Morrisons
Electric Can Opener

Identity One

Research, Dissection and Discussion of generic electrical can opener

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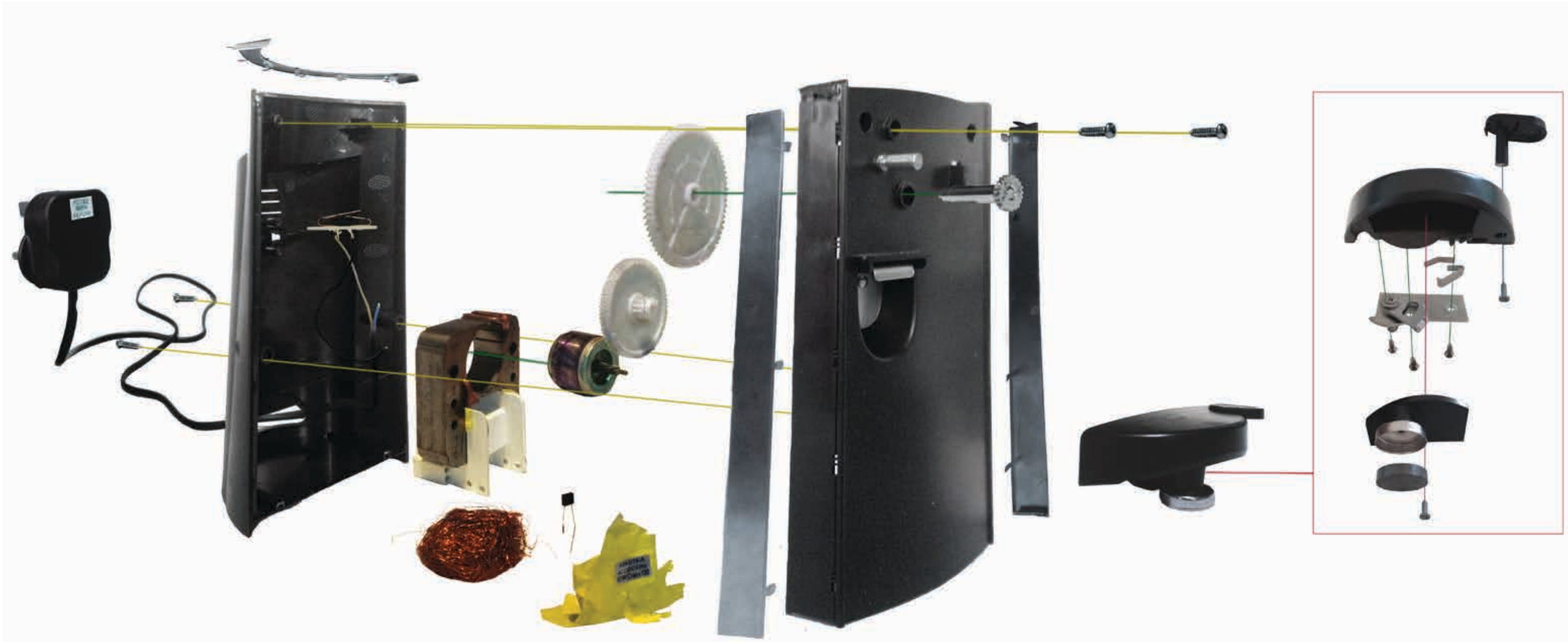


Experience

Analasys

Engineering

Buying Experience

Morrisons
Electric Can Opener

John Lewis, Glasgow

John Lewis is a Mid to High end department store found in city centres and large retail centres. It sells a wide range of goods: clothing, furniture, technology and home ware seem to be it's main focus. The overall brand image is one which purports an interest in Quality, Design and Ethics.

John Lewis aims to be an aspirational shopping destination due to it's luxury image. This is clear from a general marketing focus on heritage and tradition, and specific adverts which aim not to encourage individual or short term sales, but provide a lasting brand image (see 2013 Bear & Hare advert). Therefore consumers coming to John Lewis perhaps focus not on buying a specific product, but come with an open attitude to choosing products in-store.

This is reflected in-store, products are all laid out individually, and testing is encouraged, which in turn changes buyer attitudes from a price-first to a position where they are more likely to spend more on a product which costs more due to quality. It is probably this strategy which leads to more profit per unit. This is how the company can afford to offer the additional benefits to the consumer of a high quality customer service and extended warranties.

Morrisons, Partick

Morrisons is a Large Supermarket (but not Hypermarket), where the focus is on selling a large amount of food produce. In it's 2013 - 2014 annual report, it made a conviction to be 'Food focused not generalist', which separates it from competitors in the mid range supermarket segment, such as Tesco, who are increasingly going towards selling an ever expanding range of product.

Morrisons does however sell a range of electronics in it's supermarkets. In Partick there was a half-isle dedicated to kitchen tools and appliances. They offer a limited choice of products compared to larger department stores, they were selling 5 or 6 models of common appliances (toasters and kettles), and a very limited choice in other appliances. In every case, the difference between products was only in the price bracket they occupy.

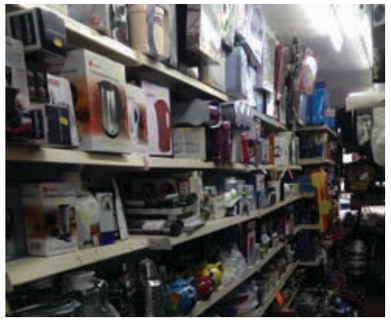
Morrisons marketing focuses on promoting Morrisons as a brand close to traditional markets and selling locally grown produce. Therefore, the strategy is probably to sell to consumers who are in a rush, or were planning to buy, and took the opportunity in-store. The products are boxed and placed next to price information only; products therefore are produced to-cost and without real concern for user experience.

Homecare & Hardware

Homecare and Hardware (H&H) is a seemingly independent store on Dumbarton Road, Partick, which specialises in 'Toiletries, Bedding, Blinds, Paint, Hardware, Electrical, DIY, Petcare'. The store is then, a badly organised collection of seemingly unconnected items, the only relation between them being that they are physical products. The stores focus seems to be on stocking a wide, wide variety of products, in the hope that someone comes in with a specific need.

The marketing strategy for H&H is a large, red and black sign, and a commitment to putting as many items outside the store front as possible, which conveys the stores generalist attitude. There were consumers in and out of the store, so it probably makes gains from consumers that are supportive of local businesses or looking for convinience.

H&H's electrical strategy was to stock as many different types of product as possible. there were kettles, toasters, toast makers, mixers, herb grinders and many other products. Most were from unrecognisable brands, and priced fairly arbitrarily, not necessarily undercutting low or mid range products from say, Morrisons. Customer service was offered by a few people on their phones stood around talking by the cash register.



Buying Experience

Morrisons
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Morrisons, Partick

Getting There

The store is very accessible to all forms of transport, it is in a central location in Partick, right next to the train and subway station, and a main bus stop. It is within walking distance from most of Partick and the west end of Glasgow. There is a good amount of car parking available, although it may get busy during peak traffic times. Non car users are catered for with a plentiful supply of zebra crossings and pavements.

In the store

The shop inside is extremely focused on selling food produce, The consumer is initially confronted by a huge range of fresh vegetables, with food service counters towards the rear. Supermarkets are arranged in such a way as to squeeze as much money out of us as they can, by distributing popular items as far apart as possible and placing them in what seem to be illogical places. Morrisons' 'Food focused not generalist' attitude in this case placed electricals in an isle somewhere in the middle of the store, near the counters.

Product Choice

The electricals and homeware aisle has one wall of pans, plates, cutlery and other hard goods, and an opposite wall with manual kitchen instruments, and electrical home appliances. The amount of choice for certain appliances is quite high, with between 5 and 6 models of toaster and kettle, standard appliances almost everyone has at home. There is also 3 models of Iron, 3 models of microwave and various other products which only on choice of model.

In every case, Products were seemingly only chosen to fill different price brackets. A focus on quality is not evident, as customers cannot physically wield the appliances before they purchase them. The consumer can only assume that quality is analogous to price. When consumers were offered a wide choice this means they chose between 'M Savers', at an ultra low price, 'Morrisons', a brand that encourages us to believe is of higher quality than the basics, and brand labeled products, usually in this case it was 'Russel Hobbs'; This is purportedly the best quality that Morrisons thought was acceptable. I chose to buy a 'Morrisons' Electric Can Opener.

Checkout

The customer is now offered two methods of checkout, person-to-person and self-checkout. Self checkout is a fairly new addition to the retail environment, allowing users to scan in their own produce, under supervision of a member of staff. This obviously benefits the supermarket, who need to pay less staff.

The traditional checkout option is also available, a employee of the company will scan in your item and ask you for the money, you then have the option of paying by cash or card. Staff members throughout the store are fairly sparse, there is no one specifically available to advise on appliance choices. I used person to person checkout and paid by card, the experience was quick and easy, however it may have lacked the personal touch you can expect from high end retailers such as Apple or John Lewis.

Initial Perception

Morrisons
Electric Can Opener

Unboxing Experience

Packaging

The Electric Can Opener comes in a cheap, glue-less, corrugated cardboard box, which has been gloss printed on all sides. while sat on the shelf, the lid flap was already starting to come open, the box showing slight wear on the corners, the lid was curved and creased. It had a fair amount of structural integrity, but I wouldn't drop the box by choice due to the loose lid and underside fastenings.

Unboxing

Unboxing the product was is a simple experience, there are three objects within the box, the blade bracket assembly, the main body of the opener, and the instruction manual, both parts of the machine are loosely contained in PE-LD plastic and the cutting handle is also protected by a loosely cut cardboard piece.

Assembly

The product requires a very basic assembly, which entails attaching the blade bracket to the main body. This however, is quite a fiddly experience and affects the initial experience. The instructions are brief, but enough, however the diagrams in the instructions do not exactly match the product in the flesh, which could be a worrying sign of things to come.

The Product

Morrisons
Electric Can Opener

1 Can Opener

The can opener is designed to open cans automatically. The user places a can between the blade on the bracket and the drive wheel. Pressing down on the 'PRESS ON' button with the can in place will rotate and cut open the can, stopping when finished.

2 Bottle Opener

The bottle opener is a manual fixture on the device, in which the top of a bottle is placed, and then levered down to pull off the bottle top.

3 Knife Sharpener

On the rear face of the device there is a slot which houses a grinding element, with which knives can be manually sharpened by passing the blade through repeatedly.

Product Form

The overall form of the can opener is that of a half-cylinder, with an added rear component and a flat front face. The top of the device is dominated by the blade bracket, which houses the cutting element and the on button. The only physical decoration on the product is a stainless steel trim which defines an edge around the front face, and the top of the device. There is a cooling entry above the knife sharpener on the rear.

Product Origin

Morrisons
Electric Can Opener

"In common with most UK retailers, and brands, we source most of our electrical - including the can opener - from China ●●● the prices are very hard to beat. Some factories in China are so huge and competent that most sellers in the UK use them - most microwaves, brand and supermarket, are sourced from just two factories; our cheapest kettle is made in the same factory, literally the same floor, as Morphy Richards premium kettle at 10 times the price!"

"We are conventionally tight-lipped about specifications, suppliers etc, not because we are in any way unsure about quality but simply trading secrecy ●●● we changed the design of that can opener to reduce the amount of stainless steel, and hence the cost. As the stainless steel was decorative rather than functional, plus we didn't feel a pretty can-opener was too critical, that simple change was a no-brainer and saved us £1000s of pounds, we sell about 540 units per week."

I emailed Morrisons Customer services for some insight, In return I got some details on the origin of the product, a document the buyers use to assess the can opener, and a circuit diagram of the electronics.

In the test document, Morrison's Chinese office have tested the product in a few ways, Insulation, Flash, Load and Power Consumption. The can opening performance was rated as "Can open: ok". Issues were listed as "Top of blade holder not flat; Weld lines at back; corners of spout too sharp; No suffocation warning; magnet becomes loose". Of these problems I can confirm that the bags in the delivered product did have suffocation warnings, and I did not see any of the other issues, apart from the fact that the exact same weld lines were visible on my product. The physical testing for the document consisted of to be two can opening tests.

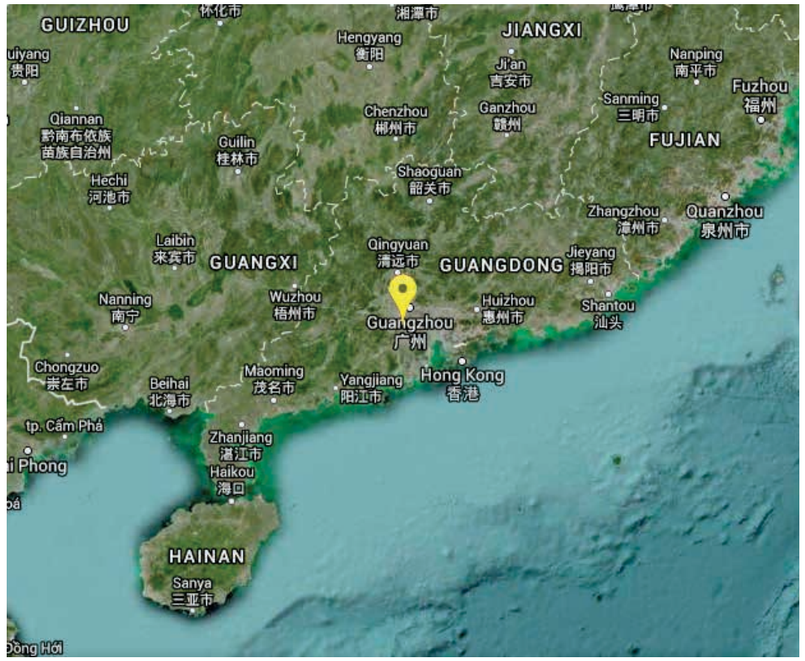
It is clear that Morrison's are not excessive in pushing for the highest standards in their own brand products.

Origin

The Morrisons brand can opener has a generic name 'CO206' and is manufactured in China by **Guang Dong Xinbao Electrical Appliances Holdings Co.** Based in Foshan, Guangdong, China. It has over 15,000 employees, and have annual sales of around $300 million.

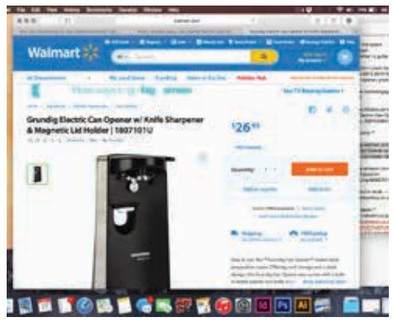
Volume

It is being sold on alibaba.com by a company called 'Xiamen Yea-Sincere Corp.' who claim to be able to supply 50000 pieces per week. Morrisons have said they sell around 540 units per week across the UK. It is not clear whether Yea-Sincere Corporation are also producing the can opener, or sourcing it from Xinbao.



Siblings

The CO2061 can opener and the white CO2061-V variant is sold across the world under many different brand names :- I have found it being sold in America under the 'GRUNDIG' nameplate, in the UK (Argos) as a Cookworks model, 'PLATINUM', 'TOSCANA', and in Japan as 'MASAMUNE'.



Cousins

Practically all free standing can openers have the same opening mechanism geometry. This would imply they have very similar production values, if not made in the same place. One key difference in the market is that some use an electrical grinding wheel for the knife sharpening component.

Human Need

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History

Can openers were first patented in the 1850's but strangely, tin cans for preserving food had been around since the 1770's. The traditional two lever, two wheel can openers were introduced in the 1930's, and have continued on in a similar form ever since. The first electrical tin opener of this freestanding form was invented by Walter Hess Bodle, who filed a patent in 1956 for a device which could open cans and sharpen knives with electrical assistance. From observing the Patent file and watching videos of the first 'UDICO' can openers, it is clear the design has remained largely unchanged.

Market

Initially, I assumed that such a product was ridiculous, one of those gadgets people buy on a whim and never get used. My initial usage of the product confirmed these allegations, the device was fiddly, kept jamming, cans would fall out halfway through etc. I couldn't find anyone who had used such a device before, so I conducted some research online. I found many user reviews of similar products on online stores, and most were quite positive. Nearly all products in this niche category seem almost identical in terms of the primary function, and the reviews mainly came from people representing Elderly, Incapable and Disabled people who found great joy in a product which, after some initial practice, was much more easy to deal with than a manual can opener. There also seemed to be a range of consumers who made no note of any disadvantages, so it must have a following amongst the able bodied.

Product

Any product of this nature then, must be easy to use, cater for low dexterities, and present minimal risk to the user. It must also, secondarily, be of use enough for it to deserve it's place on the work surface, easy to do light maintenance, and avoid looking too much like an assistance product as this could dissuade able bodied people, who may believe the product isn't for them.

User Needs

The user must understand the product after reading brief instructions, at best, be able to use the product with intuition alone.

Any able bodied persons must be able to use this product quickly and easily after a few uses, the product could be more useful if it is open to use by people with low dexterity. At best, it should be quicker than a manual can opener from first use.

Any auxiliary functions must be accessible to those accommodated for by the can opener, if the product is going to be delivered as a convincing whole.

Product Usage

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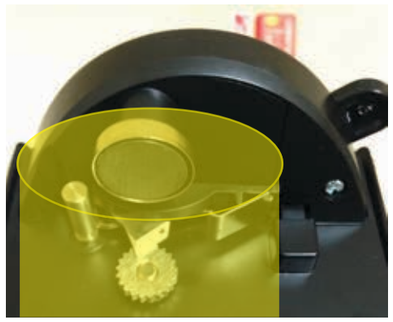
A video showing the operation can be found @

Electrical Can Opener



The User is confronted first with the Can opening arm and must fit the product into the bracket. The three contact points are the Silver bar to the left which must touch the top of the can, the blade, which must rest within the rim, and the wheel which must be in contact with the underside of the rim.

In practice, it is a fair challenge to locate the tin in the correct position, with two causes: The area of concern is invisible to the user when installing the can; and the locating points could be a lot better in the way they guide the placement of the can.

The next part of the operation is to press the blade bracket down into the can opener, this simultaneously pierces the can and sets of the motor which turns the can. The can is held in by the fixtures on the device, and the opener can be left completely hands free for the duration of the can cutting.

Problems at this stage are as follows; the can opener failed on several attempts to get through a full rotation of the can without spontaneously dropping the can onto the work surface. This was mainly an issue with heavier cans such as ravioli, no such problems were encountered with lightweight soup cans. Upon this error, the bracket often locks in place, which initially took a short while to free up before the problem was worked out.

The can is easy to remove from the device after opening and, helpfully, the lid is kept in place with a magnet, although it doesn't seem possible to remove the lid without touching a sharp edge, or coming into contact with the tinned produce stuck to the lid.

Knife Sharpener

The knife sharpener is a grind stone at the rear of the product, placed in a small horizontal slit. The user is meant to draw the knife through the stone repeatedly until the correct sharpness is required. This is a step back from the 1958 model, wherein an automatic knife sharpener was powered by the motor.

User experience for this part of the device is not the best. The device requires to be unplugged because any position you would use to stabilise the device during sharpening would turn the motor on, and knives will scrape the black plastic, leaving cosmetic damage, and black plastic particles all over the blade.

Bottle Opener

The bottle opener is simple enough to use in principle, bottles are inserted, and then brought down to remove the lid. It is quite handy having a bottle opener always out on the kitchen worktop, if you consume a lot of bottled beverages.

However, to use the bottle opener, you must bring the product right to the edge of the counter, because bottles are too long to work properly given the height of the device and it then has a habit of throwing those bottle tops onto the floor, a negative for impaired users. Also, it is best advised to unplug the device before using this function, which is another hassle.

Maintenece / Occasional Tasks

Day to day, the blade bracket can be removed for washing, which is a simple operation, but is probably required every time the device is used.

No other routine maintenance is required, and any repairs require a tri-lobe screwdriver so are not intended to be done by the user,

Form and Design
Assessment through Ram's 10 Principles

Morrisons
Electric Can Opener

Dieter rams is a well respected industrial designer who worked for Braun and Vitsœ from the 1950s to the present day. I will use his 10 principles, which he introduced through talks in the later stages of his career, to gain an insight into the product.

The principles however are not an Objective test of the products worth; They represent a strict modernist ideology which, although being a strong guiding light to many designers is not regarded as the ultimate objective in all design

Innovative

The manual tin opener was first conceived in the late 1800's, the current basic manual opener arrived on the market in the 1930's. This type of freestanding electrical can opener was first sold by 'UDICO' in 1958. This design appears not to develop much upon that concept, apart from the additional bottle opener.

Useful

The product somewhat succeeds at it's tasks, however, the form of the knife sharpener has been made to keep the device slim and impedes the sharpening process. There are also limitations to the bottle opener. It's issues with can opening are not due to it's form.

Aesthetic

The form of the tin opener is relatively simple, and efforts have been made towards a clear asthetic language. For example, the smooth plastic enclosure for the blade bracket diverts our eyes from the mechanical reality, labeling has been relegated to the underside, and screw holes have been filled with inserts.

Understandable

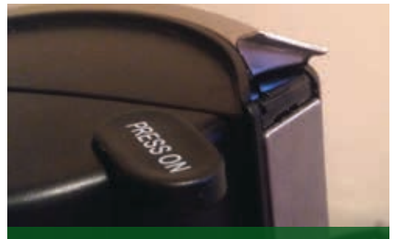
The can opener makes clear it's primary purpose by promoting the blade to the top center of the product. A user should be able to figure the device out fairly easily, and the 'PRESS ON' label helps us work it out. The form could perhaps help us out more with locating exactly where to put the can when loading the device.

Unobtrusive

Assuming a consumer wants such a device on a kitchen worktop, the product is fairly restrained in it's visual appearence. The metal trim on the flanks is perhaps an unnecessary visual complication, but overall the device is innofensive. Hand held can openers are, naturally, less obtrusive to the kitchen space.

Honest

The metal band *is* made of plate metal which is a nice touch, although it could be taken as an attempt to fool the consumer into thinking the product used a metal construction. The black plastic is good to touch and therefore not merely cosmetic. The overall form is unpretentious and avoids 'retro' or 'dynamic' styling features.



Long-lasting

Only time will tell if the form and appearance of this product will become dated, although the design does lack 'fashionable' attributes and is un-exciting in a way that may benefit it in the future. The metal band is extremely easy to pull away though, so this is a stylistic element which will only reduce the product's lifespan.

Thorough

A recess inside the body at the rear allows storage of the power cable, this is a nice touch which goes beyond the primary function. When the product arrived, there was a small piece of plastic still attached from the manufacturing process, so the manufacturers haven't been obsessive in their quest for a perfect product.

Environmental

ABS and steel are both durable materials, and can be recycled at the end of the products life. The only waste in the packaging is the LDPE packaging ans the box is made from cardboard. The product also confirms to RoHS standards. The product then, achieves required standards, but does not go the extra mile.

As little design as possible

The product is not completely logically designed, although it gets quite close. The metal is a decorative rather than an essential touch, and certain shapes, namely on the back side of the device seem ever so slightly over-styled. It is though, fairly anonymous, and benefits from a lack of excessive branding.

Product Dissection

Morrisons
Electric Can Opener

Mechanical

Rotor with Helical 7 tooth Shaft

Gear One
Outer - 72 tooth helical gear
Inner - 10 tooth spur gear

Gear Two
Outer - 72 tooth spur gear
Inner - connection slot

Shaft

Toothed wheel

Electrical

Wire (x4)

Plug

Switch

Spring

Plastic Cap

H4F TAM Thermal Cutoff

60W Shaded Pole Motor

Copper Coil

Stator

Blade Bracket

Bracket Body

Magnet Assembly

Housing

Magnet

Spring

Blade Assembly

Bar

Washers Blade

PRESS ON button

Switch Connector

Metal Brackets (x2)

Round Head Phillips Screw (x2)

Flat Head Phillips Screw (x3)

Casing

ABS Body

Front Panel

Rear Panel

Stainless Steel Trim

Left Plate

Right Plate

Top Plate

Switch Panel

Round Flanged Phillips Screw

Round Head Phillips Screw

Cord Grip

Round Head Phillips Screw (x2)

Mechanism Fastening

Motor Restraint

Round Tri-wing Screw (x4)

Gear Axle Bar

External Features

Knife Sharpener

Grinding stone

Steel Clamp

Round Head Phillips Screw (x2)

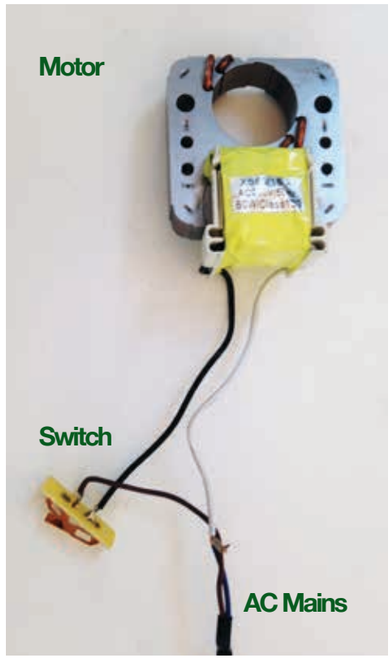
Bottle Opener

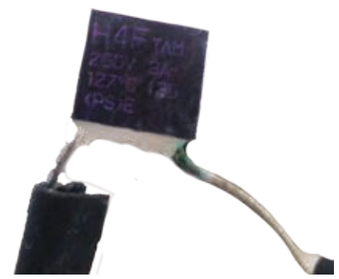
Steel Opener

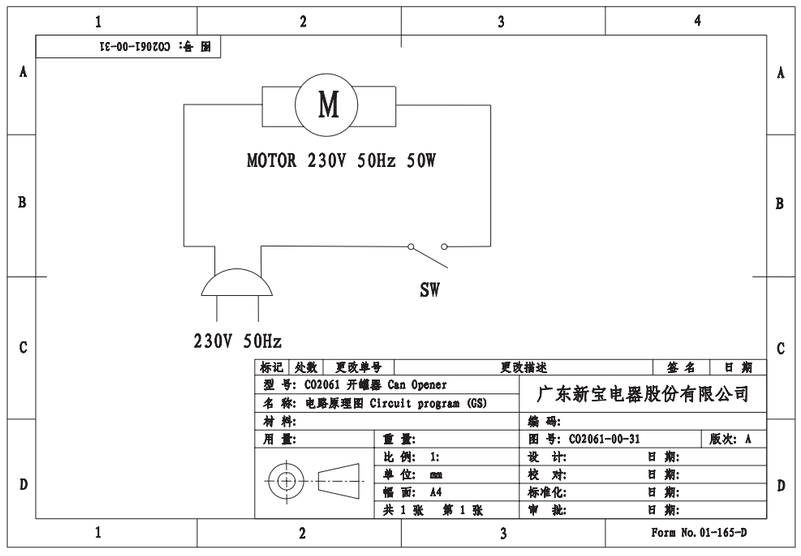
Rivet

Electrical System

Morrisons
Electric Can Opener







Motor

A 60W Shaded pole Motor, designed to convert AC power from the mains into rotary motion. It uses a copper coil to Induce a field in the laminated core which then induces a field over the motor. The Magnetic field is varied by the effects of the secondary copper coils. This imbalance causes the rotor to rotate.

Laminated Core	Layered die cast laminates- soft iron
Auxiliary Winding	Copper bar - automatically bent
Wire Coil	Drawn Copper Wire
Tape	Adhesive Tape
Rotor	Squirrel Cage Rotor with fixed helical gear

Thermal Cutoff

This is a H4F TAM model Fusible Alloy type Thermal cutoff, made by the Tamura Thermal Device Corporation, Japan. It is mounted within the tape which surrounds the copper motor coil. Rated at 127°C, the thermal cutoff is single use and will break down at the rated temperature to stop current in the event of overheating.

1. Fusible Alloy

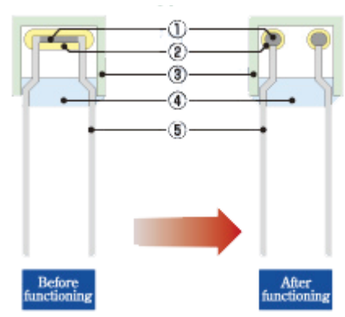
Specific Alloy; breaks at 127°C

2. 'Special Resin'

3. Insulation Case

4. Epoxy Sealant

5. Tin plated lead wire



img - http://www.tamurathermaldevice.co.jp

Switch

The switch is a mechanical assembly that takes user input and uses it to complete the circuit. The switch in this product is extremely simple, a sprung plastic bar is moved by the blade bracket, which pushes 2 copper plates against each other to allow current to pass.

Connection Plates	Stamped, Bent, Copper sheet metal
Switch Board	Plastic Board
Soldering	Hand Soldered
Wiring	Thermoplastic Coated 22AWG wire Dongguan Kelin Wire b Co.

Mechanicals

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Gears

The device houses two gears within the body to transfer torque from the motor to the shaft. Plastic gears for cheap home appliances are commonly made of nylon (a Polyamide) or Acetal (Polyoxymethylene). These materials are favored for their resistance to wear, strength and low coefficient of friction.

Shaft

This Steel shaft connects the internal gear system to the exterior functional parts. At one end is a ‘D’ shaped section which attaches to the centre of the driving gear. At the other end is a triangular-toothed gear which is intended to both grip and rotate the can.

Restraint

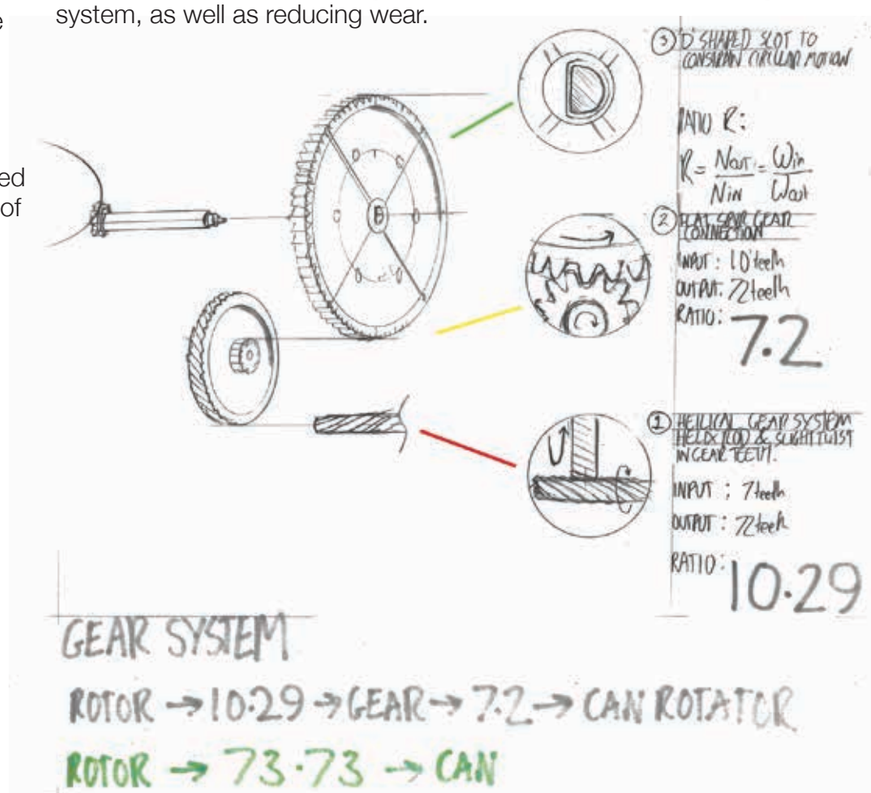
This bracket holds the rotor of the motor into place and is affixed with tri-wing screws. It is made of a similar polymer to the gears.

Gear System

Gear systems are required to transmit rotational movement between two parts of a machine. In the can opener, a reduction in speed and a gain of torque is required. This is achieved by transferring the driving motion through a set of gear pairings where smaller gears drive larger gears (gear ratios greater than one). The effective gear ratio in this device is 73.73.

Assuming the motor rotates at 50Hz (revolutions/second) this would tell us that the drive-shaft will take 1.47 seconds per rotation.

The can opener uses a Helical gear system on one interface and a standard spur system on the other. Helical gears are twisted into a helix and offer a refinement over spur gears in the sense that the mesh more smoothly than spur gears. This was perhaps used on this as it will be more quiet at this velocity (~5m/s). The large amount of Lubricant present will also significantly deaden the noise of this gear system, as well as reducing wear.



Exterior Casing

Morrisons
Electric Can Opener

Front & Rear Case

The front and rear casings have been injection moulded using ABS which is known to be impact resistant and tough. A clear indicator of it's production process is the complex web on the inside face of the component. Metal components such as the can opener have been stamped or riveted into the plastic after moulding for a permanent fit.

The Injection moulding process has had an astounding impact on the design of the product. For example the splayed-out sides of the front panel are probably only at that angle for removal from the mould, and the textured surface designed to disguise the associated surface imperfections.

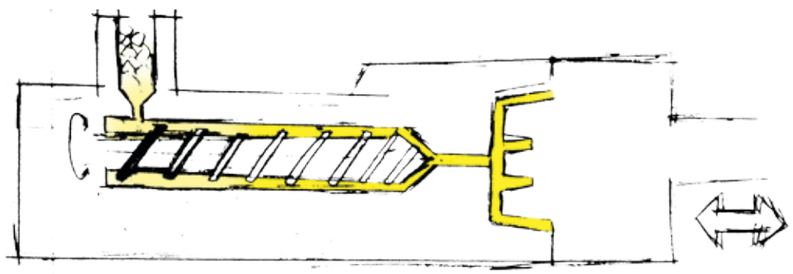
Metal Trim

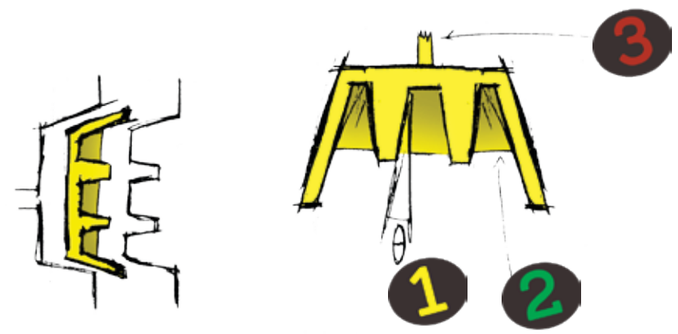
A stainless steel trim covers the edges of the device; this trim will have been stamped and bent into shape with cold forming techniques. It has a brushed finish which both adds 'visual appeal' and covers minute scratches and imperfections.

Injection Moulding

Injection moulding is an incredibly common process used to mass produce plastic parts with high tolerances and good surface finish. Molten plastic is melted and pressurised, before being injected into a detailed mould. The plastic is then allowed to cool before it is ejected from the mould.

Products designed for Injection Moulding will be semi-hollow and constructed with consistent, and relatively thin, walls. Products which are injection moulded are designed with draft angles **(1)** on the interior walls so they can easily be ejected after forming. They often have complex rib structures **(2)** on the internal faces, which give the product a solid structure during use, and minimise warping during production. The location of the 'Sprue' **(3)** formed when the product is moulded is an important consideration too, otherwise unnecessary bumps will appear of the surface, which would lead to expensive secondary finishing processes.





Blade Bracket

Morrisons
Electric Can Opener

Plastic Parts

The plastic parts of this assembly are made from injection moulded ABS, with an identical finish to the surface of the main body. The plastic 'PRESS ON' button is separate, printed with a transfer and screwed in with a self tapping screw. Pressing the bracket completes the electric circuit, and cuts open the can.

Blade Assembly

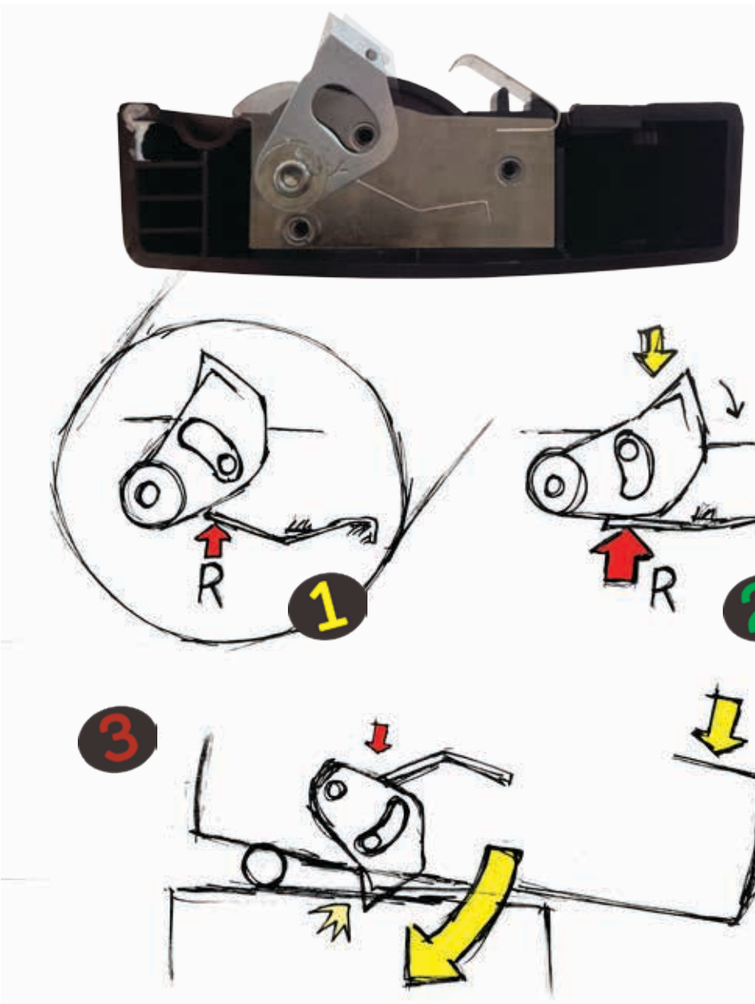
The blade assembly is made up of the blade, riveted onto a bottom plate, both steel. It provides the cutting function of the can opener.

Magnet

A Very strong magnet is connected, magnetically to a sprung steel bar. This whole assembly is permanently fixed onto the plastic body, itself screwed onto the bracket.

Bracket Mechanics

The blade is constrained by the rivet and an internal steel bar so it can rotate freely within a certain range. A flat metal beam acts as a spring, which provides a force,(1) moving the bade to it's furthest point. When a force is applied to the blade, the system reacts,(2) providing a strong but dampened reaction force. During operation when the can is initially loaded the can sits unbroken. A slight rotation **(3)** of the bracket prompts a force great enough to break through the lid of the can.



Operation - Motor

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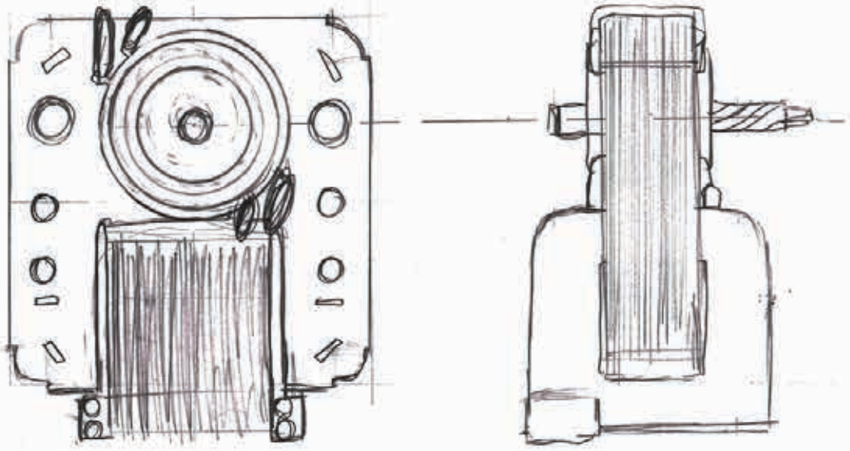

Shaded Pole Motor

Single Phase AC Induction Motor

This motor is employed in the Can Opener as the drive for rotating the can. Shaded Pole Motors were the first type of AC single phase induction motor. This system uses two plain and two 'shaded' poles. The shaded poles have a winding on them (the copper coils adjacent to the motor). Current induced in this coil causes a secondary magnetic field and opposes the main magnetic field, which is in phase with the AC Current.

As can be seen on the diagram, the primary magnetic field, shown in green, changes with current (***I***), and the secondary field, shown in red, around the shaded pole changes with (negative) rate of change of flux **(-dϕ/dt)**. The influence of the shaded poles lags behind that of the main poles **(1,2 & 3)**, effectively causing a rotating field which draws the rotor around in a circular motion. This works with AC because when the current is flipped **(4)**, the rotor has completed a half rotation and is pulled back to **(1)** over the other half of the cycle.

A shaded pole motor of this configuration would rotate with the current, in this case 50Hz, and a small initial imbalance means a small starting torque. So for can opener, the system must be geared in a way which considerably slows the rotational speed.