(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
4 September 2014 (04.09.2014)

WIPO | PCT

(10) International Publication Number
WO 2014/133475 A2

(51) International Patent Classification: Not classified

(21) International Application Number:
PCT/TR2014/000049

(22) International Filing Date:
27 February 2014 (27.02.2014)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
2013/02510 1 March 2013 (01.03.2013) TR

(72) Inventor; and
(71) Applicant : **ÖZÇELİK, Merih** [TR/TR]; 10040 Sk. Cadde:45, No. 24 Aosb, 35620 İzmir (TR).

(74) Agent: **INNOVASIA DANIŞMANLIK AR-GE PATENT HİZMETLERİ TİCARET LİMİTED ŞİRKETİ**; Konak Mh., Lefkoşe Cd No:12, 16140 Bursa (TR).

(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Published:

— *without international search report and to be republished upon receipt of that report (Rule 48.2(g))*

(54) Title: NOVELTY IN REFLECTING THE IMAGE ON THE PRODUCT BEFORE THE LASER PROCESSING

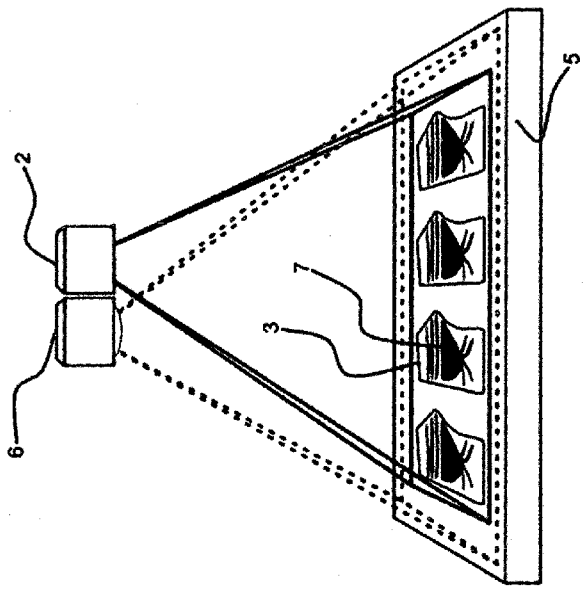

Figure 1

(57) Abstract: The invention is a laser processing system consisted of a laser burner (2) where the infrared laser beams are being sent, used for etching, cutting, marking of the products (3) made of any materials or for the formation of the image patterns, and is related to containing at least one projection machine (6) where the image is being exactly reflected before the desired target pattern (8) is being formed on the mentioned products (3).

WO 2014/133475 A2

DESCRIPTION

NOVELTY IN REFLECTING THE IMAGE ON THE PRODUCT BEFORE THE LASER PROCESSING

Technical Field

The invention relates to the system used during providing said visual effect by means of laser on the products on which visual effect is desired to be created.

The invention particularly relates to the application of the projection machine to the system in the marking before laser processing in the systems in which visual effect such as pattern, marking is created on said product.

State of the Art

Laser technology is a commonly used system today and particularly, a method frequently used in the processes such as marking, laying out, pattern designing on the fabric in textile sector.

Laser marking means application of the processes such as etching, bending on various materials by using Laser technology. Using Laser technology in this sense introduces countless advantages in both appearance of material quality and material utilization and cost calculations. All kinds of marking such as logo, pattern or script may be made on these materials by using Laser marking technology. Marking process by Laser technology is realized in a shorter time than the other processes and in desired sensitivity and low cost and the results are quite satisfactory and good. Many sectors such as textile, automotive, machinery, wood and electronics are actively using this technology and if desired efficiency is obtained, material on which marking process is realized look more quality and stylish.

Old methods have become outdated by the introduction of Laser technology. Desired applications are able to be realized faster, more quality and elite and at the same time, more quickly by Laser technology.

One of the most important differences between the processes realized by the old methods and the ones realized by Laser marking is the number of products for which marking is able to be realized in the course of time. Marking, burning, cutting processes of the products in series by Laser technology are realized more quickly than the ones in the old methods.

In the systems related to marking method by Laser in the old technique, burning infrared Laser beam exiting from carbon dioxide Laser weld and visible beam exiting from Laser marker are overlapped such that they can overlap on the beam combiner positioned with β angle. When the beams coming from Laser weld and marker reach scanning head, an angular scanning area is created on the application surface through reflectors (mirrors) located in X and Y axis. Viewing the area of application by a visible marker Laser light before marking, cutting, etching or burning processes are realized by infrared beam is realized by combining the beam coming from both welds. In this method, first, defining by the marker on the application area to be processed and then, such surface is processed by the beam coming from CO_2 Laser weld. Then, the application surface processed is changed with another application surface on which processing will be manually made. Lost time during manual change by an employee of the product processed and the product to be processed and non-use of one weld when the other is in use; namely, lost time due to the situations such as operation periods of Laser beams following one another occurs. Thus, said method is not an appropriate production technique for the business organizations which require serial production.

In a patent application of no. 2011/00616, after the product to be marked is laid down on the cutting table, fabric marking is made through a floating mechanism being capable of longitudinally moving at two axes. Said system is rather slow due to floating working principle and has a high risk of making an error due to its scanning logic.

In a patent application of no. 2011/03427, an external laser head used for marking is available. When the pictures of said application are examined, reflectors and markers must be used for external marking head. As it is described below, the fact that the system consists of many elements both increases the cost and requires a working principle control of which is more sensitive.

When the figure-2 for the previous technique is examined, two laser heads being capable of working independently of each other in the system are available. Firstly, scanning head (1) and contours (4) of the pattern to be formed on the product are determined. Then, the pattern to be formed inside the pattern contours specified by burning head (2) s processed. As it is seen in Figure 2, two laser heads (1,2) are available in the system and these heads make different processes from each other. Using an additional scanning head outside burning head increases the risks of failure and calibration. In this method, only contours of the visual element-pattern to be printed on the product are seen. This causes an effect which reduces the operator's forecasting of process end during the process.

In previous technique, vibration occurs on the pattern-visual image formed on more products than one on the table due to mechanic scanning. Additionally, since scanning form contours on the area where the pattern-visual element will be formed, written expressions like warning message outside these are impossible to be formed.

Another disadvantage is that it is capable of performing single-color scanning since the source of light is single color.

Also, using external additional head increases the first investment costs and maintenance costs which must be performed.

Finally; development is required in Laser marking systems and in the method related to these systems which allow burning, cutting, etching or marking processes to be realized quickly on various products by using Laser technology and therefore, new configurations which will eliminate the abovementioned disadvantages and introduce solutions to present systems are required.

Object of the Invention

Present invention relates to Laser meeting the abovementioned requirements, eliminating all disadvantages and introducing some additional advantages and marking method and auxiliary system which realizes all these processes.

One object of the invention is to eliminate the usage of external or internal head used for marking outside burning (marking) head used in previous technique.

Another object of the invention is to reduce investment costs required for the system along with elimination of head requirement used for marking.

Object of the invention is to minimize the maintenance costs as well as providing the system realizing marking process through simple equipment.

Object of the invention is to ensure reflection of not only the contours of said pattern on the product on which processes such as marking, pattern formation processes will be carried out but also one-to-one reflection of the picture of the pattern.

Object of the invention is to eliminate the technical problems of one-to-one picture reflection of visual element to be processed on the product and in respect of some issues such as alignment which operator may experience and make process-end forecasting of operator stronger.

Object of the invention is to prevent marking process from being negatively affected from the vibration which occurs due to mechanical scanning in previous technique.

Another object of the invention is to ensure that warning or informative scripts or signs are reflected near visual pattern to be formed on the product to be processed.

Another object of the invention is to ensure that visual element to be reflected on the product has more colors than one.

Structural and characteristic qualities of the invention and all of its advantages will be better understood with the figures given below and detailed explanations written by referring to these figures and therefore, evaluation should be made in consideration of these figures and detailed explanations.

Brief Explanation of Figures

Present invention should be evaluated with the figures explained below so that said the configuration and advantages of the invention along with additional elements can be understood the best.

Figure 1: Front view depicting the projection machine carrying out reflection process in which pattern is reflected in one-to-one manner for marking process on the product to be processed and where marking process is made through burning head.

Figure 1a: View of visual pattern formed on the product following burning process in which final situation of such visual pattern is illustrated.

Figure-2: View of the system in which the head carrying out burning process belonging to the previous technique and additional head carrying out marking process are available.

Drawings must not necessarily be scaled and the details which are not necessary to understand the invention may be omitted. Apart from this, at least substantially identical elements or at least the elements having substantially identical functions are illustrated with the same numbers.

Reference Numbers

1. Laser marking head
2. Laser burning head
3. Product
4. Pattern contours
5. Application platforms
6. Projection machine
7. Projection image
8. Target pattern

Detailed Explanation of Invention

In this detailed explanation, preferred embodiments of the system related to marking method of Laser as the object of the invention and application of this method are explained such that the subject can be understood better and these embodiments do not create any restrictive effect.

The system as the object of the invention is comprised of one laser burning head (2), one projection machine (6) reflecting the image on the product (3) to be obtained and processed, application platform (5) where the products (3) to be processed are positioned.

Said laser burning head (2) receives source of light from laser light source. Infrared beam is sent on the product through the mirrors which it has in its inner structure and thus, burning process is realized. Burning process is established based on the same logic through the method used in previous technique. Our invention relates to the method of realizing marking process which must be carried out before burning process on the product (3).

The system as the object of invention works as follows:

As it can be seen in Figure-1, projection machine (6) is placed near laser burning head (2) for marking as being different from previous technique. Projection machine(6) is more simple in terms of its structure than laser marking head (1) used in previous technique and more reliable in terms of its working principle. Visual pattern to be processed on the product (3) is reflected identically with the projection machine (6). As it can be seen in Figure-1, projection view (7) reflected from the projection (6) and target pattern (8) is identical. In other words, when the operator reflects the view in the projection machine (6) on the product (3), target pattern (8) to be formed on the product (3) is able to be seen before burning process is carried out. In the view in Figure-2 belonging to the previous technique; burning process is started after the contours (4) of the pattern to be formed on the product (3) are specified. The fact that additional head must be used for this method and disadvantages sides of this have been explained under the title of "state of the art".

A mechanical device is not required in usage of projection machine (6) according to the previous technique. This eliminates the risk of breakdown due to simple nature of the system.

Projection machine (6) in which identical view of target pattern too be formed on said product (3) is reflected before it is formed by burning process may be assembled externally near the laser burning head (2) in the system or with the laser burning head (2) in a single head.

View reflected from said projection machine (6) is either only identical view of target pattern (8) or the contours of target pattern (8) as it is in previous technique. Namely, both identical view and contours of the view can be reflected on the product (3) from the projection machine (6) depending on either the conditions or preference.

CLAIMS

1. The invention relates to processing system by laser containing laser burning head (2) where infrared laser beams used for burning, cutting, marking or formation of visual patterns on the product (3) manufactured from any material are sent, **wherein** it comprises at least one projection machine (6) on which view of target pattern (8) which is desired to be formed on said product (3) is identically reflected before said pattern (8) is formed.
2. Marking system by projection according to Claim 1, **wherein** said projection machine (6) is located in a unique structure in a single block as well as being externally present near the laser burning head (2).
3. The processing system by laser containing laser burning head (2) where infrared laser beams used for burning, cutting, marking or formation of visual patterns on the product (3) manufactured from any material manufactured from any material are sent **wherein** it comprises the process steps of;
   - Reflection of identical views of the processes such as mark, pattern desired to be formed on said product on the product as projection view (7) through the projection machine (6) following positioning the product (3) to be processed on the application platform (5) in preferred number,
   - Following reflection of the projection view (7), formation of target pattern (8) by infrared laser beam coming from laser burning head.
4. The marking system by projection according to Claim 3 wherein, said projection view (7) is exactly the same as the target pattern (8) and also, is able to reflect warning and informative views.

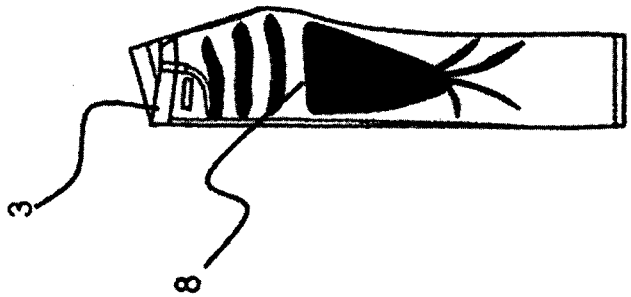

Figure - 1a

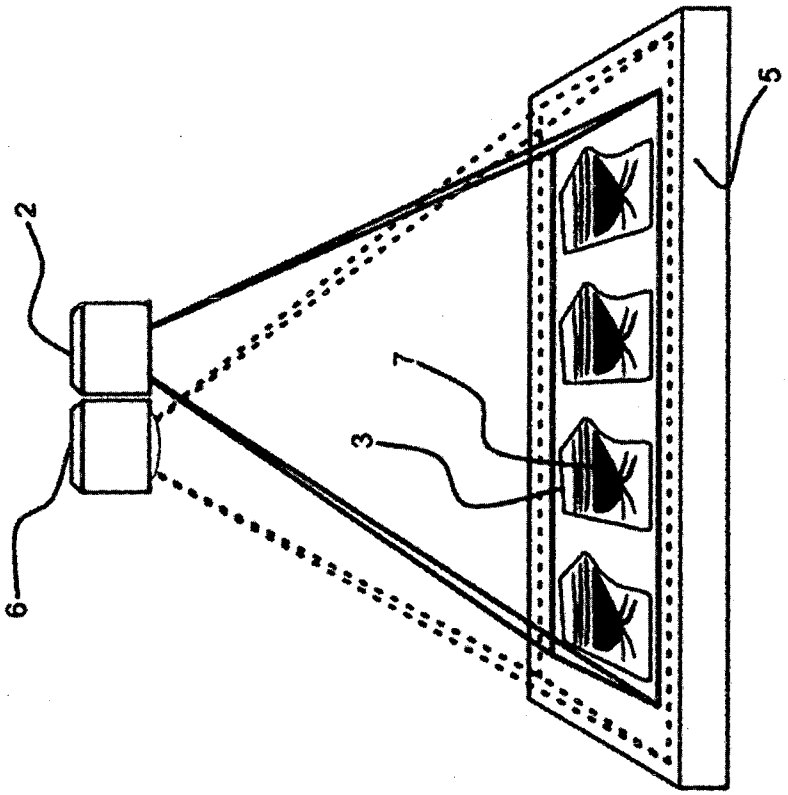

Figure 1

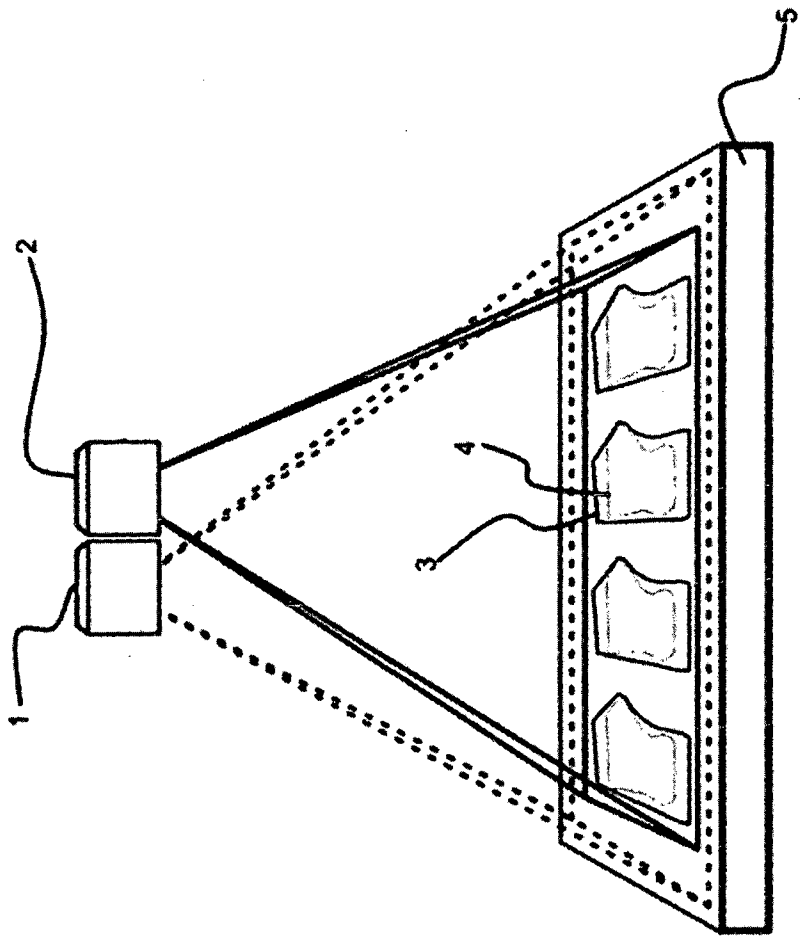

Figure 2 (Prior Art)