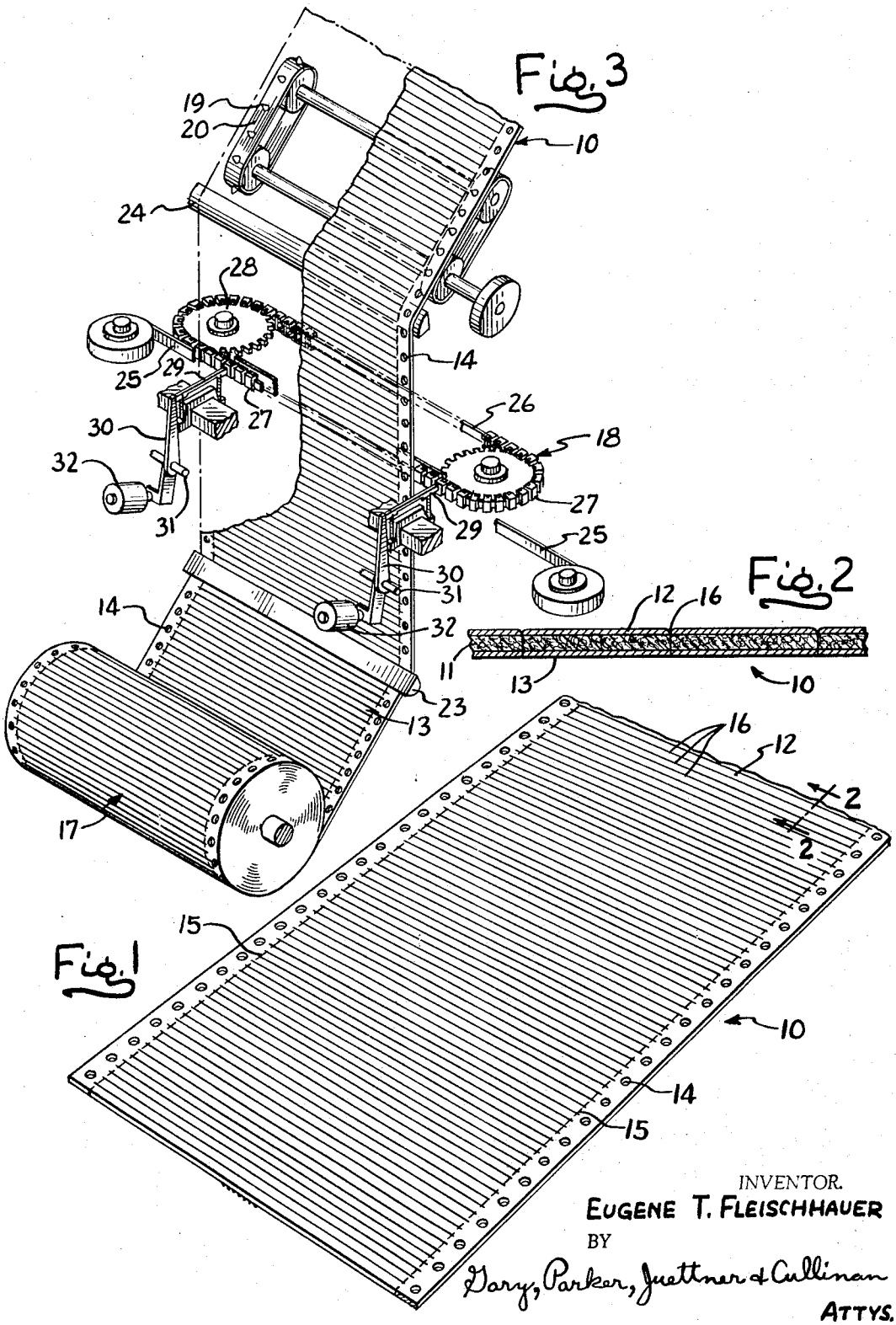
Nov. 14, 1967 E. T. FLEISCHHAUER 3,352,740

INDEX STRIPS

Filed Oct. 2, 1963 2 Sheets-Sheet 1



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INDEX STRIPS

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Fig. 4

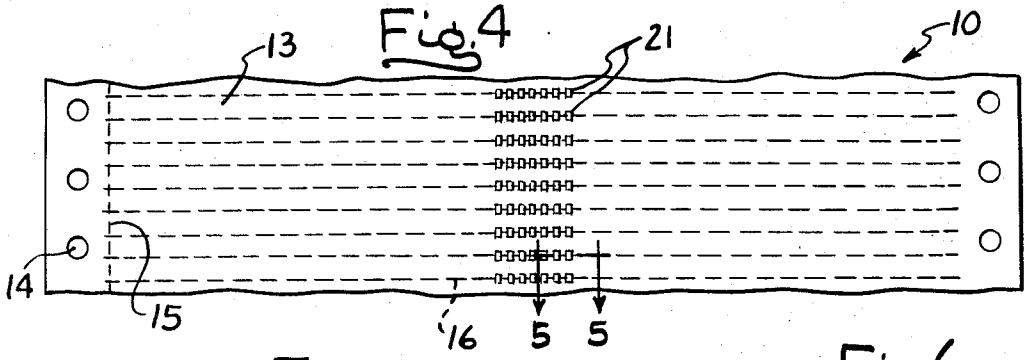


Fig. 5

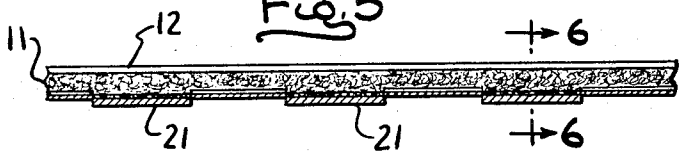


Fig. 6

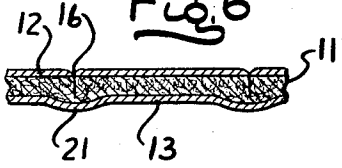


Fig. 7

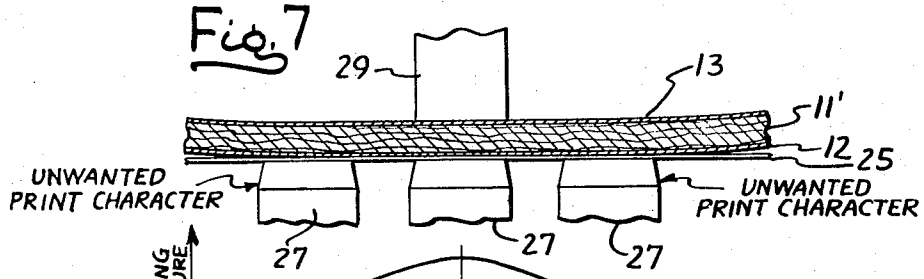


Fig. 8

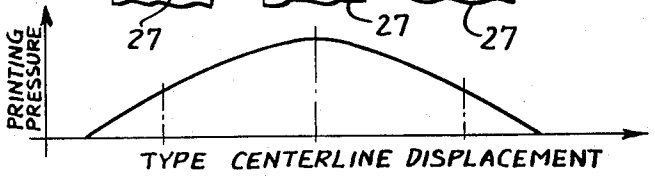


Fig. 9

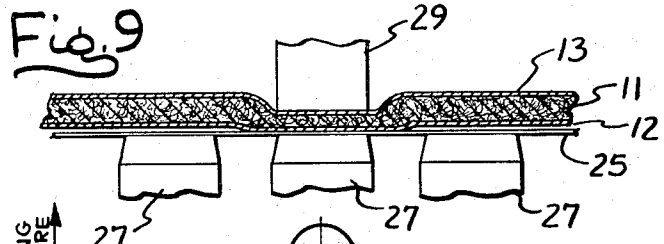
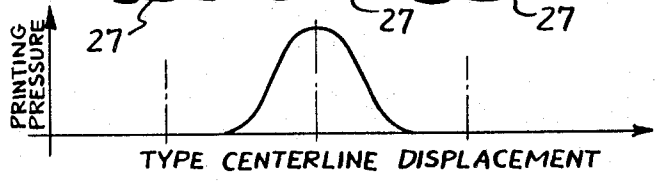


Fig. 10



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3,352,740

INDEX STRIPS

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Filed Oct. 2, 1963, Ser. No. 313,225
1 Claim. (Cl. 161—112)

ABSTRACT OF THE DISCLOSURE

Flexible index strips in continuous hingedly connected sheet laminate form for use on back printers comprising a compressible, resilient, flexible core portion having a low modulus of elasticity faced with a relatively thin printable web of relatively high modulus of elasticity and backed with a relatively thin web, said laminate being formed with score lines extending wholly through the facing web and core to define a plurality of separable elongated relatively narrow strips.

This invention relates to improvements in record or index strips provided in sheet or roll form for use in visible index record equipment of the class described in Powell U.S. Patent 1,594,112 and in Deinlein et al. U.S. Patent 2,832,712, where the sheet or roll of record strips comprises relatively thin resilient wood veneer core, surfaced on its upper face with a sheet of paper adapted to receive indicia as by typewriting, and backed with a relatively thin sheet of paper, the assembly being scored or cut transversely through the upper sheet of paper and the wood veneer to form a chain of relatively narrow elongated hingedly connected record strips adapted to be inserted into a typewriter, tabulator, addressing, duplicating or the like business machine for applying information to the record strips.

After desired information has been applied to the chain of connected record strips, the strips are manually or mechanically separated from each other by rupturing the thin connecting backing sheet, and the separated strips mounted on suitable frames having inturned longitudinal flanges by flexing the strips and inserting their opposed ends beneath the frame flanges, as is well known in the art.

Although record strips having wood veneer and the like rigid cores are satisfactory for use with typewriters which have typed characters that are propelled to strike the paper medium through an inked ribbon, the assembly being backed by a cylindrical rubber platen, such heretofore conventional construction has been found to be unsatisfactory when employed on business machines employing what is known as "back printers" such as described in Simpson et al. U.S. patent 3,041,964, and others issued to International Business Machines Corporation, which have type characters which are held relatively fixed with respect to the paper and ribbon for printing and wherein a hammer strikes the rear of the paper to bring it into contact with the inked ribbon-type character combination.

Whereas flexible and rigid materials can be satisfactorily employed on conventional typewriters, only relatively flexible material can be printed satisfactorily on back printers of the character aforesaid because rigid materials of the character heretofore known tend to distribute the printing pressure over a broad area resulting in printing of adjacent unwanted characters producing a blurred appearance.

It is therefore an object of the present invention to provide record strips of the class aforesaid which can be imprinted on back printers without imprinting adjacent unwanted characters in a manner whereby the printing force is confined in a zone directly between the type character and its corresponding striker and not allowed to diverge significantly.

The objects of the present invention are accomplished by providing a laminate having a cushioning impact core, that is one which is compressible, resilient and flexible and has a low modulus of elasticity on the order of less than about 200,000 pounds per square inch, such as is provided by employing a core composed of rubber bonded cellulose fiber, felt, cork, soft paper and cellular material such as expanded or foamed resins and the like, these cores being laminated between sheets of paper at least one of which is of relatively tough flexible nature such as ledgerpaper and which is printable. The laminate even though its components are flexible is of sufficient rigidity to be passed through the business machine and subsequently employed as index or record strips which can be mounted on flanged holder frames as aforesaid. These cores are on the order of about .016 to about .024 inch in thickness. The prior wood veneer core had a modulus of elasticity in the range of 1 million to 1½ million pounds per square inch.

Other objects and advantages of the present invention, its details of construction and arrangement of parts, will be apparent from a consideration of the following specification and accompanying drawings wherein:

FIG. 1 is a perspective view showing a sheet of flexible index strips in continuous hingedly connected sheet form of the present invention.

FIG. 2 is a section on line 2—2 of FIG. 1.

FIG. 3 is a diagrammatic view illustrating an arrangement of back printing apparatus employing flexible index strips in continuous hingedly connected sheet laminate form of the present invention.

FIG. 4 is a rear elevational view of the sheet material of FIG. 1.

FIG. 5 is an enlarged section taken on the line 5—5 of FIG. 4.

FIG. 6 is a section on the line 6—6 of FIG. 5.

FIG. 7 is a diagrammatic view illustrating the operation of the back printer in combination with a flexible index or record strip of the prior art.

FIG. 8 diagrammatically indicates the resulting printing pressure and distribution thereof when employing such prior art device.

FIGS. 9 and 10 are views similar to those of FIGS. 7 and 8 but employing the improved construction of the present invention.

Referring to the drawings, the reference numeral **10** indicates a continuous sheet of hingedly connected flexible index strips of the present invention composed of a core **11** adhesively bonded between a facing sheet **12** and a backing sheet **13**. The assembly is further formed with a series of marginal regularly spaced apertures **14** at its opposed longitudinal edges for facilitating its use in business machines, as will be hereinafter explained.

The assembly is further provide with two spaced series of longitudinally extending score lines **15**, **15** which as shown are suitably spaced lines of perforation extending through the assembly so that after use the perforated areas may be broken away by flexing the perforated area on the score lines **15**. The assembly is further provided with transversely extending score or severance lines **16** which extend completely through the top sheet **12** and through the core **11** and into the backing **13**. While the backing **13** as indicated in FIG. 2 is not fully cut through and remains as a hinge, in order to insure unity while being typed on, the back **13** may be provided with removable strips of adhesive as shown in the aforesaid Deinlein et al. Patent 2,832,712, or the perforation may be effected in a manner leaving hinge-like portions **21** on the backing sheet **13**. Unity of the sheet before it is

desired to sever the component strips **12** therefrom is further aided by the spaced score or longitudinally extending lines of perforation **15**. Thus after the facing **12** has been typed on, the component strips may be separated by breaking away the strips on the marginal score lines **15** and by further breaking away the connecting web of the backing **13** or its component tapes or thicker hinged areas **21**.

As previously indicated, the core **11** of the present invention is suitably composed of material such as cellulose fibers bonded by means of a natural or synthetic rubber such as butadiene styrene co-polymer; of conventional felt; or undensified bulky paper such as a sheet composed of a mixture of kraft, sulfite and groundwood pulp; adhesively bonded cork particles, balsa wood, polyethylene foam, polystyrene foam, polyurethane foam, polyethylene film, and the like compressible, resilient flexible materials which after being compressed return substantially to their orginal form so as to provide impact cushioning in the back printing device previously referred to and which will be hereinafter more fully described.

As previously indicated, at least the facing layer **12**, and desirably also the backing layer **13**, are preferably formed of flexible but strong materials having high modulus of elasticity approaching that of wood such as ledger, map, kraft and the like papers, or synthetic film material such as cellulose acetate, polyesters such as polyethylene terphthalate and the like or combinations of paper and synthetic resin film materials.

As previously indicated, the thickness of the core **11** should be from about 0.16 to about .024 inch and the facing and backing sheets **12** and **13** desirably have thickness of about .006 inch.

FIG. 3 shows a back printer employing the sheet material of the present invention. Thus, sheet material **10** of the present invention is fed from the roll **17** thereof through the machine generally designated as **18** by drawing it over the sprocket **19** of the driven band **20**, the sprockets **19** entering the marginal apertures **14** in the sheet **10**. The sheet in its passage between the aforesaid points passes underneath the guide bar **23** and over the guide bar **24** with the face **12** of the sheet **10** disposed against the ribbon **25** lying against one run of the endless belt member **26** carrying the type members **27**. As is understood, in operation the belt **26** is driven through the sprocket wheel **28** to bring one of the type characters **27** into juxtaposition to one of the horizontal series of back strikers or hammers **29** which are operated in sequence by means of the armature arms **30** pivoted at **31** and actuated by electromagnets **32**. The hammers **29** act against the back **13** of the laminate **10** and thus press a component strip face **12** against the ribbon **25** and relatively rigid fixed type character **27**.

If one were to employ the wood veneer core strips of the prior art in this arrangement, the effect would be substantially as shown in FIGS. 7 and 8. Thus, FIG. 7 shows a strip laminate having a paper backing **13**, a paper facing **12**, and a core **11'** of wood veneer, thus presenting a relatively rigid assembly, and when the back striker or hammer **29** moves to make an impression from a type member **27** in alignment therewith, due to the rigidity of the assembly and the printing pressure, not only is there an impression from the desired type character **27** but blurred impressions are also obtained from the adjacent type characters **27**. FIG. 8 diagrammatically illustrates the magnitude of the pressure and the resulting lateral components causing impressions from the unwanted type characters even though they have not been compressed by the single back striker **29**.

As distinguished from this, FIGS. 9 and 10 diagrammatically illustrate the operation resulting from the present invention. Thus, it will be noted that when the back striker **29** acts against the assembly **10** of the present invention compression is localized, and although of the same magnitude as in FIG. 6 the lateral displacement is substantially confined to the desired single type character **27** in alignment with the striker hammer **29** so that little if any unwanted blurred printing comes about from the adjacent type characters **27** on either side of the one which is in alignment with the actuated striker bar **29**. After release of the striker bar **29**, the laminate **10** assumes its substantially planar formation due to the cushioning effect of the core **11** of the present invention.

Although I have shown and described the preferred embodiment of my invention it will be understood by those skilled in the art that changes may be made in the details thereof without departing from its scope as comprehended by the following claim.

I claim:

Flexible index strips in continuous hingedly connected sheet laminate form for use on back printers comprising a compressible, resilient, flexible impact cushioning core portion comprised of rubber bonded cellulose fibers sheet material faced with a relatively thin, tough, printable paper web and backed with a relatively thin, tough paper web both having a relatively high modulus of elasticity and strength, said laminate being formed with a series of longitudinally extending apertures adjacent its opposed marginal edges and longitudinal score lines defining marginal portions embracing said apertures, and transverse score lines between said longitudinal score lines extending completely through said facing web and core to define a plurality of separable elongated relatively narrow strips.

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