APPARATUS FOR ERASING

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ABSTRACT OF THE DISCLOSURE

An apparatus for erasing, especially for the erasure of inked lines or other markings made on transparent drafting paper or the like. The apparatus incorporates a holder for a blade having a cutting edge which exerts a scrape-type action on the paper so as to carry out the erasure. Additionally, there is provided at least one support element which cooperates with the cutting edge of the blade for unutilyly supporting the blade, and further, at least one element for guiding the blade along the line which is to be erased. The blade itself is supported at the other end in such a manner that the cutting angle of the blade with respect to a plane defined by the support element and the cutting edge is greater than 90°.

BACKGROUND OF THE INVENTION

The present invention pertains to an improved apparatus for erasing, especially for the erasure of inked lines or other markings which have been made upon transparent drafting or drafting paper for instance, and by means of a blade which is secured in a holder. Technical or engineering drawings are generally made with India ink upon transparent drafting paper, because their permanency and reproducibility is insured for this way in the best possible manner. The transparent drafting paper is generally a vegetable parchment or vellum which is glassy transparent, and is also rather strong in wet condition and extremely fine porous with respect to all other types of paper. The ink is usually either a suspension of dye powder, preferably furnace black or lamp black, or a dyestuff solution. In every instance the fine pores of the transparent drafting paper insure that the dyestuff or ink only slightly penetrates the paper. During erasing the dyestuff or pigments which have been applied to the paper should again be removed. Generally, a soft rubber eraser is not suitable for erasing ink since the latter contains a bonding agent which strongly bonds the dyestuff or carbon black with itself and also with the paper. Rubber erasers which contain a grinding or abrasive agent are of greater effectiveness. These rubber erasers remove a thin surface layer of the paper, and therefore, also the ink located thereupon. An extension of this technique resides in the utilization of glass fiber bundles which are retained in a guide sleeve and whose threadably extendable tips are employed for grinding or abrading away the ink from the surface of the paper. However, a drawback of erasers which contain grinding agents and also glass fiber bundles resides in the fact that they act upon a relatively wide surface of the paper, so that as a practical matter it is almost impossible to prevent permanent damage to the surface of the paper during erasing. A different expedient known to the art for carrying out erasures is the erasing knife. Such possesses a usually arc-shaped blade which is secured in a small handle or grip. Further, there are also erasing knives having blades which may be exchanged in the handle, and wherein preferably razor blades are employed as the actual erasing tool. During erasing the blade is guided as steeply as possible over the paper since there is a great danger of cutting the paper by the inclined positioned blade. What is disadvantageous about the erasing knives which generally only act upon a small surface of the paper is that, during the free guiding of the knife and the blade it is extremely difficult to locate the line which is to be erased. As a result, notwithstanding the small line of contact between the knife and the paper nonetheless a relatively wide surface is erased. Apart from this, extreme care must be taken to prevent the knife from cutting the paper, and furthermore, when using razor blades the latter always contact the paper with a sharp edge so that it is impossible to prevent a pronounced damaging of the paper surface.

SUMMARY OF THE INVENTION

Accordingly, it is a primary object of the present invention to provide an improved apparatus for erasing which overcomes the aforementioned drawbacks of the prior art structures. Another, more specific object of this invention pertains to an improved apparatus for erasing, particularly for erasing inked lines or other markings upon drafting paper in a manner providing a clean erasure without destruction of the paper surface and in an area confined substantially to the region of the ink marking which is to be removed. Still a further significant object of the present invention relates to an improved apparatus for erasing marks upon a paper in an extremely easy and reliable manner, without damage to the paper surface, and further, wherein the apparatus structure is relatively inexpensive to manufacture and extremely easy to use.

Generally speaking, the present invention is characterized by the features that the holder of the erasure apparatus possesses at least one support element which cooperates with the cutting edge of the blade to provide an unutilyful support for the blade, and further, such holder is provided with at least one element for guiding the blade along the line or mark which is to be erased. Further, the cutting edge or angle of intersection of the blade with the plane defined by the support element and the cutting edge is greater than 90°.

Owing to these measures it is brought about that the holder during erasing can be placed upon the drafting paper and can be guided thereby, so that the angle of intersection or cutting angle of the blade always is constant. Through the provision of a cutting angle of greater than 90° the blade is not used as a cutting tool rather as a doctor blade or scraper. Consequently, it is practically impossible to damage the paper through cutting. The arc-shaped blade has only a short line of contact with the drafting paper, resulting in a narrow erasure line. Furthermore, the arrangement of the cutting edge of the blade in a plane of a reference surface located at the holder enables application of the holder over the line which is to be erased in such a manner that the cutting edge contacts this line and the guide elements render possible a precise guiding of the holder along a ruler or straightedge or French curve. As a result, the scraper of the blade is also exactly guided along the line which is to be erased, so that for erasing a drafting line or other mark generally only a single erasure line is required.

BRIEF DESCRIPTION OF THE DRAWING

The invention will be better understood, and objects other than those set forth above, will become apparent, when consideration is given to the following detailed description thereof. Such description makes reference to the annexed drawing wherein:

FIG. 1 is a fragmentary perspective view of a preferred
embodyment of inventive apparatus employed in conjunction with a ruler serving for guiding;

FIG. 2 is an end view of the apparatus depicted in FIG. 1, and applied to the drafting or drawing paper and guided along the ruler; and

FIG. 3 is a cross-sectional view of the apparatus depicted in FIG. 2, taken substantially along the line A—A thereof.

FIG. 4 is a perspective view of another embodiment of the inventive apparatus employed in conjunction with a ruler serving for a guide;

FIG. 5 is a side view of the apparatus depicted in FIG. 4 showing the relationship of the apparatus to a line to be erased.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

With reference now to the drawing, in FIG. 1 there is depicted a holder or holder means 10 which is guided along the edge 11 of a ruler 12 in order to erase a line 13 or any other marking. On the side of the originally prismatic holder 10 opposite the ruler 12 there is provided a front side face 15 that coacts with a front end face 14. Also, by reference to FIGS. 2, 3 and 5, it will be noted that there is provided a rear end face 16 that coacts with a rear side face 17 that is rearwardly displaced with respect to the front side face 15. Between the front and the rear side faces 15 and 17 respectively there is located a central side face 18 which is even further rearwardly recessed than the rear side face 17 and towards the center of the basic prismatic form. Further, it will be recognized that the upper side or surface 19 of the holder 10 is inclined to provide a roof or cover 20 over the central and rear side faces 18 and 17 respectively. The rear region of the holder 10 has a recess 40 at the side opposing the central side face 18 and confronting the forward side face 15. Projecting out of this recess 40 is a blade 21 which is disposed in the guide slot 33 of the holder 10.

In the cross-sectional view depicted in FIG. 3 there will be recognized both of the edges 30, 31 serving for the lateral guiding of the housing 10. These edges 30, 31 are disposed at a straight line which intersects both of these edges and is parallel to the central side face 18. The edges 30, 31 are formed by the provision of a cutaway portion 32 at the central lower portion of the side wall 40, as best recognized by referring to FIG. 2. The aforesaid guide slot 33 for the blade 21 is inclined with the central side portion 18 at an angle lying in the range of 30° to 50°, and preferably as here shown about 45°. As should be further apparent the blade 21 is provided with an aperture or hole 41 through which there is piercingly guided a screw member 34 or equivalent structure. This screw member 34 is disposed in a bore 42 extending in the lengthwise direction of the holder 10. Further, the diameter of this bore 42 is larger in the region extending from the rear end face 16 up to the guide slot 33 than the region extending from the latter up to the front end face 14. The blade 21 is backed by a support or underlay member 35 and the portion of the screw member 34 located between this support member 35 and the rear end face 16 of the holder 10 is mounted in a bushing or sleeve 36.

Continuing, it will be recognized that a knurled nut 37 or the like is secured to the portion of the screw 34 which protrudes out of the front end face 14 of the holder 10. A substantially cylindrical bolt member 38 which is rounded at its lower end, as generally indicated by reference numeral 38a, is mounted at the rear portion of the holder 10 neighboring the sides 16 and 17 thereof. This bolt member 38 protrudes out of the housing of the holder 10 and is resiliently biased by a spring 39 (FIG. 2) or the like from the top towards the bottom.

During assembly of the individual components of the inventive apparatus the blade 21 and its backing support member 35 are pushed into the guide slot 33 in such a manner that the cutting edge 22 (FIG. 1) of the blade 21 is directed towards the front end face or side 14 of the holder 10. Thereafter, the screw member 34 inserted in the sleeve or bushing 36 is introduced through the slot 41 and 43 of the blade 21 and backing support 35 and the knurled nut 37 is slightly tightened onto the portion of the screw 34 which projects out of the front end face 14 of the housing 10. Then the blade 21 is adjusted in such a manner that the portion of its substantially arc-shaped cutting edge 22 extends out of the bottom 10 of the housing 10 to come in line in the plane of the central side portion 18. Only then is the blade 21 fixedly held by tightening the knurled nut 37.

During erasing, initially a ruler 12 is placed parallel to the line 13 or otherwise which is to be erased. Thereafter, the apparatus of the invention is placed by means of both of the edges 30, 31 against the ruler 12 and the latter is displaced parallel to its initial or starting position until the line 13 to be erased is exactly aligned with the approximately vertical plane of the central side face 18 serving as a reference surface. Since, as above described, during assembly of the apparatus care must be taken that the portion of the blade 21 contacting the paper is disposed in the plane of the central side face 18, it will automatically follow that after this aligning operation of the central side face 18 with regard to the line 13 to be erased also the blade 21 will be aligned with the line 13 to be erased.

The substantially arc-shaped cutting edge 22 of the blade 21 then possesses a cutting angle or angle of intersection with regard to the line 13 to be erased which is greater than 90°, and at the same time possesses an angle of attack of about 45°. As a result, the cutting edge 22 simultaneously scrapes and shears the line 13 or other marking from the paper 44 without being able to cut into the paper. Furthermore, since the cutting edge 22 of the blade 21 is additionally rounded the line of contact with the paper is relatively short, that is to say, the erasure line is not much wider than a normal drafting line.

Hence, it is sufficient by moving the apparatus in a single movement which is as continuous as possible along the ruler 12 to remove the drafting line 13.

The rounded bolt member 38 which provides a smoothing mechanism, during the erasure motion of the apparatus, contacts the paper 44 after the blade 21 has scraped thereover, and accordingly, if individual fibers of the paper protrude out of the bonded structure will again push these protruding fibers back into the surface of the paper 44.

Guiding of the housing or holder 10 takes place by means of the edges 30, 31 between which the housing is cutaway, as previously explained, and for which reason it is possible to guide such apparatus not only along a linear ruler, rather with equal facility along a French curve. Naturally, the inventive apparatus will also carry out an erasing operation if it is used without any guide and only displaced manually over the paper; yet, however, with this mode of operation the advantages which are provided by the inventive apparatus are not fully enjoyed.

Instead of the described screw connection biasing the blade 21 and the holder 10 it is also possible to use a quick tightening or tensioning device. Furthermore, it is equally well possible to mold the apparatus in a light metal or plastic and in the same working operation to mold the blade in the correct position. Further, it is possible to equip the holder with a pin or the like and by means of which it can be secured to a compass in order to erase circular lines.

In accordance with a further preferred embodiment of the inventive apparatus illustrated in FIGS. 4 and 5 the holder possesses the form of a hollow upwardly open parallelepiped 50. Both of the longitudinal faces 51 of this parallelepiped 50 are constructed at the region of the lower edges 52 formed with the support surface 53 as slide surfaces 54 for lateral guiding and at the region
of the upper edges 55 are provided with vertical grooves 56 which facilitate grasping and displacement of the apparatus. The rear face 57 of the parallelepiped 50, as viewed in the direction of erasing, encloses an angle of about 75° with the support surface 53. At this rear face 57 there is secured a circular blade 58 in such a manner that its cutting edge 59 protrudes towards the bottom past the support surface. Furthermore, this blade 58 is rotatably mounted at its center 60, so that each desired portion of its periphery can be optionally rotated into a position projecting past the support surface 53 and thus can be used as a cutting edge 59. In the central region of the base surface of the hollow parallelepiped 50 and extending in its longitudinal direction is a slit-like window 61 which runs substantially parallel to both of the slide surfaces 54 for lateral guiding of the apparatus and which possesses the same vertical spacing from the slide surfaces 54 as the cutting edge 59 of the blade projecting past the support surface. When this form of apparatus is employed the slit-like window 61 is conducted over the line which is to be erased, whereby it is insured that the cutting edge 59 of the blade 58 is likewise engaging this line. Furthermore, above the circular blade 58 there is disposed a black, triangular arrow 62 whose color contrasts well with that of the metallic colored blade 58 and whose tip 63 points to the portion of the blade which projects downwardly past the support surface. This arrangement therefore facilitates application of the apparatus to corners and edges which are not visible through the slit-like window 61. Finally, a further blade 64 is secured at one of the longitudinal sides 51 at the edge neighboring the blade 58. This further blade 64 only protrudes past the rear side of the parallelepiped 50 and which can be used in the manner of the known erasing knife.

However, it should also be understood that it is possible to construct the holder so as to possess a substantially rod-like configuration so that it can be manually guided in the manner of a writing implement. In so doing, one end of this rod is provided with a support- and a guide element and the blade. The use of this embodiment does, however, require some manual dexterity because the proper guiding of the blade is obviously that much better the larger the size of the support- and the longitudinal element.

While there is shown and described present preferred embodiments of the invention, it is to be distinctly understood that the invention is not limited thereto but may be otherwise variously embodied and practiced within the scope of the following claims. Accordingly, what is claimed is:

1. An apparatus for erasing, especially for erasing inked lines on transparent drawing paper or the like, comprising a holder having a leading end and a trailing end and operated by advancing the leading end along a line to be erased; a scraper blade having a leading surface and a trailing surface that terminates in an edge portion having at least a portion thereof formed as an arcuate scraping edge; said holder means being provided with means defining an element for untiltably supporting and guid-

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