G06K

RECOGNITION OF DATA; PRESENTATION OF DATA; RECORD CARRIERS; HANDLING RECORD CARRIERS

Definition statement

This subclass/group covers:

Methods or arrangements for reading or recognizing printed or written characters or for recognizing patterns, e.g. fingerprints; for graph-reading or for converting the pattern of mechanical parameters into electrical signals; for printing of data in the shape of alphanumeric or other characters from a record carrier; for verifying the correctness of markings on a record carrier; for sensing record carriers; and for marking the record carrier in digital fashion.

Arrangements for producing a permanent visual presentation of the output data.

Column-detection devices.

Conveying record carriers from one station to another, e.g. from stack to punching mechanism.

Record carriers for use with machines and with at least a part designed to carry digital markings.

Information retrieval from punched cards designed for manual use or handling by machine, and apparatus for handling such cards, e.g. marking or correcting.

Arrangements for preparing the data output from a computer for printing, e.g. computer or network printers insofar as they are involved in outputting the result of a computation, like a document.

References relevant to classification in this subclass

This subclass/group does not cover:

Printing per se	B41J

Postal sorting	B07C
Hand-held input or output devices for transferring data to be processed into a form capable of being handled by a digital computer, e.g. light-pens, joysticks, mice or trackballs	G06F 3/033

Informative references

Attention is drawn to the following places, which may be of interest for search:

Transponders powered by received radio waves, e.g. passive transponders	G01S 13/75
Tags attached to, or associated with, an object, in order to enable detection of the object	G01V 15/00
Magnetic head applications	G11B 5/31
Magnetic alloy thin films, such as used in magnetoresistive applications in magnetic heads	G11B 5/39
Magnetic alloy thin films, such as used in magnetic thin film media applications	G11B 5/64
Magnetic alloy thin films, such as used in static memory applications	G11C 11/00
Responders; Transponders	H04B 1/59
Near-field transmission systems using transceiver	H04B 5/02

Special rules of classification

G06K 17/00 covers methods or arrangements for effecting co-operative working between equipments covered by two or more main groups G06K 1/00-G06K 15/00.

G06K 9/00 takes precedence over G06K 7/00.

G06K 19/00 takes precedence over G06K 21/00.

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Record carrier	means a body, such as a cylinder, disc, card, tape, or wire, capable of permanently holding information, which can be read-off by a sensing element movable relative to the recorded information or by electrical contacting or non-contacting means
Data	is a synonym for information

G06K 1/00

Methods or arrangements for marking the record carrier in digital fashion (interpreting G06K 3/02)

Definition statement

This subclass/group covers:

This groups covers details of card punching machines and methods using such machines as well as the printing of optically readable codes, such as barcodes, in particular in relation to the difficulties of said printing on the material being printed on.

Relationship between large subject matter areas

G06K 1/121 is related to B41J (printing in general). G06K 1/126 is related to B23K 26/00(laser marking of workpieces, e.g. metal workpieces)

Reading and writing of magnetic stripes, RFIDs, and of smart cards is classified in G06K 7/00.

Special rules of classification within this group

Methods of marking or printing of barcodes and other optically detectable digital codes should be classified in G06K 1/12 and lower

Only G06K 1/12 is presently active as the methods of card punching are practically obsolete.

Typically G06K 1/121, problems associated to the difference between the theoretically desirable bar code and the real printed barcode and how this has its effect on the quality (readability) of the barcode:

FIG . 4
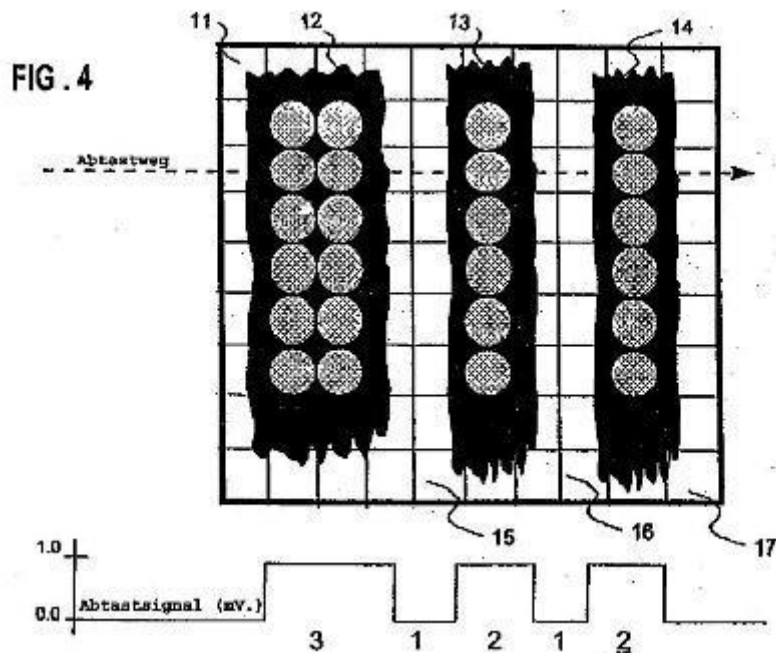
and G06K 1/126 typically is related to laser marking of optical codes, e.g. on workpieces:
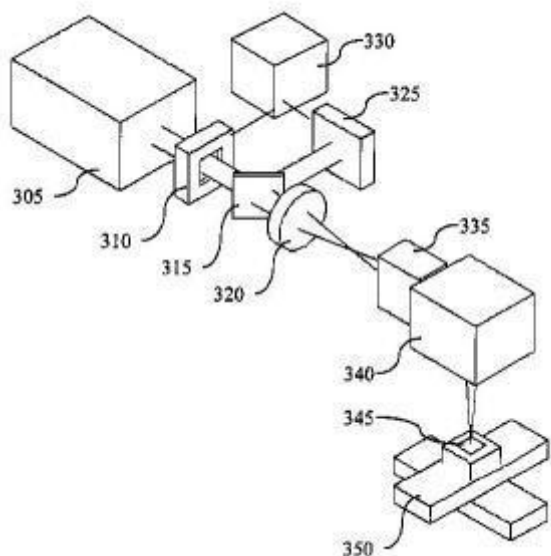
This group was originally created for classification of various card punching systems and methods. With these systems being nowadays obsolete, the only relevant group being in use is that of G06K 1/12 which focuses on methods and systems particular for marking machine readable codes such as bar codes on various substrates and the particular problems related thereto, e.g. to avoid bleeding in the printing process so that the bars constituting the barcode are "sharp".

Synonyms and Keywords

In patent documents the following expressions/words "barcode", "bar code",

"optical code" and "marking" are often used as synonyms.

G06K 3/00

Methods or arrangements for printing of data in the shape of alphanumeric or other characters from a record carrier, e.g. interpreting, printing-out from a magnetic tape

G06K 5/00

Methods or arrangements for verifying the correctness of markings on a record carrier; Column detection devices

Definition statement

This subclass/group covers:

- Methods or arrangements for verifying the correctness of markings on a record carrier;
- Column detection devices;
- Correctness of marking may be assessed by detecting physical properties, check-digit, plausibility check or by comparing with stored data.
- Examples:
- Bar code data is compared with data in memory,
- Spectral light of bar code is compared with predetermined spectrum;
- Production line with a marking device, followed by a verification device to check correctness of the marking; see illustration herebelow:

Fig. 1
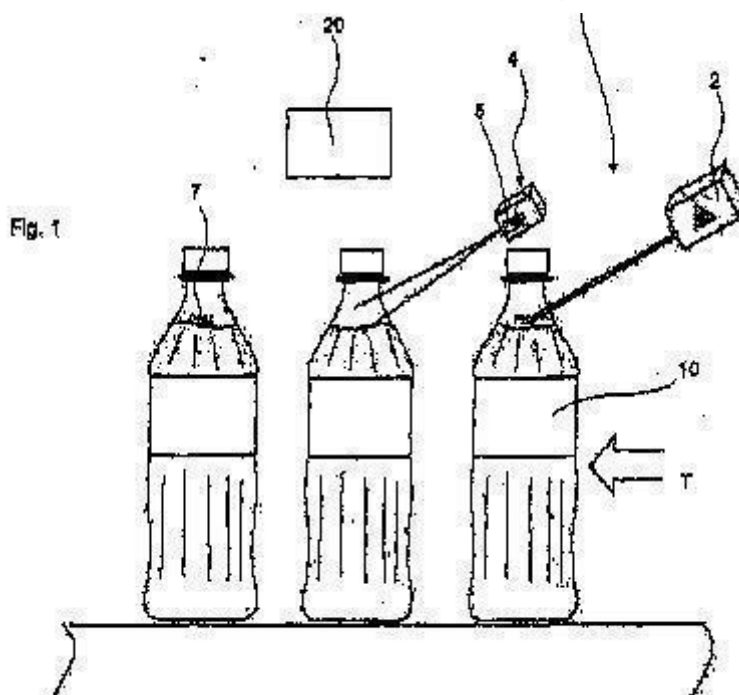
References relevant to classification in this group

This subclass/group does not cover:

Devices for scanning or checking the printed matter for quality control	B41F 33/0045
Error detection or correction by redundancy in data representation, e.g. by using checking codes.	G06F 11/00
Testing paper currency, securities, bonds or similar valuable papers for genuineness by testing patterns thereon, e.g. comparing to a reference in a memory	G07D 7/20

G06K 7/00

Methods or arrangements for sensing record carriers, [N: e.g. for reading patterns] (G06K 9/00 takes precedence)

Definition statement

This subclass/group covers:

This group covers the arrangements for reading and writing of devices such as non-contact smart cards, contact smart cards, barcodes, magnetic stripes and other digitally records included on a handheld object, such as a card, or e.g. printed or otherwise included on a label for attachment to an object, for identification of the object.

Informative References

Attention is drawn to the following places, which may be of interest for search:

Attention is drawn to the following places which may be of interest for search:

Identification of animals	A01K 11/00
Marking of poultry and the like	A01K 35/00
Receptacle for credit cards, such as etuis	A45C 11/18
Check-out counters, e.g. including a barcode scanner	A47F 9/046
Implanted circuitry (for diagnostics)	A61B 5/00
Detecting for diagnostic purposes	A61B 5/117
Sorting of articles according to an identifier or destination marking	B07C 3/18

Sorting using a machine readable code	B07C 5/34
Printing of security markings	B41M 3/14
Card filing arrangements	B42C 17/00
Printed mater of special format, e.g. identity or credit cards	B42D 15/00
Indicating train identities using tags	B61L 25/04
Containers for laboratory use carrying an identifier, e.g. an RFID or barcode	B61L 3/14
Transponders fixed to bicycles	B62H 5/20
Labelling machines, e.g. fixing machines to fix a label with a bar code to a package	B65C
Refuse receptacles carrying identification means	B65F 1/14
Article conveyance distributing the articles according to bodily destination marks, e.g. in production lines	B65G 47/49
Stacking and de-stacking of flat articles, e.g. stacking plural card shaped objects	B65H
Marking arrangements for laundry purposes, e.g. to track laundry using RFID tags	D06F 93/00
Paper including security elements, e.g. methods to create a paper support carrying an RFID	D21H 21/40
Details of vessels, means for coding or identifying them	**F17C123/00**
Recording measures values, e.g. using sensors	G01D 9/00
Position detection of objects using reflection of radio waves on passive responders, e.g. with exchange of information between interrogator and responder	G01S 13/00
Tags for enabling detection of objects, e.g. to locate underground oil pipes or landmines	G01V 15/00
Scanning systems	G02B 26/10
Optical elements, such as lenses	**G02B5/99**
Computer security in general	G06F 21/00

Business methods using RFIDs or barcodes or the like	G06Q
Tachographs using smart cards or the like for recording	G07C 5/08
Access control using an identification card, opening of card doors using a transponder	G07C 9/00
Payment using cards	G07F 7/08 G07F 7/10
Cash registers using barcode scanning	G07G 1/00
Partner search systems using transponders	G08B 1/08
Anti-theft systems using transponders or the like	G08B 13/24
Identification of vehicles	G08G 1/017
Labels, tags, tickets and security seals	G09F 3/02, G09F 3/03 G09F 3/20
Optical recording on CDs, DVDs and the like	G11B 20/00, G11B 23/00
CD's with transponders	G11B 23/20, G11B 20/00
Recording reproducing or erasing on magnetic carriers in general	G11B 5/00
Optical recording on flat record carriers other than barcode recording	G11B 7/00
Circuit means for protection against loss of information of semiconductor storage device, e.g. on cards against alpha rays inducing soft errors	G11C 5/00
Contactless power supplies for memory stores	G11C 5/14
Manufacturing coils not particular for non contact smart cards	H01F 41/00
Cards including details of the manufacturing of the semiconductor device	H01L 23/498 H01L 23/538
Antennas design details	H01Q 1/22
SAW circuits not for record carriers	H03H 9/64
SIM card connection arrangements particular for mobile phones	H04B 1/38
Near field transmission systems not RFID type	H04B 5/00
Wireless local area networks	H04L 12/28

Mobile phones with a barcode reading functionality	**H04M1/7255**
Digital cameras combined with a further device (e.g. a mobile phone)	H04N 1/00
Wireless networks in general	H04W
Conductive patterns on PCBs other than on smart cards	H05K 3/10
Casings cabinets drawers for interchangeable modules	H05K 5/02
Faraday type of protections of electrical circuits	H05K 9/00

Special rules of classification within this group

G06K 7/0004 is for classification of combined arrangements, like a device incorporating a barcode reader and an RFID reader.

G06K 7/0013 is for classification of constructional details and functions of contact card readers, such may be the housing of the reader, the entry slots of the reader, the peculiarities of the contact arrangements for contacting the contacts on the smart card or memory card, protection arrangements for protecting the circuits of the card reader against intrusion or unwanted inspection.

G06K 7/084 is for classification of magnetic stripe reading arrangements. Typically these magnetic stripes are included on a card shaped object as the classical credit card.

G06K 7/10009 is for classification of arrangements for interogating wireless record carriers, such as RFIDs and non-contacts smart cards. Typically, the arrangements comprise arrangements to resolve collision between plural RFIDs that try communicating with an interrogator at the same time, arrangements for controlling the power of the interrogation field, arrangements allowing the interrogator to mimic an RFID or transponder or vice versa, protocols for RFID interrogators, protection arrangements and antenna arrangements adapted for RFID interrogation.

G06K 7/10544 is for classification of constructional aspects of barcode reading arrangements, such as arrangements for focalisation, cameras, mirrors, handheld readers.

G06K 7/1099 is for classification of arrangements using X-Rays to retrieve identification codes on objects.

G06K 7/12 is for classification of barcode reading systems where the color of the light that is used is of importance, e.g. using UV or IR to illuminate invisible fluorescent barcodes.

G06K 7/14 is primarily for classification of software for barcode readers in particular algorithms to locate or retrieve a barcode from an image.

G06K 7/01, G06K 7/02, G06K 7/04, G06K 7/06 are not used as the technology thereof is not in development anymore.

Synonyms and keywords

In patent documents the following expressions/words "smart card connector", "card connector", "card reader", "interrogator", "RFID", "transponders" and "tag reader" are often used as synonyms.

G06K 7/0004

[N: Hybrid readers]

Definition statement

This subclass/group covers:
Reader/writers capable of handling different information recording principles, either on respective data carriers or on data carriers having information recorded according to a plurality of recording principles.

Examples:

- combined chip card / magnetic stripe card reader,
- combined contactless / contact IC-card readers,
- combined barcode / RFID readers.
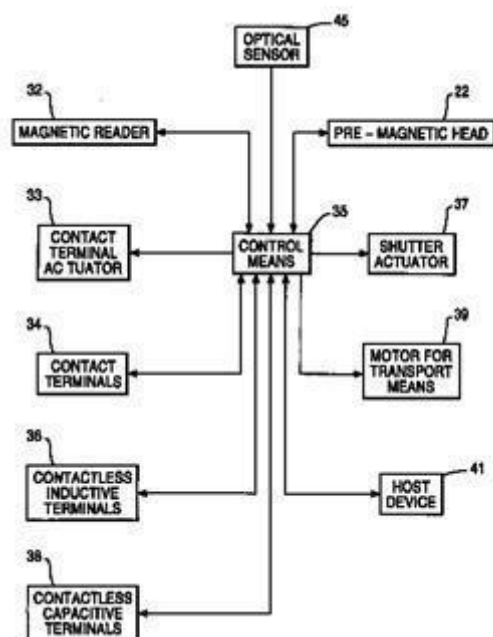
Special rules of classification within this group

In particular readers/writers that combine two types of readers in one and the same device and where a synergetic interaction between the two is present need to be classified inhere.

G06K 7/0013

[N: by galvanic contacts, e.g. card connectors for ISO-7816 compliant smart cards or memory cards, e.g. SD card readers (connectors in general H01R 13/00; connectors for SIM cards used in mobile phones or the like H04B 1/38)]
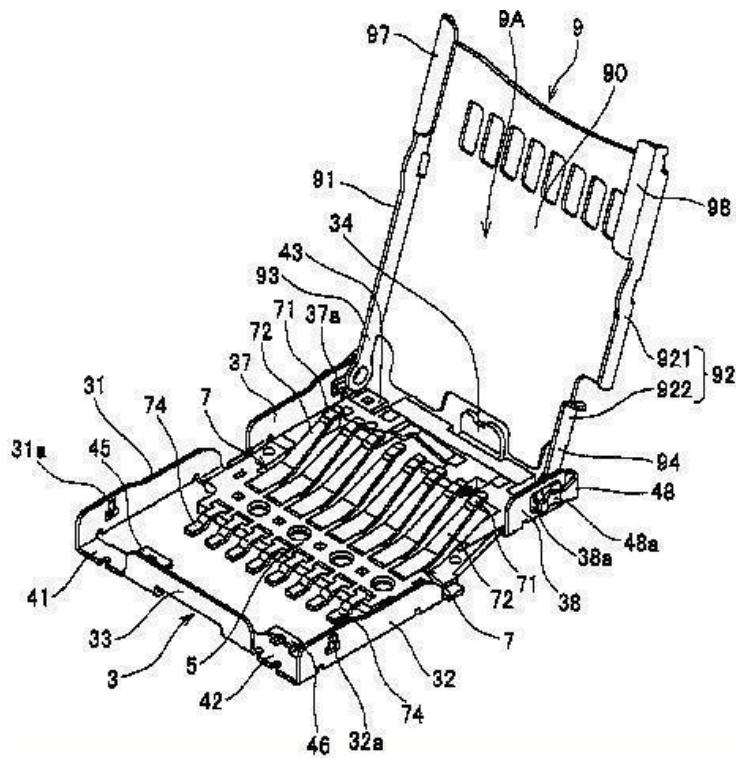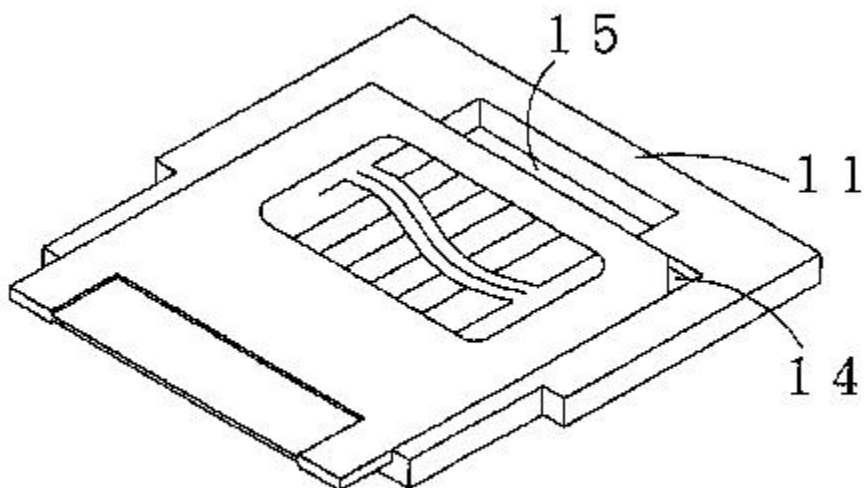
Definition statement

This subclass/group covers:

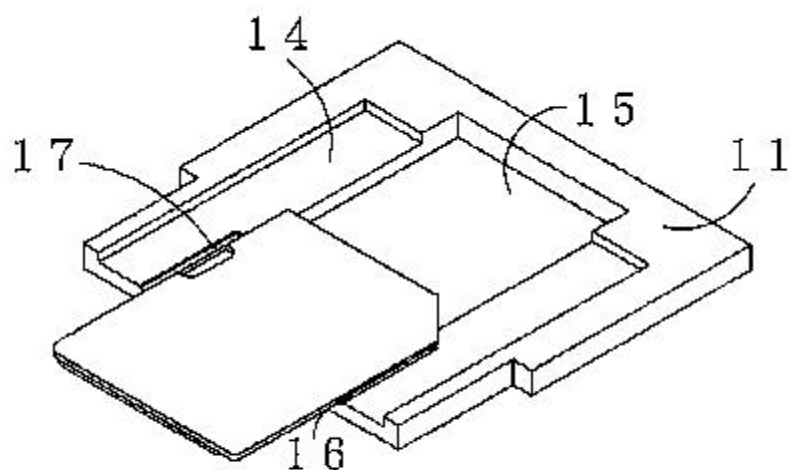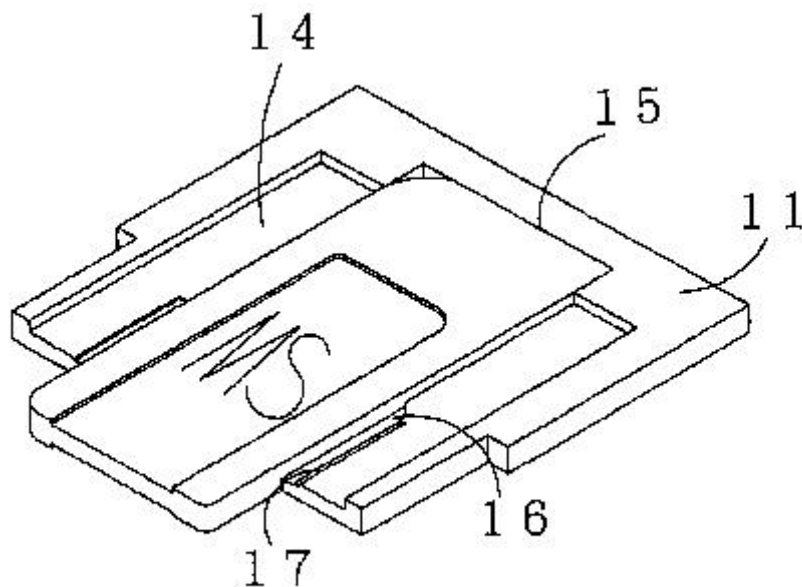G06K 7/0013 deals with arrangements for connecting a smart card to a card reader, for example:
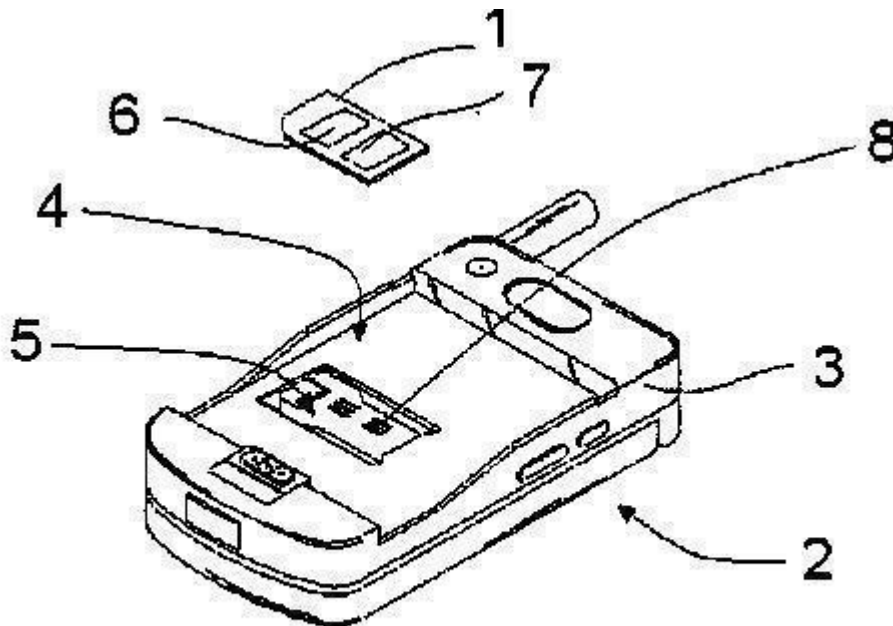
or

but also with arrangements for connecting a variety of memory cards, such as MMC, memory sticks, SD cards and the like; see illustration here below:

G06K 7/10009

[N: sensing by radiation other than optical or corpuscular, e.g. by microwaves]
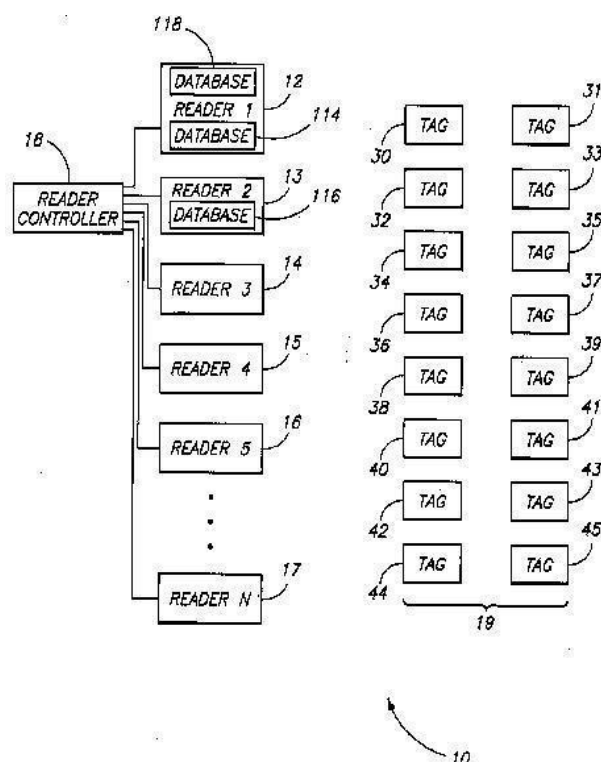
Definition statement

This subclass/group covers:
Ancillary aspects of RFID interrogators such as collision resolution, energy

usage, antenna arrangements and security of the interrogation process.

Example:

arrangement to interrogate a cloud of transponders.

Informative References

This subclass/group does not cover:

Systems using the reflection or reradiation of radio waves, e.g. radar	G01S 13/75, G01S 13/76
Reading of smart cards, dongles, for authentication and access control in computer systems	**G06F21/00N5A2D2**
Communication between electronic keys and locks, e.g. car keys with transponders	G07C 9/00174
Mutual authentication between data carrier and terminal or host	**G07F7/10D4**
Transmitter circuits	H04B 1/00
Near field transmission systems	H04B 5/00
Transmission power control in radio transmission systems	H04B 7/005

Wireless local area networks, home automation	**H04L12/28W**
Secure transmission, encryption, protection against differential power attacks (DPA)	H04L 9/00
Wireless communication networks	H04W

G06K 7/10881

[N: Constructional details of hand-held scanners]

Definition statement

This subclass/group covers:
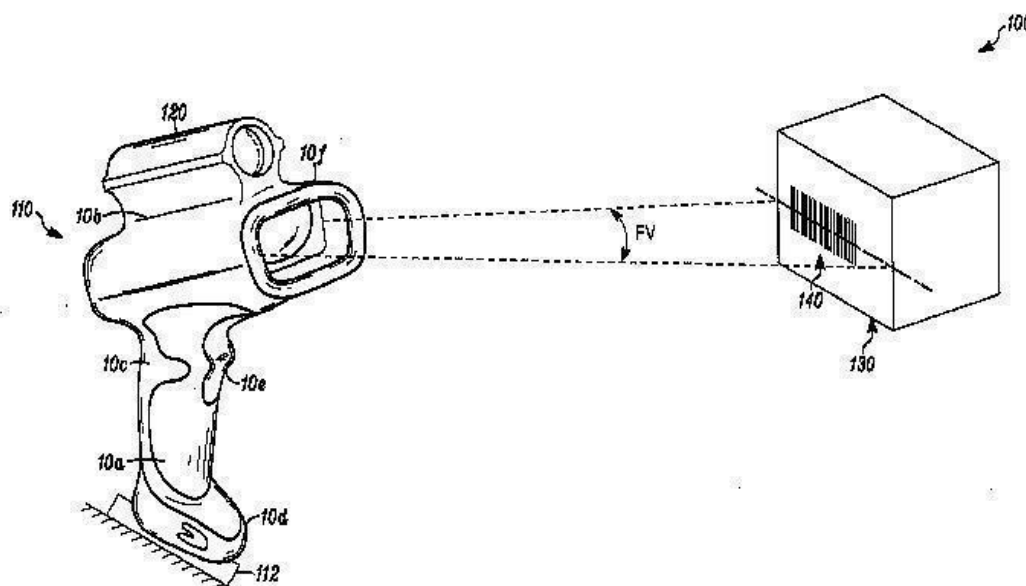Details of handheld barcode readers are to be classified herein.

FIG. 1

G06K 7/10544

[N: by scanning of the records by radiation in the optical part of the electromagnetic spectrum]

Definition statement

This subclass/group covers:
G06K 7/10544 is reserved mainly for barcode reader systems, e.g. construction of the typical checkout counter multi-window systems:
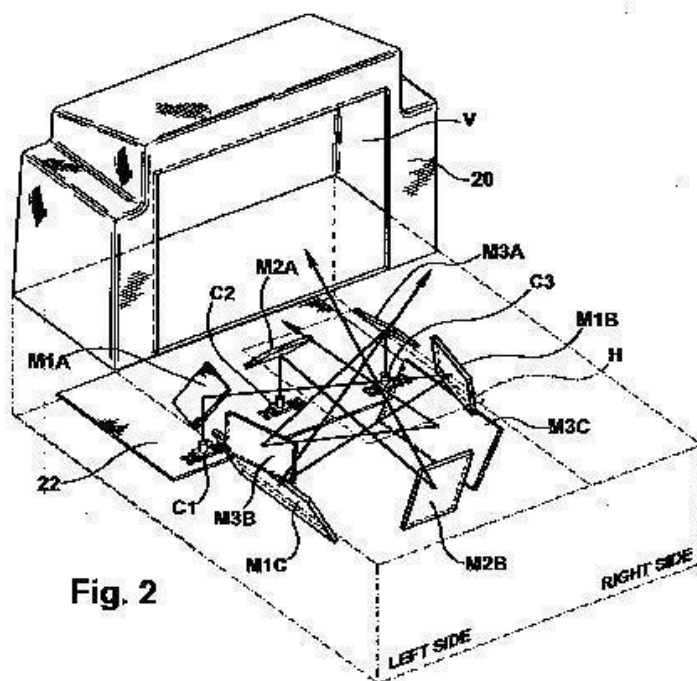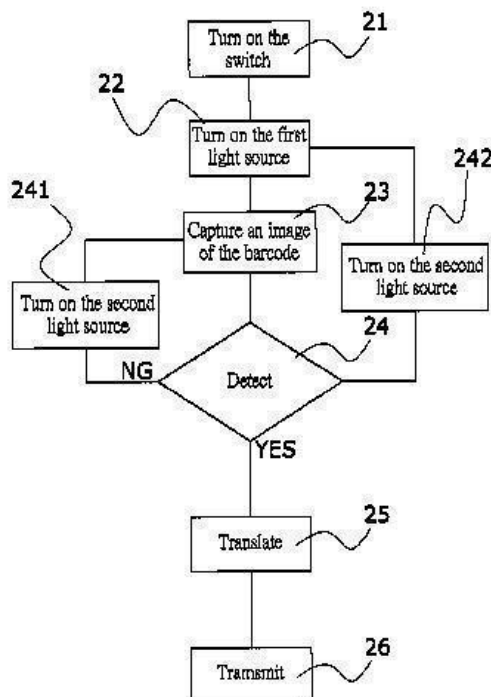
Fig. 2

G06K 7/12

[N: by scanning of the records by radiation in the optical part of the electromagnetic spectrum]

Definition statement

This subclass/group covers:

Optical code readers, such as barcode readers, with special adaptations for reading barcodes in a selected predetermined wavelength range, e.g. barcode readers particularly adapted for colour barcodes or barcode readers for barcodes that are invisible under regular illumination conditions but become visible when illuminated by a special light source, such as UV light:

Turn on the switch 21

Turn on the first light source 22

Capture an image of the barcode 23

241 Turn on the second light source

242 Turn on the second light source

Detect 24

NG

YES

Translate 25

Transmit 26

Relationship between large subject matter areas

This is related to the Indexing Code G06K 2019/06225 where color and other wavelength specific optical codes are classified.

Special rules of classification within this group

Bar code and optical code readers adapted for reading and illuminating targets that emit specific wavelengths, e.g. fluorescent targets, invisible targets only visible in infrared or UV.

Synonyms and keywords

In patent documents the following words are often use:

Infrared, UV, ultraviolet, fluorescence, color.

G06K 7/14

using light without selection of wavelength, e.g. sensing reflected white light [N: (G06K7/10B to G06K7/10T take precedence)]

Definition statement

This subclass/group covers:

Barcode decoding methods and algorithms that are applied after the raw barcode material, such as the 2D image of a barcode, resides in the memory of a computer system. For example this groups covers algorithms that are applied after the image of the barcode has been taken by a CCD or CMOS based imager and the image is in the memory of a computer system and can be subjected to image processing techniques for retrieving, correcting and decoding the bar code in the image.

Fig. 1

Fig. 2
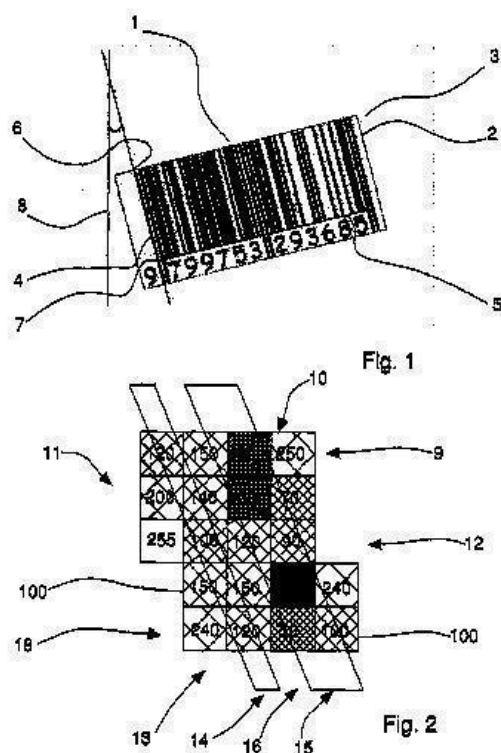
Special rules of classification within this group

Algorithms for decoding bar codes should be classified here, in addition to methods for detecting bar codes, for error correction of bar code images imaged by a CCD camera.

G06K 9/00

Methods or arrangements for reading or recognising printed or written characters or for recognising patterns, e.g. fingerprints (processing or analysis of tracks of nuclear particles G01T 5/02; [N: information retrieval G06F 17/30; medical diagnosis A61B 5/00, G06F19/00A2; recognition of molecular sequences G06F19/00C; radio frequency identification G06K 7/00; recognition of barcodes and similar code images G06K 7/10; computer systems based on specific computational models G06N; image analysis, industrial and biomedical inspection, positioning or tracking G06T 7/00;

recognition of acoustic speech signals G10L 15/00; acoustic speaker identification G10L 17/00])

Definition statement

This subclass/group covers:
The initial (IPC 1) scope of **G06K9/00** was:

"Methods or arrangements for reading or recognising printed or written characters or geometric figures" (OCR). From IPC 3 on, it also covers methods and arrangements for "recognising patterns" in general.

Recognising patterns means the labelling (categorisation, classification, identification) of a pattern, being measured data representing an object, with a meaningful label, based on the measured data from the object. It can also concern the detection of predetermined classes of patterns. The recognition function has tolerance to variability of objects within a class. The label is meaningful in the sense that it represents a group of objects which share common properties or features. The label can be one of multiple labels (e.g. OCR) or binary (e.g. authentication).

Methods or systems for recognising patterns include the following functions:

- Acquisition of the pattern measurements, typically image acquisition. Acquisition includes stripping measured data not "belonging" to the pattern to be identified.
- (optional): pre-processing of the measurements, which should reduce the raw acquired / measured data. Determining / measuring features of the pattern (e.g. components in a spectral transformation) is a typical pre-processing for pattern recognition, but also size normalisation,binarisation, etc can be involved.
- decision on a class involving comparison with reference information.

G06K 9/00 covers all of the above functions as far as essentially related to pattern recognition based on images (also sequences of coordinates, e.g. gestures or handwriting, as these can be used to generate an image). The essential relationship usually concerns the explicit use of acquisition or pre-processing functions for recognising patterns, but could also be an inherent or implicit relationship, e.g. feature extraction of the iris of an eye.

G06K 9/00 further covers image feature extraction in general.

G06K 9/00 further covers the actual recognition (classification; decision making) processes that can be applied irrespective of the nature of the patterns (objects) or measured data, e.g. classification/ discriminant methods. Also clustering and Blind Source Separation are covered.

G06K 9/00 further covers the recognition of patterns in (one dimensional) signals, as far as the processing is of general applicability, i.e. not specific to the nature of the signal (e.g. not cardiac or seismic patterns).

The structure of the classification scheme comprises 4 main branches.

G06K 9/00006 ... G06K 9/00852: specific applications, where the nature of the above listed functions is specific for those applications (e.g. fingerprint, face, video).

G06K 9/20: image acquisition.

G06K 9/36: image preprocessing.

G06K 9/62: matching and classification using electronic means and further.

G06K 9/00973, G06K 9/00993 electronic hardware and software implementations; management of recognition tasks.

G06K 9/58, G06K 9/74, G06K 9/76 and G06K 9/82: optical hardware arrangements (holograms etc.).

G06K 9/03 error detection and correction.

Relationship between large subject matter areas

As functions originally provided in G06K 9/00 are less and less implemented on dedicated hardware but on general purpose computers (PC) instead, new related groups have been created outside G06K 9/00.

The most important of these is G06T 7/00: Image analysis. Most of G06K 9/00 deals with recognition based on images of objects, this part would logically be a subset of image analysis, G06T 7/00.

When no semantic label is obtained by the image analysis or processing, but rather some other information (position, size, motion vector, etc.), classes in G06T 7/00 apply.

Functions traditionally associated with pattern recognition can also be used for image analysis, enhancement or other transformations. When not essentially related to a recognition, classes in G06T (mostly G06T 3/00, G06T 5/00 and G06T 7/00) should apply. The particular relationships and exceptions to general rules will be treated below for the particular classes concerning such specific functions.

References relevant to classification in this group

This subclass/group does not cover:

Processing images not necessarily for purpose or recognition	G06T 3/00; G06T 5/00
Feature extraction in relation to other image analysis than pattern recognition and image analysis in general	G06T 7/00
Industrial and biomedical image inspection	G06T 7/0002

Reading and decoding (bar) codes	G06K 7/00; G06K 19/00
Recognition or classification of text	G06F 17/20; G06F 17/30
Neural networks not specially adapted for pattern recognition	G06N
Detecting, measuring and recording for medical diagnostic purposes	A61B 5/00; **G06F19/00A2**
Identifications of persons by non automated means (e.g. latent fingerprint development)	A61B 5/117
Speech and voice recognition	G10L
Recognising patterns from RADAR signals	G01S
Geophysics	G01V

Examples of places where the subject matter of this group is covered when specially adapted, used for a particular purpose, or incorporated in a larger system

The mere use of known pattern recognition techniques for particular applications should be classified in the appropriate technical field (application place) when provided, optionally with an Indexing Code in G06K 9/00 as additional information. These are referred to in the appropriate group definitions and in the below table:

Recognising banknotes	G07D 7/00
Content based data retrieval	G06F 17/30
Access control based on biometrics	G07C 9/00007
Identity verification in commercial transactions	G06Q
Burglar, theft or intruder alarm	G08B 13/196
Security arrangements for protecting computer systems against unauthorised activity	G06F 21/00
Arrangements for computer network security	H04L 29/06551
Postal sorting	B07C 3/10
Image compression involving recognition of patterns in the image	H04N 1/4115

Special rules of classification within this group

Generally speaking, function-related groups should be used except when

application-specific processing details are disclosed, i.e. it would not be obvious to use the same process for another application, e.g. fingerprint scanners normally cannot be used to scan documents. In that case, application-related groups will be used in the first place.

If an application does not require specially adapted processing, an application group should not be used. The type of application becomes additional information can be indicated by a corresponding Indexing Code.

G06K 9/60, G06K 9/78 and G06K 9/80: Combination of functions from acquisition, preprocessing and/or matching/ classification. Other combination groups are G06K 9/54 and G06K 9/56 and G06K 9/82. Only combinations of functionally related concepts should be classified in combination groups, e.g. feedback from recognition scores to preprocessing function or a particular sequence of partially non-linear processes.

G06K 9/00013

Image acquisition (materials for developing fingerprints, means for visual identification A61B 5/1172)

References relevant to classification in this group

This subclass/group does not cover:

Powders, films and other products for developing latent prints	A61B 5/1172

G06K 9/00046

by using geometrical optics, e.g. using prisms (G06K 9/00033 takes precedence)

Definition statement

This subclass/group covers:
Sensors where a finger contacts an optical element, e.g. a prism and where the image creation is based on different behaviour (reflection) of light where skin does resp. does not touch the optical element.

G06K 9/00087

Matching; Classification

Definition statement

This subclass/group covers:
Aligning fingerprint patterns or features; Matching criteria;

Classifying fingerprint as match resp. no match to a reference fingerprint.

References relevant to classification in this group

This subclass/group does not cover:

Classification of the type of the fingerprint	G06K 9/0008
Matching consecutive images to detect spoofs	G06K 9/00107

G06K 9/00127

Acquiring and recognising microscopic objects, e.g. biological cells and cellular parts (apparatus for measuring microbiological properties C12M 1/34; optical analysis of chemical or physical properties of particles, e.g. investigation of dimensions G01N 15/14; biomedical image inspection, e.g. detecting abnormal objects G06T 7/0012)

Definition statement

This subclass/group covers:

Classifying or recognising biological material or microscopic objects based on shape or pattern;

Acquisition as far as having a relation with an image analysis process.

References relevant to classification in this group

This subclass/group does not cover:

Apparatus for measuring microbiological properties	C12M 1/34
Optical analysis of chemical or physical properties of particles, e.g. investigation of dimensions	G01N 15/14
Biomedical image inspection	G06T 7/0012

G06K 9/00154

Reading or verifying signatures; Writer recognition

Definition statement

This subclass/group covers:

The recognition/ authentication of persons by their signature or handwriting; both scanned and dynamic.

G06K 9/00496

Recognising patterns in signals and combinations thereof (signature verification G06K 9/00154; analysing specific medical signals, e.g. bioelectric signals, blood pressure A61B 5/00; processing radar and similar signals G01S; analysis of chromatographic signals G01N 30/86; processing seismic signals G01V 1/28, G01V 1/46; acoustic speech processing G10L; transmission systems H04B 1/00)

Definition statement

This subclass/group covers:

Methods for analysis or recognition of patterns in signals not representing images, not specific to the nature or origin of the signal.

References relevant to classification in this group

This subclass/group does not cover:

Signature verification	G06K 9/00154
Analysing specific medical signals, e.g. bioelectric signals, blood pressure	A61B 5/00
Processing radar and similar signals G01S	G01S
Analysis of chromatographic signals	G01N 30/86
Processing seismic signals	G01V 1/28, G01V 1/46
Acoustic speech processing	G10L
Transmission systems	H04B 1/00

G06K 9/00852

Recognising whole cursive words

Definition statement

This subclass/group covers:
Cursive handwriting, i.e. connected characters.

References relevant to classification in this group

Recognition of "online" writing	G06K 9/00402, G06K 9/22

G06K 9/20

Image acquisition

Definition statement

This subclass/group covers:

All processes resulting in isolating and preparing the part of a signal corresponding to the pattern to be recognised, without discarding any measured signal content belonging to the pattern.

References relevant to classification in this group

This subclass/group does not cover:

Scanners, cameras	H04N
Tablets, coordinate inputting stylus	G06F 3/00

G06K 9/2009

[N: Construction of image pick-up using regular bi-dimensional dissection]

Definition statement

This subclass/group covers:

Scanning resulting in a two dimensional bitmap, as opposed to e.g. flying spot scanners. Only as far as essentially related to the recognition process.

G06K 9/28

using discrete sensing elements at predetermined points

Definition statement

This subclass/group covers:

Using discrete sensing elements positioned at predetermined locations but not forming a regular grid pattern.

G06K 9/32

Aligning or centering of the image pick-up or image-field

Definition statement

This subclass/group covers:

In Optical Character Recognition this means the normalisation of the position and /or orientation of the character image, e.g. based on centre of gravity, estimated baseline, etc. (not by matching with reference information). In general, the alignment or centering has a relationship with a reference position for which the reference information (template or other model) was obtained.

References relevant to classification in this group

This subclass/group does not cover:

Camera calibration	G06T 7/0018
Image analysis for determining position of objects	G06T 7/004

G06K 9/3208

[N: Orientation detection or correction, e.g. rotation of multiples of 90 degrees]

References relevant to classification in this group

This subclass/group does not cover:

For inclination angles requiring a smaller correction than 90°	G06K 9/3275

G06K 9/3233

[N: Determination of region of interest]

Definition statement

This subclass/group covers:
The region of interest potentially containing patterns to be recognised.

G06K 9/3275

[N: Inclination (skew) detection or correction of characters or of image to be recognised (determining orientation of objects in general G06T 7/004)]

This subclass/group does not cover:

Rotations of 90°, 180° and mirroring:	G06K 9/3208
Determining orientation of objects in general	G06T 7/004

G06K 9/34

Segmentation of touching or overlapping patterns in the image field [N: (segmentation by quantisation, e.g. thresholding, G06K 9/38; edge detection for image feature extraction G06K 9/4604; extraction of connected components or edge linking G06K 9/4638; segmentation or edge detection for general image processing G06T 7/0079)]

Definition statement

This subclass/group covers:

In Optical Character Recognition this means the cutting out of characters from neighbouring or touching objects. Could also apply to other touching or overlapping objects, e.g. industrial parts or cell in a microscope slide.

References relevant to classification in this group

This subclass/group does not cover:

Segmentation or edge detection for general image processing	G06T 7/0079
Segmentation by quantisation, e.g. thresholding,	G06K 9/38
Edge detection for image feature extraction	G06K 9/4604
Extraction of connected components or edge linking	G06K 9/4638

G06K 9/36

Image preprocessing, i.e. processing the image information without deciding about the identity of the image (image data processing or generation, in general G06T)

Definition statement

This subclass/group covers:

All processes which reduce the raw acquired data belonging to the pattern to be recognised, with the aim of separating distinguishing information from relatively uninformative data, e.g., in OCR the outer shape or stroke pattern are more relevant for the character identity than the stroke thickness or character size.

References relevant to classification in this group

This subclass/group does not cover:

Image processing not essentially for pattern recognition	G06T
Selecting subset of features	G06K 9/6228
Extracting features by operating on the feature space:	G06K 9/6232

G06K 9/38

Quantising the analogue image signal [N: e.g. histogram thresholding for discrimination between background and foreground patterns (region-based segmentation of touching or overlapping patterns G06K 9/342; region-based segmentation for general image processing G06T 7/0081)]

References relevant to classification in this group

This subclass/group does not cover:

Image segmentation as such	G06T 7/0079
Region-based segmentation of touching or overlapping patterns	G06K 9/342

G06K 9/40

Noise filtering

Definition statement

This subclass/group covers:
Noise filtering only if essentially related to recognition.

G06K 9/42

Normalisation of the pattern dimensions

This subclass/group does not cover:

Scaling of images	G06T 3/40

G06K 9/44

Smoothing or thinning of the pattern

Definition statement

This subclass/group covers:

Thinning in the sense of reducing the pattern to the essential information, e.g. as a preprocessing step to find characteristic points of a skeleton pattern. Smoothing in the sense of separating of relevant from irrelevant shape features.

References relevant to classification in this group

This subclass/group does not cover:

Smoothing for general image processing	G06T 5/001
Morphologic operations for general image enhancement	G06T 5/30

G06K 9/46

Extraction of features or characteristics of the image [N: (segmentation of touching or overlapping patterns G06K 9/34; edge detection for feature extraction G06K 9/4604; segmentation or edge detection for general image processing G06T 7/0079)]

Definition statement

This subclass/group covers:

Measurements on patterns or detection of components of patterns essentially suitable for recognising the patterns.

References relevant to classification in this group

This subclass/group does not cover:

Segmentation of touching or overlapping patterns	G06K 9/34

Eedge detection for feature extraction	G06K 9/4604
Segmentation or edge detection for general image processing	G06T 7/0079

G06K 9/4642

by performing operations within image blocks or by using histograms (G06K 9/4652 and G06K 9/4671 take precedence; matching image histograms G06K9/64S)

Definition statement

This subclass/group covers:

Histograms also in the meaning of counts of foreground pixels, e.g. in columns for an x-axis histogram.

References relevant to classification in this group

This subclass/group does not cover:

Matching image histograms	**G06K9/64S**

G06K 9/482

[N: analysing the spectrum of the contour, e.g. Fourier expansion]

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

In Fourier expansion, the coordinates of ordered points of a closed contour (x,y) are considered as complex numbers x+j.y, which can be considered as a repetitive one-dimensional sequence, which can be analysed with Fourier transform.

G06K 11/00

Methods or arrangements for graph-reading or for converting the pattern of mechanical parameters, e.g. force or presence, into electrical signal (combined with character or pattern recognition G06K 9/00; feelers for copying devices on machine tools B23Q 35/00; arrangements for measuring areas G01B; measuring force G01L; adapted as input devices to

computers [G06F 3/00](#); systems for transmitting the position of an object with respect to a predetermined reference system, e.g. tele-autographic system, [G08C 21/00](#))

Special rules of classification within this group

This group and its groups are no longer used for the classification of new documents as from 1 January 2006. Documents relating to methods and arrangements for input to a computer are classified under [G06F 3/033](#) and [G06F 3/041](#).

Before 1 January 2006, groups [G06K 11/00](#) to [G06K 11/06](#) were already not used because of obsolence, whereas other groups under [G06K 11/06](#), deleted in 2006, were used to classify costructional details of computer pointing devices now classified under [G06F 3/033](#) and digitizers technologies now classified under [G06F 3/041](#).

G06K 13/00

Conveying record carriers from one station to another, e.g. from stack to punching mechanism (transport devices in general [B65G](#); handling thin or filamentary material in general [B65H](#))

Informative references

Attention is drawn to the following places, which may be of interest for search:

Attention is drawn to the following places, which may be interesting for search

Handling of coins or of paper currency of similar valuable papers	[G07D](#)

Special rules of classification within this group

[G06K 13/06](#) is for classification of mechanisms that assist in correct guiding of the card in the card reader

[G06K 13/08](#) is for classification of aspects for inserting and ejection of cards into and out from card readers.

[G06K 13/08](#) contains in particular the arrangements for inserting and ejection of cards, like card ejectors using a spring and a heart shaped cam to arrive at a push-push card insertion-ejection arrangement.

Fig. 3
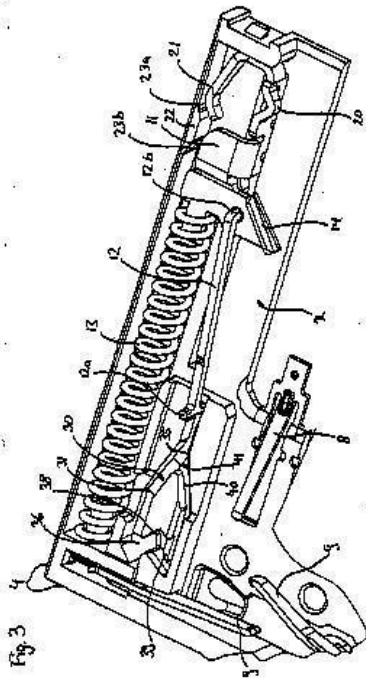
G06K 15/00

Arrangements for producing a permanent visual presentation of the output data [N: (construction of printing heads B41J 2/00; special arrangements for scanning and reproduction of pictures involving their transmission, e.g. facsimile H04N 1/00; for photocomposing B41B 19/00)]

Definition statement

This subclass/group covers:

Digital data processing in printers and related to the printing of computer output data.

Control of digital printing means, not otherwise provided for.

Relationship between large subject matter areas

Printing as such is covered by	B41
Printer drivers	G06F 3/12
Image processing	G06T

References relevant to classification in this group

This subclass/group does not cover:

Photocomposing	B41B 19/00
Special arrangements for scanning and reproduction of pictures, e.g. photographs, facsimile	H04N 1/00
Two-dimensional image generation	G06T 11/00
Control and analysis of mechanical parameters involving printing test patterns	B41J 29/393
Digital data processing in computers and related to printing	G06F 3/12
Construction of print heads	B41J 2/00
Light beam scanning systems using movable or deformable optical elements	G02B 26/10

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

To rip (verb)	to generate a pixel map of an image

Synonyms and Keywords

In patent documents the following abbreviations are often used:

PDL	Page Description Language
RIP	Raster Image Processing

G06K 17/00

Methods or arrangements for effecting co-operative working between equipments covered by two or more of the preceding main groups, e.g. automatic card files incorporating conveying and reading operations

Definition statement

This subclass/group covers:

- Methods or arrangements for effecting co-operative working between equipments covered by two or more of the preceding main groups, e.g.

automatic card files incorporating conveying and reading operations.

- Methods or systems involving reading and writing of identification or authentication codes on record carriers, or reading of codes and transporting of carriers.

G06K17/00IS nowadays used for classification of arrangements and methods where a plurality of objects is tagged with an identifier and some logistic process is carried out using the arrangement. Often, such documents nowadays need to be sent to G06Q for classification, particularly if the technical effect of the identifiers that are used is common knowledge.

Further classification information:

G06K 17/0022 e.g. contains inventory control systems:
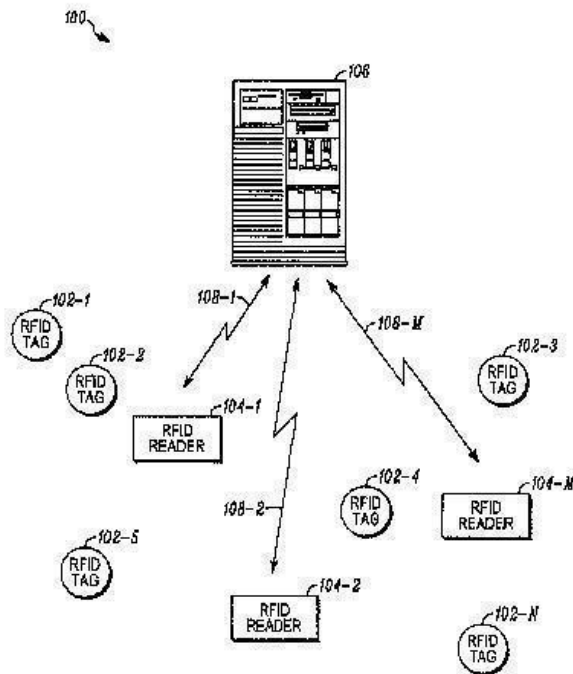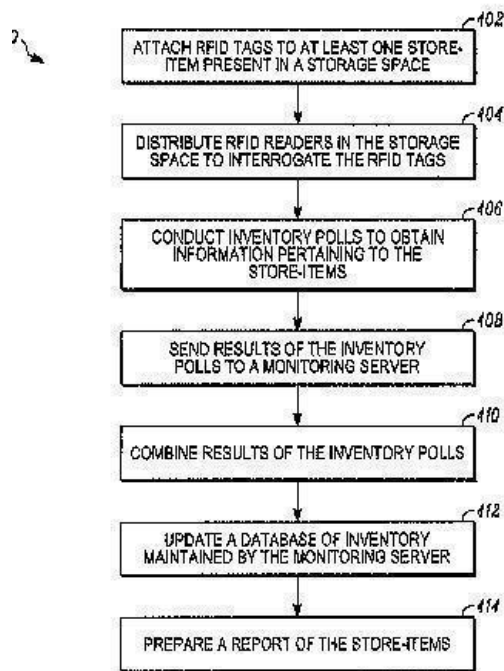
G06K 17/0025 is reserved for combined RFID - printing systems, like the typical RFID label writers:

Fig. 3
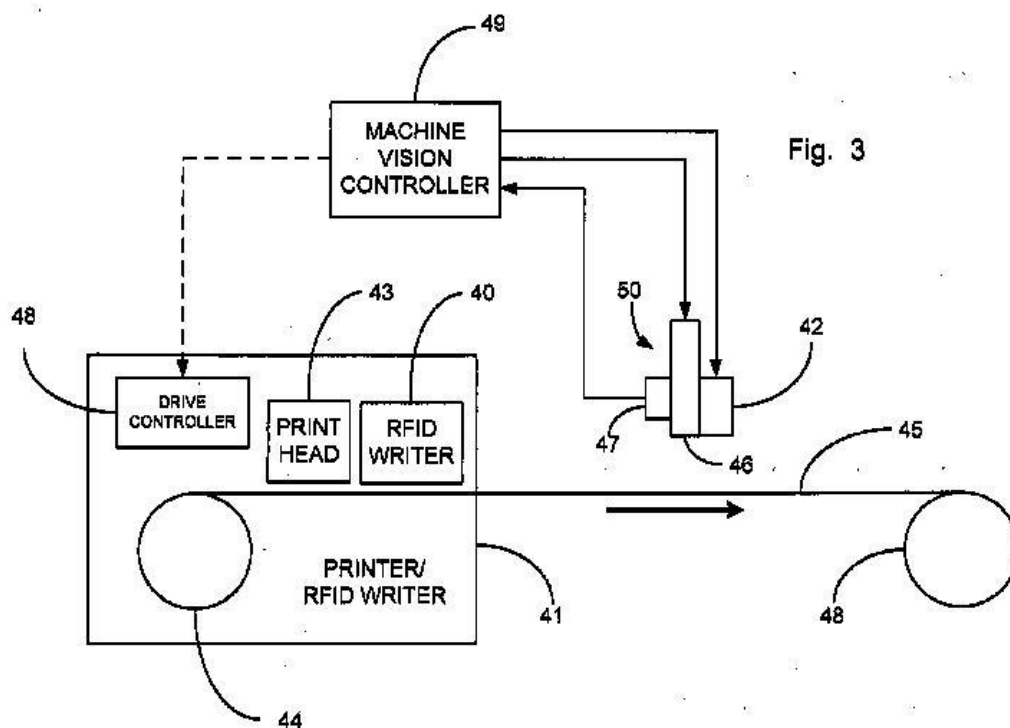
G06K 17/0029 is reserved for arrangements to deal with grouped articles with each article having an identifier:
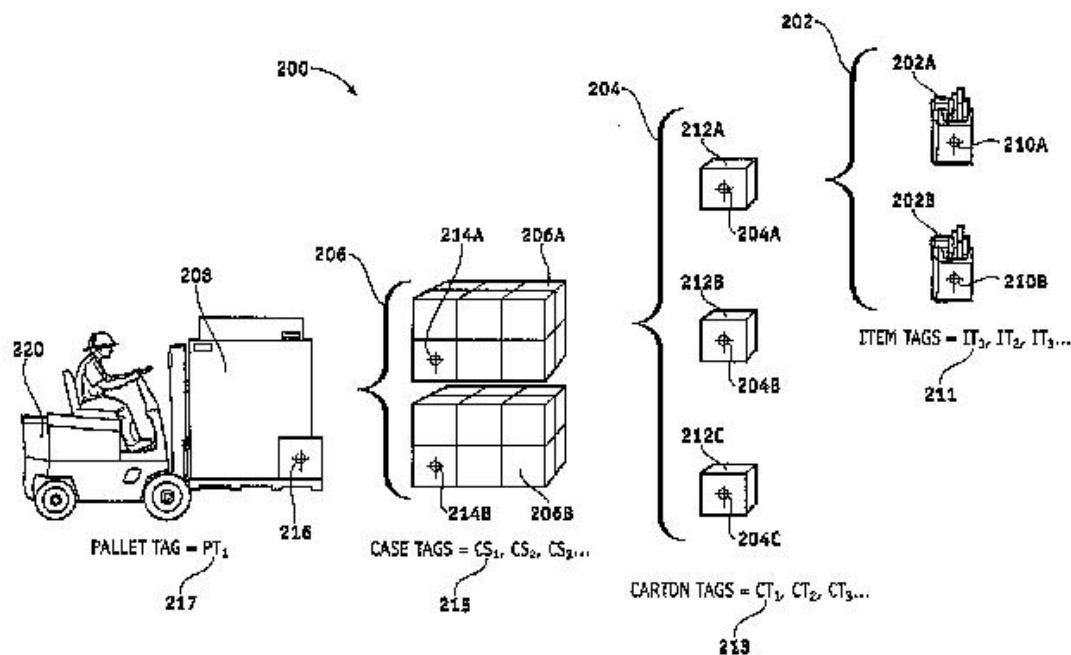
References relevant to classification in this group

This subclass/group does not cover:

Pure business methods are not classified inhere but need to be classified in G06Q.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Medical information systems using digital record carriers such as smart cards	G06F19/00M5P1
Logistics using RFIDs or barcodes	G06Q10/00D
Inventory control using RFIDs or barcodes	G06Q10/00E
Access-control involving the use of a pass, e.g. tag, transponder	G07C 9/00007
Theft detection systems using tags	G08B 13/2402
Correctness verifcation	G06K 5/02
Personalization of a card	G07F7/10D2
Test tubes with identification means	B01L3/14B2
Labelling machines using RFIDs	B65C 2009/0003
Collecting waste	B65F 1/00
Collecting milk	A01K 11/00

Medical systems in general photo orders	A61

Special rules of classification within this group

The particular use of a record carrier, if of importance to the invention, should be classified in the corresponding G06K 17/00 groups.

Examples of such uses are:

- processing documents, checks, formulars;
- personalising cards or checks, issuing personal tickets, passbooks or the like;
- tracking objects or persons;
- grouping, sorting, transporting, distributing documents or goods (waste, milk, photo orders, in libraries);
- stock management ,inventory systems;
- for fraud control purposes;
- for transactions,payments,ordering, games;
- checking, inspecting or history purposes, e.g. histograms;
- generating labels; for automatic (e.g. process) control purposes;
- for use in medical applications, Information recording and providing systems.

Under G06K 17/0025 can be found devices combining in a single entity printing and RFID writing

Under G06K 17/0029 can be found arrangements to interrogate grouped objects carrying identifiers, such as a carton with an RFID containing multiple cigarette packages each having an RFID.

G06K 17/0003, G06K 17/0016 and G06K 17/0032 are not active anymore

G06K 19/00

Record carriers for use with machines and with at least a part designed to carry digital markings (record carriers adapted for controlling specific machines, see the appropriate subclass for the machine, e.g. B23Q, D03C, G10F, H04L; form printing B41; file cards B42F 19/00; record carriers in general G11)

Definition statement

This subclass/group covers:

In this main group primarily hand holdable devices or artifacts are classified that contain at least one digital marking, such as RFIDs, smart cards, magnetic stripe cards, barcodes, optical codes, and non-intelligent resonating

digital marks without.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Attention is drawn to the following places which may be of interest for search:

Plastic moulding techniques for card shaped objects, such as smart cards	B29C 45/14
Printing or marking of cards not characterised by the kind of marking	B42D 15/00
Data input/out arrangements, such as buses, to transfer data from/to smart cards	G06F 13/38
General arrangements for computer security	G06F 21/00
Operating system software for smart cards	G06F 9/44
Arrangements on smart cards for sensing fingerprints	G06K 9/20
Cards for automatic acces control systems	G07C 9/00
Record carriers made e.g. of paper or other flexible material, suitable fo use as a banknote	G07D 7/00
Smart cards for payment	G07F 7/00
Antitheft arrangements using RFIDs	G08B 13/24
Labels for tamper secure fixing to objects	G09F 3/03
Details of memory layout in smart cards	G11C 5/00
Manufacturing of the integrated circuit in a smart card	H01L 23/00
Security software for smart cards and RFIDs using encryption	H04L 9/00
Manufacturing of printed circuits on a smart card	H05K 3/00

Special rules of classification within this group

Amongst the various groups under G06K 19/00, the following groups are the most important, in particular in that these groups are most frequently used:

Constructional details of optical codes, such as barcodes	G06K 19/06009
Magnetic stripes as used on e.g. credit cards.	G06K 19/06187
Functionality of contact based smart cards	G06K 19/07
Arrangements for protection the integrated circuit in smart card against intrusion	G06K 19/073
Constructional details for non-contact smart cards, RFIDs, transponders or wireless tags	G06K 19/07749
Functionality of non-contact smart cards, RFIDs, transponders or wireless tags	G06K 19/0723
Constructional details for contact-based smart cards	G06K 19/077

G06K 19/02

characterised by the selection of materials, e.g. to avoid wear during transport through the machine

Definition statement

This subclass/group covers:

The selected material of the record carrier achieves an extra effect which is not directly related to the function as record carrier.

Examples:

- record carrier made of a material that withstands gastric acids so that it may be brought in the stomach of cattle, or
- a tag with special adaptations to the material to attach it to a garment, like
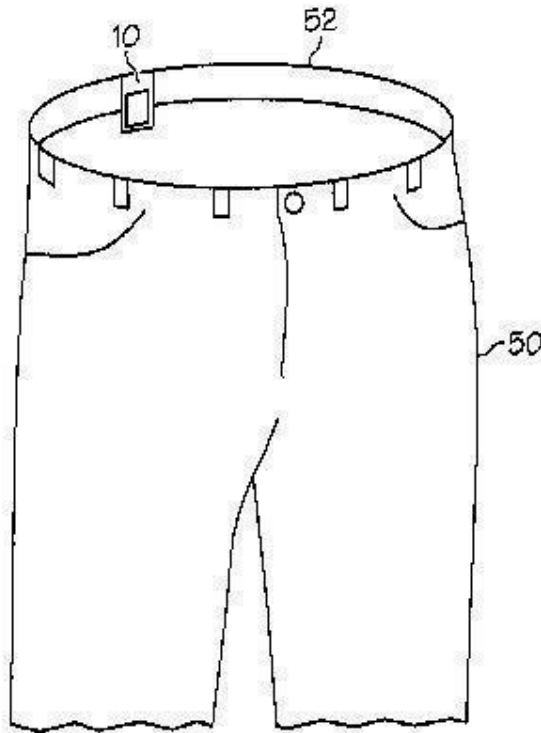
or a metal data carrier

Counterexample:

bar code printed in a colour material only visible under UV light: G06K 19/06046.

G06K 19/04

characterized by the shape
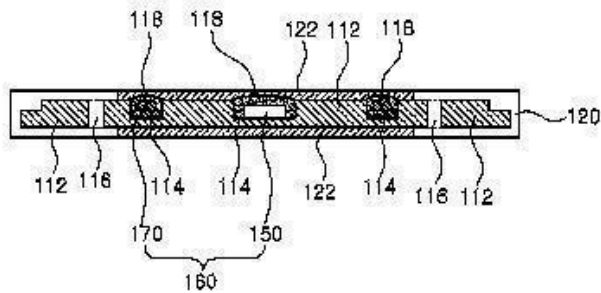
Definition statement

This subclass/group covers:
Different peculiar form factors.

Examples:

- circular RFID tag to be attached to a DVD
- identification wrist band for newborn babies in hospitals
- credit card with a non-standard shape (e.g. one rounded corner as a marketing gag)
- casino chips with RFID
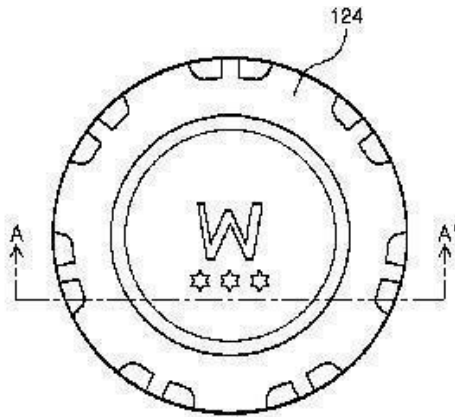
[Fig. 2]

G06K 19/06009

[N: with optically detectable marking (G06K 19/063, G06K 19/08 take precedence)]

Definition statement

This subclass/group covers:
Examples:

- label coding data by spectral signatures
- using characters having small modifications to code digital data in a text
- printed data code
- barcodes like a 2D barcode where each barcode pixel is a barcode itself:
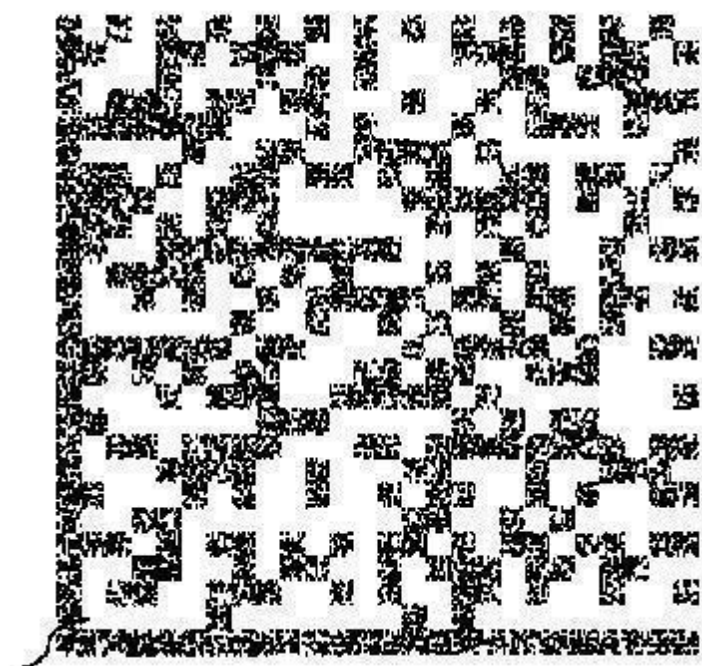
but also barcodes where the barcode is at the same time an antenna of an RFID like device (needs also a classification in G06K 19/07749):
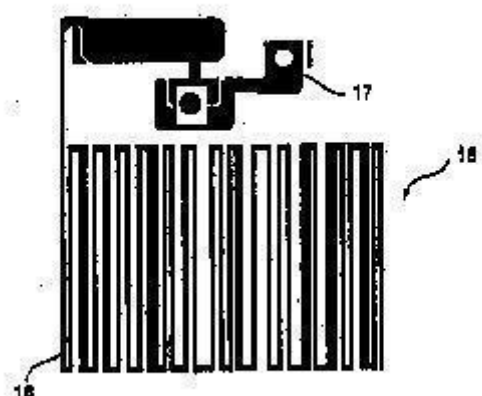
Special rules of classification within this group

Holographic, diffractive or retroreflective recording	G06K 2019/0629
Wavelength selection	G06K 2019/06225
Miniature code	G06K 2019/06234

G06K 19/06018

[N: one-dimensional coding]

Definition statement

This subclass/group covers:

Digital optical markings arranged in one dimension in space, such as the well known 1D barcodes

G06K 19/06037

[N: multi-dimensional coding]

Definition statement

This subclass/group covers:

Markings arranged in more than one dimension in space.

Examples: Code 49, DataMatrix, MaxiCode, PDF 471.

G06K 19/06046

[N: Constructional details]

Definition statement

This subclass/group covers:

Constructional details of optically detectable markings (e.g. kind of material or physical properties).

Example: encoded optical identification elements including an optical substrate having a diffraction grating with refractive index variations (e.g. WO2005027031).

Special rules of classification within this group

See G06K 19/08 and lower if there is a combined effect with an other type of code.

G06K 19/06187

[N: with magnetically detectable marking]

Definition statement

This subclass/group covers:

The marking codes at least one bit (e.g. present/not present), data carriers for

magnetically detectable purely analog "signatures" or signals should not be classified here.

Examples:

- classical banking/credit card with a magnetic stripe;
- bar codes printed with magnetic ink;
- security tags comprising magnetic elements coding digital information (security tags per se: see G08B).
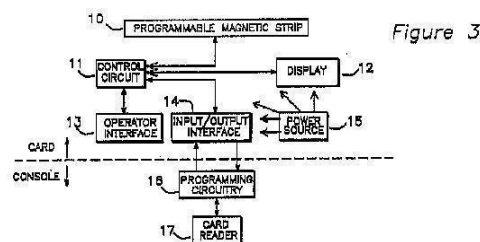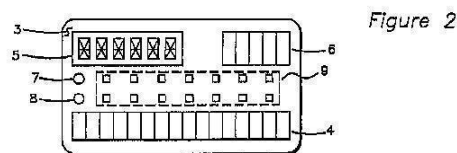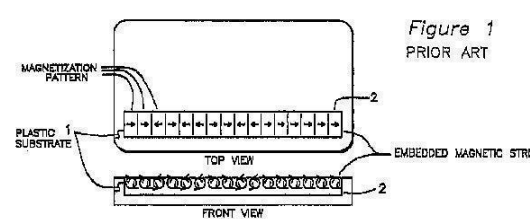
Figure 1
PRIOR ART

Figure 2

Figure 3

Informative references

Attention is drawn to the following places, which may be of interest for search:

Attention is drawn to the following places which may be of interest for search

Magnetic theft detection tags	G08B
Magnetic recording with relative movement between data carrier and transducer	G11B 5/00
Magnetic alloy thin films as used in magnetoresistive application in static memory applications	G11C 11/00

G06K 19/06196

[N: Constructional details]

Definition statement

This subclass/group covers:

Constructional details of the magnetically detectable markings (e.g. kind of material or physical properties).

Special rules of classification within this group

Consider classifying in G06K 19/08 and groups if there is a combined effect with another type of code.

G06K 19/063

the carrier being marginally punched or notched, e.g. having elongated slots

Definition statement

This subclass/group covers:
Examples:

- punched cards;
- credit card with Braille characters.

References relevant to classification in this group

This subclass/group does not cover:

Relief-type marking	G06K 2019/06271

G06K 19/067

Record carriers with conductive marks, printed circuits or semiconductor circuit elements, e.g. credit or identity cards [N: also with resonating or responding marks without active components]

Definition statement

This subclass/group covers:
Examples:

- bar codes printed with conductive ink;
- card comprising pencil markings to be sensed by their conductivity;
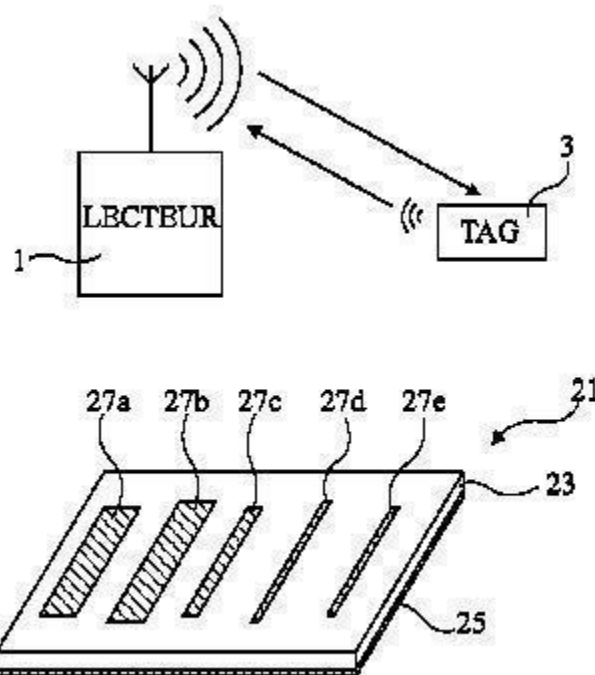- cards carrying a passive LC circuit.

G06K 19/0672

[N: with resonating marks]
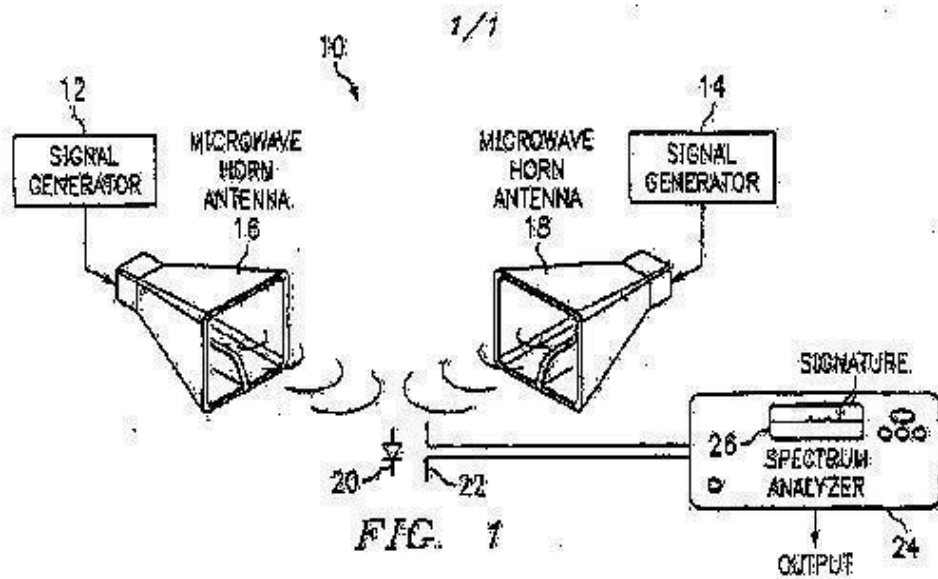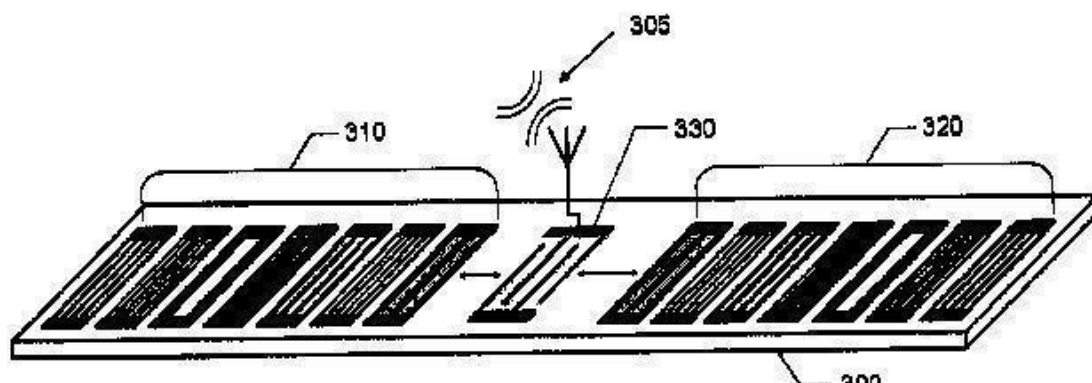
Definition statement

This subclass/group covers:
Examples:

record carrier comprising a plurality of resonating LC circuits

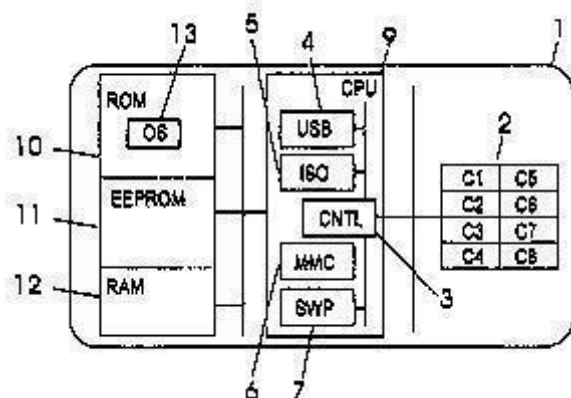or e.g.

FIG. 1

or surface acoustic wave (SAW) transponders

G06K 19/07

with integrated circuit chips

Definition statement

This subclass/group covers:
Data carriers, such as smart cards or RFID tags that comprise at least one integrated circuit.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Attention is drawn to the following places which may be of interest for search:

EEPROM memories	G11C 16/00
Switched networks for telephone systems	H04Q 7/00

G06K 19/0723

[N: the record carrier comprising an arrangement for non-contact communication, e.g. wireless communication circuits on transponder cards, non-contact smart cards or RFIDs]
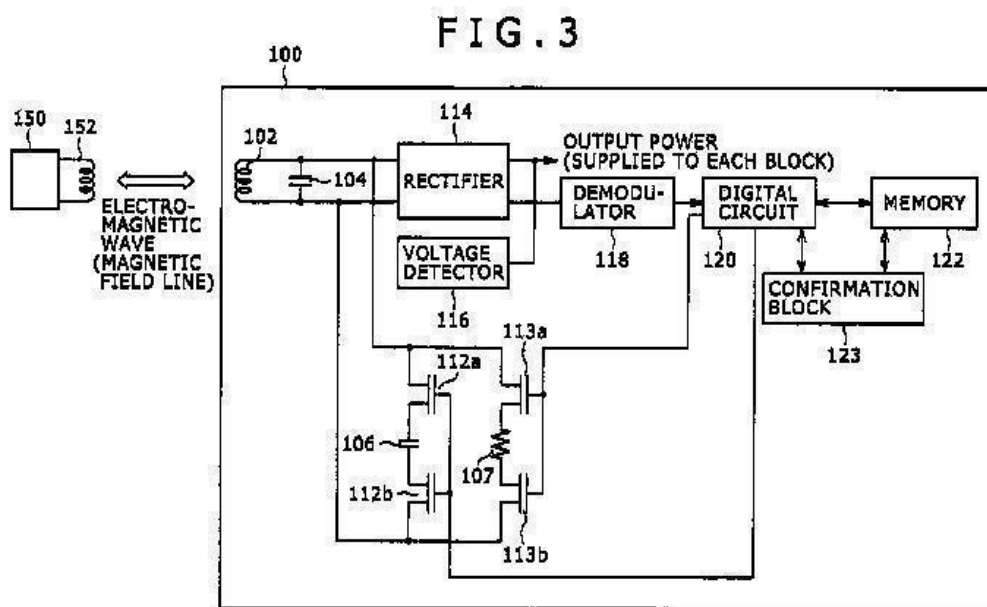
Definition statement

This subclass/group covers:
data carriers with integrated circuits and with a wireless communication means.

Examples:

RFID tags and contactless chip cards (ISO 14443, 15693, 18000).

FIG.3

References relevant to classification in this group

This subclass/group does not cover:

System using reflection of radio waves using passive responders radiating a codes signal	G01S13/02A1
System with exchange of information between initiator and responder	G01S 13/765
Near-field transmission systems	H04B 5/00

G06K 19/073

Special arrangements for circuits, e.g. for protecting identification code in memory (protection against unauthorized use of computer memories G06F 12/14)

Definition statement

This subclass/group covers:

In this group security related aspects realized by means on the card or the RFID device are found, e.g. arrangements to protect the circuits on a smart card against intrusion.

References relevant to classification in this group

This subclass/group does not cover:

At least some of the measures for preventing access to the data in the integrated circuit should be hardware based, pure software solutions, e.g. encryption, should not be classified in G06K. In these cases the classes of the related fields mentioned below should be considered.

Security arrangements in computer systems	G06F 21/00
Smart cards for payment	G07F 7/10
Secure smart card communication using encryption	H04L 9/00

G06K 19/07327

[N: Passive means, e.g. Faraday cages (Faraday-type protection of electric circuits in general H05K 9/00)]

Definition statement

This subclass/group covers:

Examples: metallic screens around an RFID tag for blocking an interrogation field in order to make sure that the RFID tag cannot be interrogated without permission

Informative references

Attention is drawn to the following places, which may be of interest for search:

Attention is drawn to the following places which may be of interest for search:

Screening of semiconductor devices	H01L23/00V
Screening against electric or magnetic fields	H05K 9/00

Special rules of classification within this group

Shielding measures intended to protect the stored data belong in this class. This class is not used if shielding measures are intended to minimize undesired effects of mounting on e.g. metal and other electromagnetically interfering objects/surfaces. In this case: use class G06K 19/07771.

G06K 19/07336

[N: Active means, e.g. jamming or scrambling of the electromagnetic field]

Definition statement

This subclass/group covers:
Example:

Blocking chipcard which prevents communication of other cards by repeated response under violation of waiting times defined in the communication protocol.

G06K 19/07345

[N: by activating or deactivating at least a part of the circuit on the record carrier, e.g. ON/OFF switches]

Definition statement

This subclass/group covers:
Example:

Chip card in which the antenna is only connected to the chip if a user presses a mechanical switch.

G06K 19/07363

[N: by preventing analysis of the circuit, e.g. dynamic or static power analysis or current analysis]

Definition statement

This subclass/group covers:
Example:

Chipcard IC writing to dummy cells even if no real write operation is required.

G06K 19/07381

[N: with deactivation or otherwise incapacitation of at least a part of the circuit upon detected tampering]

Definition statement

This subclass/group covers:
Example:

RFID tag in which the chip is separated from the remaining circuitry if the tag is removed from the surface it was attached to.

G06K 19/0739

[N: the incapacitated circuit being part of an antenna]

Definition statement

This subclass/group covers:
Example:

RFID tag in which a fuse section in the antenna is destroyed by a high power pulse from a checkout counter.

G06K 19/077

Constructional details, e.g. mounting of circuits in the carrier

Definition statement

This subclass/group covers:
In this group all kinds of constructional peculiarities related to manufacturing, materials, special devices included in the data carrier like displays, sensors, batteries, etc are to be classified and searched. Also MMC cards are found here when no special features clearly for other fields are under consideration.
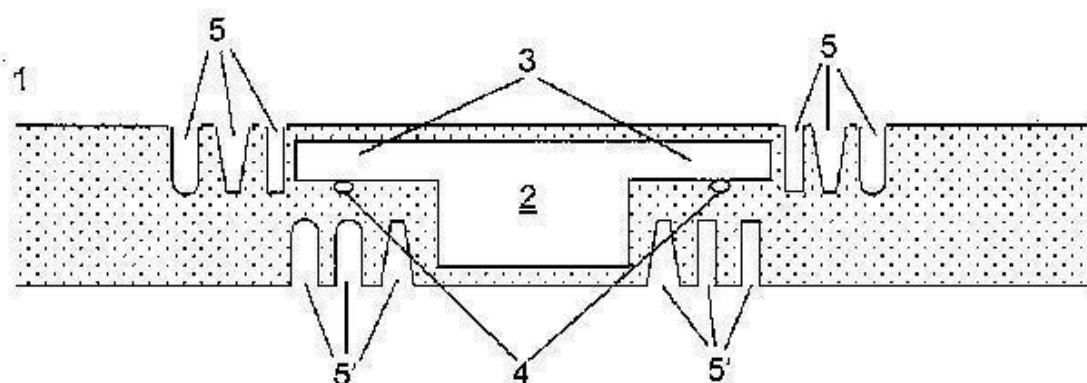
Examples:

removable sim cards
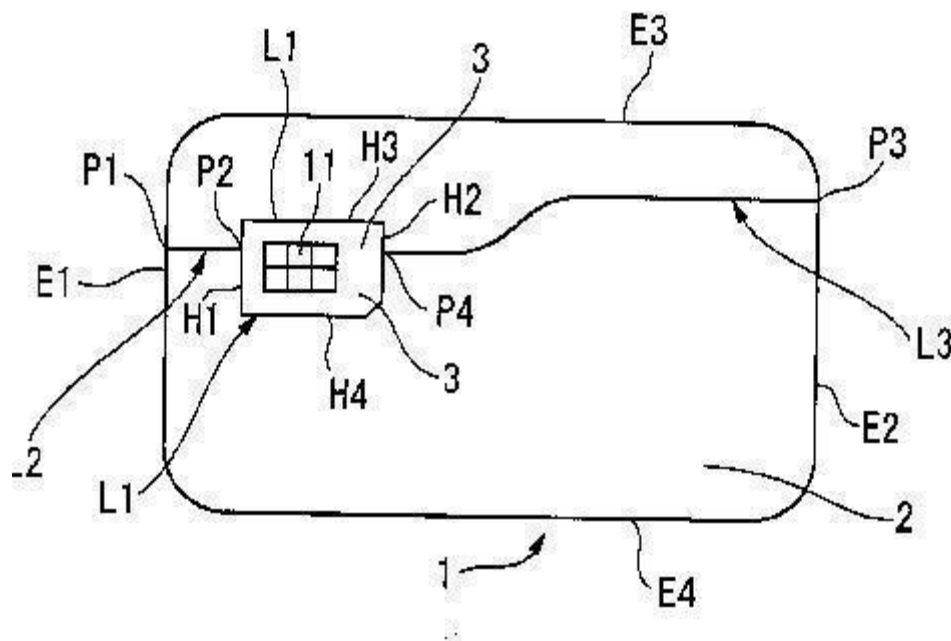
or special arrangements for avoiding breaking of the integrated circuit on a smart card:

Fig. 2

Informative references

Attention is drawn to the following places, which may be of interest for search:

Attention is drawn to the following places which may be of interest for search:

Holders, etuis, cases, for credit cards or the like	A45C 11/182
Injection molding for cards	B29C 45/14647
Processes for making labels or tags	B31D 1/02
Interconnection between memories and computers	G06F 13/00
Acces protection for memory cards	G06F 21/00
Access control with a pass containing electronic elements	G07C 9/00119
Memory	G11C
Connection arrangements for memory cards	H01R 13/00
Housings for electronic devices, such as memory sticks or other memory cards	H05K 5/0256

G06K 19/07743

[N: External electrical contacts]

Definition statement

This subclass/group covers:

Record carriers with an integrated circuit chip and with galvanic contacts at the surface of said record carriers, such as ISO 7816 smart cards.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Attention is drawn to the following places which may be of interest for search:

Sensing record carriers by galvanic contacts	G067K/00K
Arrangements for conducting current for flat cards	H01L 23/49855, H01L 23/5388

G06K 19/07745

[N: Mounting details of integrated circuit chips]

Definition statement

This subclass/group covers:
Record carriers with an integrated circuit chip wherein the integrated circuit chip is mounted into a card body, or the like, as a module.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Attention is drawn to the following places which may be of interest for search:

| Semiconductor technology (in general)	**H01L23/25**
Encapsulation of chip modules	H01L 23/28

G06K 19/07749

[N: the record carrier being capable of non-contact communication, e.g. constructional details of the antenna of a non-contact smart card]

Definition statement

This subclass/group covers:
G06K 19/07749 is for constructional details particular for non-contact data carriers, such RFIDs, e.g. methods of placing the antenna wire on the data carrier:
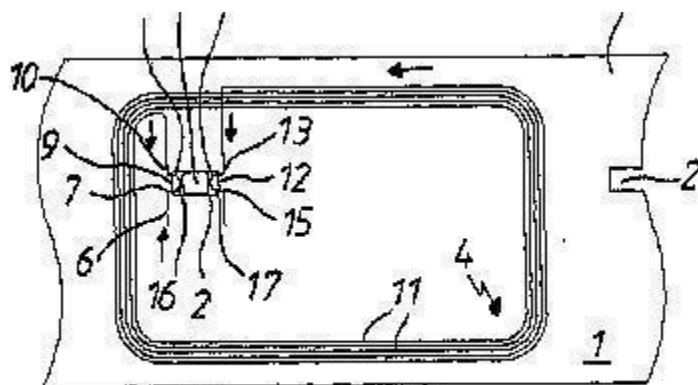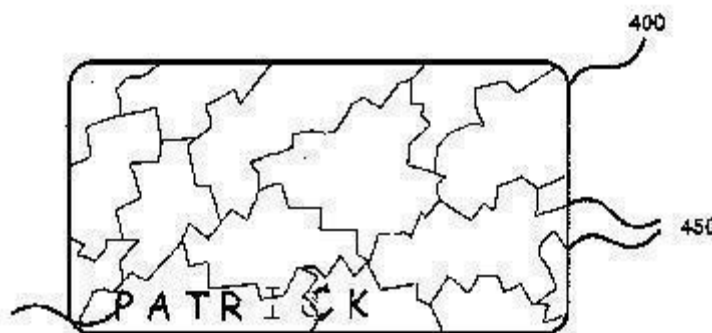
G06K 19/08

using markings of different kinds [N: or more than one marking of the same kind] in the same record carrier, e.g. one marking being sensed by optical and the other by magnetic means

Definition statement

This subclass/group covers:

G06K 19/08 and lower contains data carriers with at least one marking designed for authentication, e.g. the pattern of random cracks functioning as a signature for authentication:

G06K 19/083

[N: Constructional details]

Definition statement

This subclass/group covers:
Examples:

RFID transponder using the metallic layer inside of a DVD as a part of its antenna circuit.

G06K 19/10

at least one kind of marking being used for authentication, e.g. of credit or identity cards ([N: identification cards not to be read by a machine B42D 15/10]; verification of coded identity or credit cards in mechanisms actuated by them G07F 7/12; [N: printed identity or similar identification-bearing cards not for use with a machine B42D 15/10])

Definition statement

This subclass/group covers:
Examples:

copy protected DVD comprising a required decoding key in an RFID transponder incorporated in the DVD body.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Attention is drawn to the following places which may be of interest for search:

Card operated payment systems	G07F 7/08, G07F 7/10