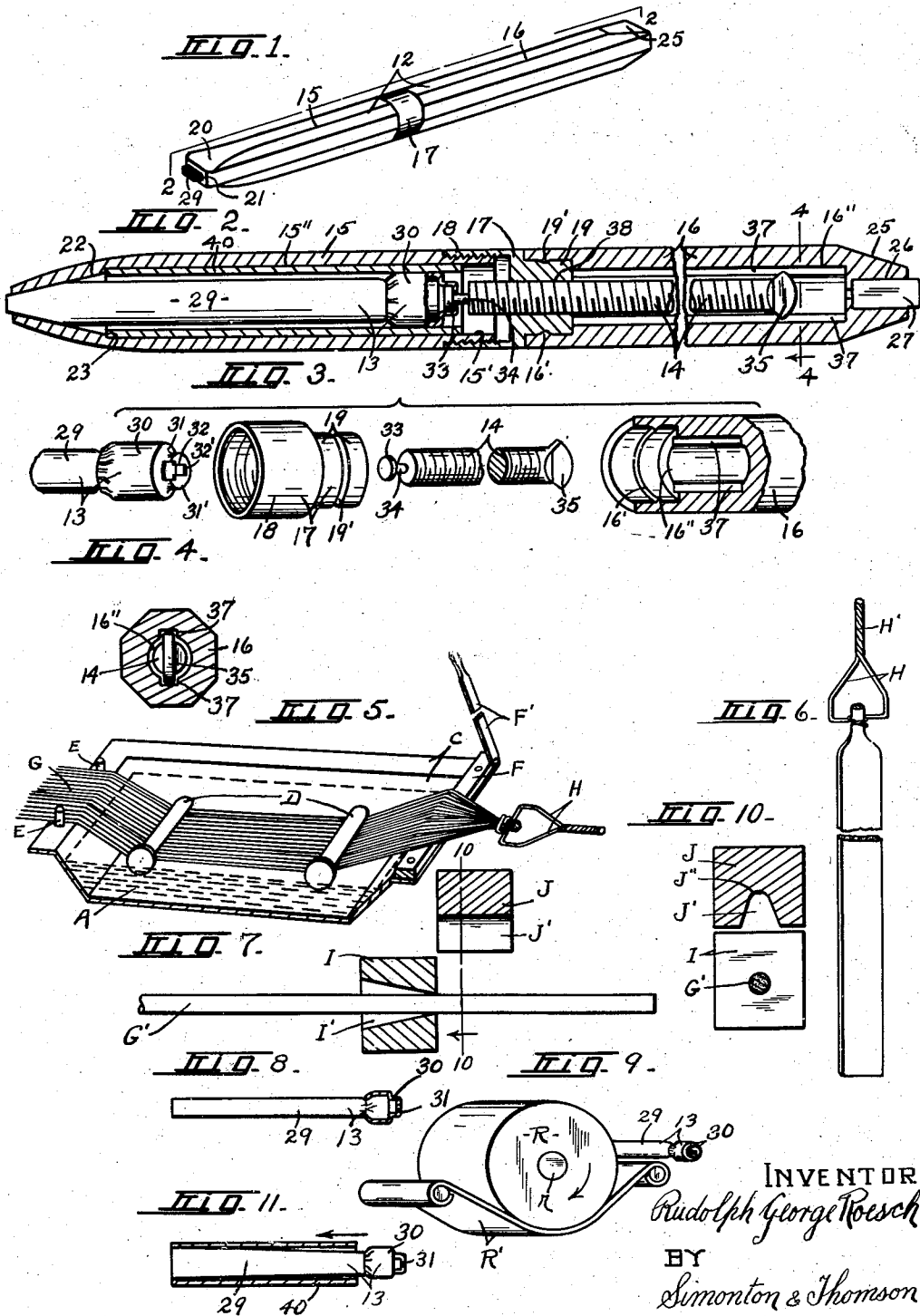
Aug. 6, 1940.

R. G. ROESCH

2,210,432

ERASER

Filed Nov. 22, 1937



INVENTOR
Rudolph George Roesch
BY
Simonton & Thomson
ATTORNEYS

UNITED STATES PATENT OFFICE

2,210,432

ERASER

Rudolph George Roesch, Syracuse, N. Y., assignor
to The Eraser Company, Inc., Syracuse, N. Y.,
a corporation of New York

Application November 22, 1937, Serial No. 175,867

14 Claims. (Cl. 120—36)

This invention relates to an eraser or abrader and to the method of making the same.

The invention pertains more particularly to an eraser for obliterating or rubbing out marks from paper or other material made with ink, pencil, crayon, or the like, and comprises primarily a case or holder provided with an opening at one end and an erasing element or refill composed of suitable abrasive material adjustably mounted in the case or holder, whereby the erasing element or refill may be impelled through said open end of the case at will, to bring the end of the element or refill slightly extended beyond said end of the case or holder for use and to provide for the required adjustment of the eraser to compensate for wear during use.

This invention is an improvement on the eraser shown in Patent No. 1,048,350 issued to Joseph K. Rush, December 24, 1912.

In the eraser shown in the above mentioned patent, the erasing element includes a brush composed of glass filaments which, when in their natural state, are not only extremely brittle and therefore adapted to break under the slightest bending or twisting stress, but have a tendency to produce smearing by spreading the particles of the mark being erased over the paper or other material from which the mark is being removed. Furthermore the glass filaments or strands of the brush when secured at one end in a head or cap, tend to separate and flare outwardly at their outer or free ends so that it is difficult to enter the brush in the barrel of the case or holder.

An object of the invention is to provide an erasing element, in the form of a refill, of highly abrasive material such as glass in fine strands or filaments treated with a suitable binding and cleansing agent, such as specially treated rubber, for maintaining the glass filaments in predetermined relation with each other and at the same time provide a cleansing agent associated with the abrasive material which will not adhere to the paper or other material upon which the marks are made, and which will readily collect or gather up from said paper or material, particles loosened by the abrasive material during the erasing of the marks and thus prevent smearing.

Another object of the invention resides in the improved manner of constructing the erasing element or brush refill, and particularly to the method of treating the glass strands or filaments from which the erasing element is made with a binding material whereby said strands will adhere, to a certain degree, to each other. The

glass strands or filaments treated by my improved method are not only maintained in a convenient shape for the insertion thereof into the case or holder but are also reinforced to such an extent that they are less liable to break when being bent or twisted. Furthermore these strands are not only particularly adapted for use as an eraser but as an abrasive or polishing medium for metals or other materials, as well.

A further object of the invention is to provide the erasing element or brush with a suitable shield releasably mounted thereon for protecting the fine glass strands or filaments prior to the insertion of the erasing element or brush in the case or holder.

Other objects and advantages pertaining to the method of applying the binding or cleansing agent to the erasing element will more fully appear from the following description taken in conjunction with the accompanying drawing in which:

Figure 1 is a perspective view of an eraser embodying the various features of this invention.

Figure 2 is an enlarged longitudinal sectional view of the same taken substantially on line 2—2, Figure 1.

Figure 3 is a perspective view illustrating various parts of the eraser shown in Figures 1 and 2, with the same arranged in exploded relation to each other, certain of the parts being shown broken away and in section.

Figure 4 is a transverse sectional view taken on line 4—4, Figure 2.

Figure 5 is a perspective view illustrating more or less diagrammatically the method of treating the glass strands or filaments of the erasing element with a binding and cleansing agent.

Figures 6, 7, 8, and 9 are views illustrating more or less diagrammatically successive steps taken in the manufacture of the erasing element following the treating of the glass strands with the binding and cleansing agent.

Figure 10 is a vertical sectional view taken on line 10—10, Figure 7.

Figure 11 is a plan view, partly in section, illustrating the erasing element mounted in a shield therefor.

The eraser, as illustrated in Figures 1 to 11 inclusive of the drawing, comprises primarily a tubular case or holder 12, an erasing element or refill 13 and suitable operating means comprising a screw 14 co-acting with the erasing element and case for moving the erasing element or refill with respect to said case.

The case or holder 12 in this instance is composed of three sections, two tubular end sections

15 and 16 and an intermediate section 17. The end sections 15 and 16 are preferably composed of light molded material, such as Bakelite, while the intermediate section 17 is preferably composed of metal, such as brass nickel plated, or other suitable material. The intermediate section 17 is composed of a tubular or cup-shaped portion 18 of substantially the same outer diameter as the end portions 15 and 16 and a hub or boss portion 19 of less diameter than the tubular portion 18 and which is arranged to extend from one end of the tubular portion in substantially co-axial relation therewith. The tubular portion 18 of section 17 is provided with internal threads which are adapted to engage corresponding external threads provided on the reduced inner end portion 15' of the end section 15 for releasably securing the intermediate section and said end section to each other. The hub portion 19 is arranged to extend into the inner end of the end section 16 and is provided with an annular recess 19' in the outer peripheral wall intermediate the ends thereof, which rotatably receives therein an inwardly extending annular rib or flange 16' formed in the adjacent portion of the end section 16, as illustrated in Figures 2 and 3.

The outer end of the holder section 15 is flattened at opposite sides, as at 20, and is provided with a substantially rectangular opening 21 of considerably less width than the interior diameter of the body of the section 15 but of substantially the same length as said interior diameter for the passage of the erasing element or refill therethrough. The interior of the section 15 is tapered, as at 22, at opposite sides from the sides of the opening 21 inwardly in diverging planes to the inner wall 15'' of the body portion of section 15. The interior of the section 15 is also provided with a shoulder 23 formed at the junction of the tapered portion 22 with the wall 15'' to provide a stop for the refill shield, as will hereinafter be more apparent.

The outer end of holder section 16 is tapered at opposite sides, as at 25, similar to the tapered portion of the holder section 15 and is provided with an inwardly extending recess 26 which terminates a short distance from the inner wall 16'' of the body portion of section 16, for the reception of a suitable pencil eraser 27 composed of rubber or the like.

The refill or erasing element 13 is in the form of a brush and comprises a cylindrical body 29 composed of fine strands or filaments of glass and which has one of the ends thereof secured firmly in a head or cap 30. This cap or head 30 is of cup-shape and has the outer marginal edge thereof contracted or crimped inwardly into clamping engagement with the adjacent portions of the glass filaments for firmly securing said head and filaments to each other.

The closed end 31 of the cap or head 30 is provided with a T slot 32 extending substantially centrally or diametrically thereof. The intermediate portion 31' of the end 31 is pressed upwardly for the reception of a head 33 formed on the end of the screw member 14 and which is connected with the said screw member by a neck portion 34 which is adapted to be slidably received within the stem or longitudinal portion 32' of the slot 32.

The screw member 14 is adapted to extend into the interior of the holder section 16 with a loose sliding fit and has the end thereof opposite the head 33 flattened, as at 35, so as to extend out-

wardly at diametrically opposite sides of the body portion of the screw to be slidably received in a pair of diametrically opposed slots 37 formed in the inner wall 16'', as shown in Figures 2, 3 and 4. The screw member 14 extends from the interior of the section 16 through a threaded opening or nut member 38 provided in the hub portion 19 of the intermediate section 17 and into the interior of the end section 15.

It will now be understood that the screw 14 will be moved axially with respect to the holder 12 upon relative rotation of the end section 16 and intermediate section 17, due to the threaded engagement of the screw with the hub 19 and to the engagement of the flattened portion 35 of the screw in the slots 37. It therefore follows that the longitudinal movement of the screw 14 will produce a corresponding longitudinal movement of the erasing element 13 connected therewith with respect to the holder section 15 for positioning the outer end of the element in proper relation with the opened end of said latter section.

My improved manner of forming the erasing element or brush 13 will now be explained. The glass strands or filaments comprising the body portion 29 are first formed into skeins which consist of the required number of the glass strands and then these skeins are cut in half to provide bundles of relatively long lengths.

These bundles are treated with a suitable binding and cleansing agent which is preferably an aqueous dispersion of prevulcanized rubber which is manufactured under United States Patents Nos. 1,443,149 and 1,682,857. This agent is a specialized compound designed for coating or impregnating and is sold under the trade name "Vultex."

This rubber compound has the unusual characteristic that after drying the rubber film produced has practically no residual tack, thus making it unnecessary to dust the surface with talcum, mica, or other dusting agent to eliminate the tacky feel which is characteristic of the average rubber compound. A particular feature of the prevulcanization process of this preferred material for binding the glass filaments to each other is that the usual solvents used in treating the crude rubber are eliminated and the rubber is not milled or masticated, and therefore it retains its original nerve and has superior strength and aging qualities.

It is to be understood, however, that other rubber or flexible compounds may be used as a binding agent for strengthening and holding the glass filaments. When the brush is to be used as an eraser, a rubber compound is preferred, because it acts as a cleaner and assists in the functioning of the eraser. For instance, I may use "rubber milk" or liquid latex after having been coagulated and prepared in the conventional manner to make ready for use. When treating the glass filaments with this usual rubber compound the rubber may be vulcanized after the glass filaments have been immersed in the rubber compound and shaped into rope or other form. If, on the other hand, the glass brush is to be used as a metal abrasive or polishing member, the filaments may be treated with a more tenacious binding agent such as glue, cement, silicate of soda, or the like, suitable for such purposes.

One method of treating the glass strands with this prevulcanized rubber solution or other binding agent, as A Figure 5, comprises in placing this solution in liquid form in a container C, having a pair of guide rollers or members D secured to one

side thereof in a horizontal plane below the normal level of the solution A. One side of the container C may as shown be provided with a pair of guide members or pins E arranged in spaced relation to each other in alignment with the guide members D. The opposite side of the container C is shown provided with a shearing edge F having a knife blade F' pivotally associated therewith for severing the glass strands. The strands of glass are passed from between the guide members E through the solution A, beneath the guide members D and thence outwardly over the shearing edge F. The distance between the guide members E and the lengths of the members D are substantially equal and considerably greater than the normal diameter or width of the bundle of glass strands, so that the strands G of glass comprising the bundle are spread out or separated during the passage thereof through the container C, as indicated in Figure 5, whereby the strands are all substantially uniformly treated with the binding solution.

The forward ends of the strands after having been submerged in the solution A may have a clamp H secured thereto to facilitate the subsequent drawing of the strands through the solution. As the strands emerge from the solution A they are cut into lengths, preferably between three and four feet long, convenient for handling. Each of these lengths is then held by the clamp H in a vertical position and the excess rubber compound or Vultex is removed therefrom in any suitable manner as by passing the strands longitudinally between revolving rolls or brushes or by the operator, who usually wears rubber gloves during this operation, passing his hand downward along the strands while gripping them between the thumb and first finger thereof. This operation not only removes the excess Vultex but also any loose glass strands or fibers and leaves the lengths in flat, ribbon like form as indicated in Figure 6.

The strands and fibers are next collected into a rope-like mass of circular cross section while the Vultex is in a plastic state, by the operator swinging the clamp H through a circular path of only a few inches in diameter while the strands hang freely in a more or less vertical position. Or the glass strands and Vultex may be brought from the ribbon to the rope form by rotation of the clamp H. This may be readily accomplished by the operator rolling the handle H' of the clamp first in one direction and then in the opposite direction by holding said handle between the palms of his hands while moving the hands alternately backward and forward with respect to each other, said strands being permitted to hang freely downward from the clamp. The rope members are then hung in a vertical position by the engagement of the clamp H with a suitable support or pin to permit the Vultex to dry.

The strands of these rope members, as G', are quite firmly held together by the thin film of prevulcanized rubber collected thereon as said rubber dries so that said members are provided with a substantially smooth outer surface which will not readily adhere to an adjacent member. These rope-like members are then cut into desired lengths for the brushes 29 by the use of suitable dies I and J, as indicated in the Figures 7 and 10. It is preferable that both ends of the severed pieces be substantially flat and normal to the axis thereof to facilitate the assembly of the pieces with the heads or caps 30, and also so that the end protruding from the open end of the holder

12 will be symmetrical and ready to be used as an eraser without additional treatment of the ends of the fibers or strands as by grinding or the like.

For this purpose one of the die members, as I, is provided with an opening I' extending there-through of conical formation and which has the smaller outlet end thereof of substantially the same diameter as the rope-like member G'. The other die member J is provided with a slot or recess J' extending inwardly from the lower edge thereof. This slot J' extends longitudinally through the die J and has the inner end J'' thereof of circular form with the sides of the slot extended from the inner end outwardly in diverging planes. The diameter of the inner end portion J'' of the slot J' is substantially equal to the diameter of the rope member G'. The die members I and J are arranged end to end in close relation to each other so that as the die member J is moved downwardly past the outlet end of the opening I' the rope member G' will be first brought into registration with the inner end of slot J'' and then severed from the portion of the rope member contained in the opening I' by the shearing action of the adjacent surfaces of the dies I and J.

During the shearing action of the dies it is obvious that the portion of the rope members aligned with the outlet end of the opening I' will be maintained thereby circular in cross section. It will also be obvious that the adjacent portion of the rope member contained in the inner end J'' of the slot J' will likewise be maintained circular in cross section during the shearing action of the dies so that the rope member will be severed substantially normal to the axis thereof and the ends of the severed portions will not be jagged or uneven as is the case when the rope member is severed by a knife blade co-acting with a substantially flat shearing edge.

After a rope member has thus been cut, the pieces are assembled with the heads 30 by inserting one end of a cut piece into a head and then contracting the outer end portion of the head about the piece in any suitable manner.

When the strands of glass have not been treated with the latex or prevulcanized rubber solution, as in the case of the structure shown in Patent No. 1,048,350 hereinbefore referred to, it has been necessary to secure the body members to the heads or caps by the use of cement, for the reason that if the head or caps were crimped or pinched into engagement with the strands, the strands would be broken off due to their brittle nature. However, when treating these strands with the prevulcanized rubber solution, they become more flexible and will withstand a considerable amount of bending or twisting before breaking. It therefore follows that there is a considerable saving in the time, labor, and material when securing the heads to the body members by merely contracting the outer edges of said heads about the body members with a suitable crimping machine.

The strands of glass are next separated from each other, to a certain degree, to enable the ends of the strands to readily conform to a general outline most conducive for erasing purposes. The separation of the strands is accomplished in this instance by passing the body members between a pressure roller, as R Figure 9, and a stationary guide member or support R'. The roller R may be rotated by any suitable means as shaft r while the guide R' is a more or less flexible

member composed of leather or the like so that the glass strands will pass between the members R and R' with a rolling action and will not be broken.

5 After the body members have thus been subjected to the action of roller R and guide R', a tubular shield, as 40, composed of cardboard or other suitable material, is passed over the head 30 onto each body member 29. The interior
10 diameter of the shield 40 is slightly greater than that of the head 30 and less than the distance across the outer end portion of the body member which is substantially greater in cross section than the head 30 after having been treated by
15 the roller R. It therefore follows that each shield 40 will contact the outer end portion of the body 29 and be frictionally maintained thereby on said body member to such an extent that the shield will not readily fall from the body member
20 during the handling thereof. The length of the shield 40 is substantially equal to or slightly less than the length of a body member 29, so that the strands thereof will be protected by said shield throughout the greater portion of the length thereof.

25 These brushes and the shield assembled therewith are usually packed, two or more, in suitable containers to be supplied with the holder 12 or independently thereof to the purchaser.
30 When it is desired to insert one of the erasing elements or brushes 13 into the holder 12, the end section 15 of the holder is first removed from the intermediate section 17 by unscrewing said sections from each other. A brush 13 to-
35 gether with the shield 40 are then inserted into the inner or enlarged end of the section 15 which has the interior of the body portion thereof of such a diameter as to readily receive the shield 40. The shield and brush are only partially in-
40 serted into the section 15, so that the head or cap 30 will extend outwardly a short distance beyond the inner end of said section.

The screw 14 which is positioned with the head 33 thereof extended a relatively short distance
45 beyond the open exposed end of the intermediate section 17, is next connected to the brush by the insertion of the head 33 into the transverse portions of the slot 32 and moved beneath the protruding end portion 31' of the head, as indi-
50 cated in Figure 2. The section 15 is then screw-threaded onto the section 17 after which the brush may be moved into position for use by rotating the holder section 16 with respect to the intermediate section 17 and end section 15
55 for moving said screw toward the open end 21 of section 15.

As the screw and brush 13 are thus moved longi-
60 tudinally, the shield 40 will move longitudinally with the brush 13 until stopped by the engagement thereof with the shoulder 23 in the section 15. Continued movement of the screw toward the section 15 will cause the brush to move out-
65 wardly until the outer end of the body portion 29 will pass through the opening 21 and project the required distance beyond the corresponding end of the section 15. During this outward movement of the brush 13, the glass strands will readily conform to the outer end portion of sec-
70 tion 15 and the head or cap 30 will move into the interior of the shield 40 which as hereinbefore stated, is of slightly greater interior diameter than the exterior diameter of said head or cap. It will thus be seen that the shield 40 not only supports the glass strands from coming in
75 contact with and clinging to or being inserted

into the fingers of the user, but it also assists in maintaining the strands in their proper rela-
tion to each other during the insertion thereof into the holder 12.

It will also be apparent that as the end of the
5 brush body 29 wears, the brush may be projected forwardly at will by simply rotating the section 16 in one direction with respect to the sections 15 and 17, and the brush may be as readily with-
10 drawn inwardly from the open end of the section 15 by rotating the section 16 relative to sections 15 and 17 in the reverse direction. During these longitudinal movements of the brush, the same
15 will freely move with respect to the shield 40 which will remain in the section 15 until the body of the brush has been substantially con-
sumed and it is again desired to replace the old brush with a new one when the shield may be removed from the section 15 after said section
20 has been removed from the section 17.

While it is desirable that the glass strands be separated from each other to a certain degree
25 when they are to be used as an ink eraser or the like, this separating step of the process may be omitted when the glass strands are to be used as an abrasive for polishing or cleaning metals or other materials. As hereinbefore stated when
30 using the glass filaments or strands for polishing purposes it may be desirable that they be maintained in fixed relation with each other as by glue, cement, or the like so as to not only enhance the polishing action of the brush but also in-
35 crease the life thereof. When treating the glass filaments or strands with a relatively tenacious binding agent, such as glue or cement, the strands after having been cut to the desired
length as they emerge from the solution A are preferably gathered while the binding agent is in a plastic state into such cross sectional form
40 as to conform to the opening therefor in the case or holder used.

It obviously is, therefore, unnecessary to treat the glass strands after the binding agent has been dried in order to enable the brush body to
45 readily conform to and pass through the case opening as in the eraser structure hereinbefore described. Furthermore it will be apparent that the size of the glass portion of the brushes may vary from that shown depending upon the use
50 to which the brush is to be put. For instance, if the brushes are to be used as an abrasive or polishing means a plurality of them may be mounted in suitable buffing wheel or other sup-
55 porting member, in which case the body portions of the brushes may be of considerably greater cross sectional area than when they are used as an ink eraser. It is thus seen that the form of the brushes in cross section and the arrange-
60 ment thereof in the supporting member may be such as to most advantageously enable them to perform the operation intended.

I claim:

1. The method of producing an abrasive member which comprises submerging a quantity of
65 glass filaments in substantially spaced-apart relation in a bath of material providing a binding agent for said filaments, thereafter gathering said treated filaments into a compact mass of predetermined form, and then drying the bind-
70 ing agent.

2. The method of producing an abrasive member which comprises submerging a quantity of
75 glass strands or filaments in substantially spaced-apart relation in a bath of material providing a binding agent therefor, then moving the filaments

into abrasive member formation, drying the binding agent, and applying a holder to the dried mass.

3. A method of producing abrasive members which comprises submerging a quantity of glass strands or filaments in a bath of material providing a binding agent therefor, gathering said treated strands or filaments to form a relatively long mass of predetermined form in cross section, drying the binding agent, and then severing the dried mass into pieces of required lengths.

4. A method of producing abrasive members which comprises submerging a quantity of glass strands or filaments in a bath of material providing a binding agent therefor, gathering said treated strands or filaments to form a relatively long mass of predetermined form in cross section, drying the binding agent, severing the dried mass into pieces of required lengths and then applying a holding element to each of such pieces.

5. The method of constructing erasing elements which comprises treating relatively long lengths of glass strands with a binding solution, gathering a desired quantity of such treated strands while the solution is in a liquid state to form relatively long rope-like members, severing said rope members at spaced intervals to form pieces of required lengths, applying a holder element to one end of such pieces to fixedly secure the strands thereof together, and then partially separating the exposed portions of the treated strands after the binding agent has become dry.

6. The method of constructing erasing elements which comprises simultaneously treating a multiplicity of glass strands with a binding agent when said agent is in a liquid form, gathering the treated strands to form relatively long rope-like members, severing said members to form pieces of required lengths, applying a cap to one end of each piece to fixedly secure the strands thereof together, and then subjecting the exposed portions of the treated strands to pressure after the binding agent has become dry for partially separating the glass strands from each other.

7. The method of constructing erasing elements of the class described which comprises passing a bundle of glass filaments through a pre-vulcanized rubber solution while maintaining said filaments spaced from each other, gathering the treated filaments while the solution is in a plastic state to form a rope-like member, severing said rope member at spaced intervals after said vulcanized rubber has become dry to form pieces of required lengths, applying a holder to one end of each piece to fixedly secure the filaments together, and then subjecting the exposed portions of the treated filaments to pressure for partially separating said filaments from each other.

8. The method of constructing erasing elements of the class described which comprises passing a bundle of glass filaments through a bath of pre-vulcanized rubber and simultaneously maintaining said filaments in a spread-out formation to substantially uniformly treat all of the filaments of the bundle, removing the treated filaments, gathering said filaments into close compact relation with each other, severing the filaments at spaced intervals to form pieces of required length, applying a holder element to one end of each piece, fixedly securing the filaments thereof together, and then subjecting the exposed portions of the glass filaments of each piece to pressure for partially separating said filaments from each other.

9. The method of producing erasers which

comprises submerging a quantity of glass filaments in a bath of material providing a binding agent, removing the excess binding agent from the filaments, gathering said treated filaments into a compact mass when the binding agent is in a plastic state, drying the binding agent of the mass, severing the mass into pieces of required lengths, and then partially separating one end portion of the filaments of each piece while maintaining the other end portion thereof intact.

10. The method of producing an eraser adapted to be received in a tubular shield of predetermined cross sectional area which comprises conducting a predetermined quantity of glass strands through a binding agent in liquid form, gathering such treated strands into a compact mass having less cross sectional area than that of said shield when the binding agent is in a plastic state by producing a vibratory action of said strands while holding them suspended by one end, subsequently drying the binding agent, and then applying a holding element to said strands.

11. The method of producing erasers adapted to be received in tubular shields of predetermined length and cross sectional area which comprises conducting a predetermined quantity of relatively long lengths of glass strands through a binding agent in liquid form, gathering such treated strands into a compact mass having less cross sectional area than said shield when the binding agent is in a plastic state by producing a vibratory action of said strands while holding them by one end in a suspended position, severing said strands at spaced intervals to form pieces having lengths substantially equal to or slightly greater than the tubular shield, and subsequently applying holding elements to said pieces at one end thereof.

12. The process of making abrasive elements which comprises passing a relatively long bundle of free glass fibers through a liquid bath of an agent capable of binding said fibers together when dry, causing said bundle to assume a cylindrical form while still wet by suspending it from one end and subjecting said suspended end to a vibratory motion, drying said cylindrical bundle, and severing said bundle to form a plurality of substantially cylindrical abrasive elements of desired lengths.

13. The process of making abrasive elements which comprises passing a relatively long bundle of free glass fibers through a liquid bath of an agent capable of binding said fibers together when dry, removing excess liquid binding agent from said bundle, causing said bundle to assume a cylindrical form while still wet by suspending it from one end and subjecting said suspended end to a vibratory motion, drying said cylindrical bundle while vertically suspended, and severing said bundle to form a plurality of substantially cylindrical abrasive elements of desired lengths.

14. The method of making abrasive members which comprises treating a plurality of relatively long lengths of glass filaments with a binding solution, gathering a desired quantity of such treated filaments to form a compact, rope-like bundle while the solution is in a liquid state, drying said bundle, severing said bundle at spaced intervals to form pieces of required lengths, and applying a cap to an end of each of said pieces.