Anti-gravity electronics

Reinterpretation of Newton's Third Law of Motion suggests that it depends upon an electronic action. Electronic interaction therefore explains the paradoxical anti-gravity properties of the force-precessed gyroscope.

H. ASPDEN

Anti-gravitational behaviour of force-precessed gyroscopes poses perplexing problems for scientists who are well versed in the principles of Newtonian mechanics. These machines demonstrate a lift force that has no counterpart, as required by Newton's Third Law of Motion, unless one imagines that a balancing force is exerted on the ether.

Traditionally we have come to accept that action must be balanced by an equal and opposite reaction. It is true that material bodies are caused to move by out-of-balance forces, but they then accelerate and there really is a balance force represented by inertial reaction. What has now emerged on the technological scene is a machine that can produce that out-of-balance force without accelerating. This means that it can, wholly or partially, offset the force of gravitation and so defy the acceleration effects of gravitation.

Some interest in this subject has been shown in the Feedback columns of *Electronics and Wireless World* (for example, see January 1987, March 1987 and August 1988 issues). For this reason and the further reason that the phenomenon has an explanation in terms of electronic effects, the following account has been written for *E&WW* readers.

NEWTON'S RULE

Students of physics, when confronted with Newton's laws of motion, are led to accept that when matter interacts by collision or otherwise (e.g. via electric or gravitational forces) there is separate conservation of linear momentum and angular momentum.

Action and reaction are balanced and this has come to mean that no self-acting machine can develop a propulsive force without shedding mass in some form. Similarly, we have always believed that no machine having a rotor and a stator can develop its own interaction to rotate the rotor at constant speed without applying a balancing torque on the stator.

Textbooks then argue from this action-reaction law and the law of energy conservation that when two perfectly elastic bodies collide so as to suffer no energy loss by heat or radiation they must comply with what is known as Newton's rule.

This rule, you will remember, says that the relative velocity of the bodies after impact is $-\epsilon$ times the relative velocity of the bodies before impact. Here ϵ is what is known as 'the coefficient of restitution', which has a value of unity for perfectly elastic loss-free collisions.

What is never explained in textbooks is the chicken-and-egg type of question, namely: 'Which comes first, Newton's Third Law or Newton's rule?' Why do we take the action-reaction law as fundamental and not Newton's rule? If Nature actually determines that Newton's rule is the more fundamental of the two, then, given that energy is conserved, we can deduce that action balances reaction.

Now, of course, it is immaterial to bother about Nature's priorities if both the action-reaction law and the rule are unquestionably valid in any physical situation. However, having discovered that the action-reaction law can be breached, there is purpose in wondering whether Newton's rule is an expression of a more basic fundamental truth.

Then it becomes possible to say that, provided energy associated with the linear, translational motion of the interacting bodies is conserved, there will be conservation of linear momentum and so balance of action and reaction. However, this argument permits us to imagine that some of that energy can be drawn from the rotary motion of one of the bodies. In this case, we will not find perfect balance of action and reaction or conservation of linear momentum. We will, in this special situation, be able to understand how a flywheel can slow down whilst using its energy to move the system linearly against the force of gravitation.

THE UNDERLYING ELECTRONICS

The implication from this is that Newton's rule is the more fundamental characteristic of interactions between colliding or interacting bodies. How can electronics be involved? Well, let us not restrict the meaning of electronics to the flow of electron currents in circuits. Electronic action can be that of the atomic electrons brought into collision with the bodies.

Consider two equal charges of the same polarity and imagine that they move along a common line so as to come into collision. Their relative velocity is a measure of the mutual electromagnetic field in the near vicinity of the collision. The energy in the field at the moment of collision is proportional to that relative velocity squared. Energy is conserved in the collision. Therefore, immediately after the collision the square of the relative velocity is unchanged from the value it had immediately before the collision. Yet initially the charges were coming together and later they were separating. Therefore, the relative velocity before collision is different from that after collision, but the square is the same. It follows that, for reasons connected with electromagnetic energy conservation, the relative velocity

THE LAW OF ELECTRODYNAMICS

The Lorentz version of the electrodynamic force law for the force caused by a unit electromagnetic charge moving at velocity v acting on a unit electromagnetic charge moving at velocity v′, separated by a unit vector distance r, can be written as [v′.[v.r]] in vector product notation. When this same expression is formulated in scalar product terms it becomes,

$$(v'.r)v-(v.v')r$$

This force is not balanced with reaction because it does not lie along r owing to the first term and because it changes magnitude if v and v′ are interchanged.

Clerk Maxwell knew that a term (v.r)v′ could be added without this affecting the empirical data. Such a term imparts a symmetry which assures balance of linear action and reaction, but allows an out-of-balance couple.

The alternative, which can be shown to account for induction effects with energy conservation, is to subtract such a term.

$$(v'.r)v-(v.r)v'-(v.v')r$$

Then the formula assures no out-of-balance couple and so conservation of angular momentum for electronic interaction. It gives an out-of-balance linear force, but it can satisfy the form of gravitational interaction. This is easily seen for the situation in which the gravitational effect is set up by fundamental charges of the same polarity, same mass and same velocity (v = v′). Then the first two terms cancel to leave a mutual force of attraction acting directly between the charges and fully satisfying the action-reaction law of Newton.

after impact is minus one times the relative velocity before impact. This is Newton's rule for a loss-free collision.

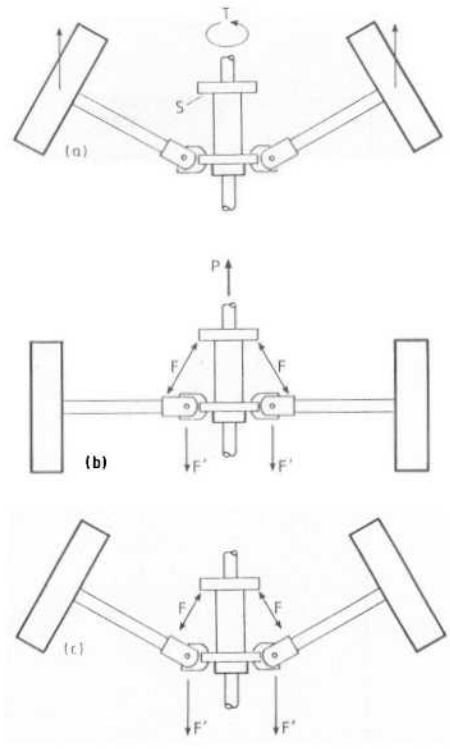
If the charges have different polarity we do not get the same result, but this merely means that the collisions satisfying Newton's rule are confined to the electrons which act as the outer guards screening the positive atomic nuclei from any involvement.

The proposition, therefore, is that, when matter interacts or collides, the action is really a summation of actions between fundamental electron-sized charges. For electromagnetic reasons the action must comply with Newton's rule and this makes that rule the fundamental condition. Thus the derivation of the law of action and reaction is consequential upon the requirement that no energy can transfer from rotary motion to the linear motion involved in the collision.

It will be seen from this that we have not had occasion to refer to forces on the ether. We do not need to countenance such forces, because we are not obliged to adhere to the action-reaction law. However, it is necessary to find a way in which to force energy from the rotary motion of a flywheel, for example, to allow this to be combined with the linear kinetic energy. This is the exceptional role of the force-precessed gyroscope.

THE FORCE-PRECESSED GYROSCOPE

It is important to realize that there is no obvious counterpart to Newton's rule when we consider rotation. Conservation of angular momentum for motion confined to a common plane is a direct consequence of energy conservation of a body moving under the action of a central force. When two bodies in rotation collide, the collisions between their individual elementary charged particle constituents will be those discussed in the linear case. However, there is some fundamental mechanism which conserves angular momentum and so assures a balance of action and reaction in that sense. No doubt this is connected with that elusive ether or the inertial frame of reference, which somehow constitute a universal non-rotating frame of reference.



Mechanism of force-precessed gyroscope. Middle diagram shows net lift force resulting from forces F and F'. Lower diagram (the toy gyroscope) shows no anomalous out-of-balance force.

Thus we do find that the gyroscope relies on the principle of conservation of angular momentum. Imagine that a flywheel spinning about a shaft is subjected to a couple which acts on the shaft to tend to turn it about an axis at right angles to the shaft axis. The plane of the flywheel will tend to be deflected by that couple. This means that the angular momentum can only be conserved about a given axis if the whole flywheel and its shaft are caused to move about a third axis orthogonal to the two axes already mentioned.

This motion is that of the precession. In a normal tower-mounted toy gyroscope the gravity forces on the flywheel develop the couple causing the precession. The centre of the flywheel precesses in a steady horizontal plane around the tower. There is no defiance of any laws of mechanics because the energy of the flywheel is unaffected by the precessional motion.

However, imagine now that the couple is not just that set up by the weight of the flywheel, but is also that of a torque applied forcibly about the vertical support axis. The flywheel will then tend to precess in a vertical plane and the key question is whether the energy needed to match the change of gravitational potential will involve exchange with that of the flywheel rotation or will be drawn from the source powering the forced precession. The answer to this, based on observation, is that it is the flywheel spin energy that is involved in the gravity balance.

The conclusion, therefore, is that the anti-gravitational properties of the force-precessed gyroscope are explicable in terms of the breach of Newton's law of action and reaction, as applied to linear momentum properties. This has been justified in terms of electronic interaction between matter.

THE FUNDAMENTAL IMPLICATION

It is curious that it has taken a discovery concerning the mechanical properties of the gyroscope to cause us to realize the true electronic basis of the laws of mechanics. The evident fact that action need not balance reaction in the linear sense can help to resolve one of the great mysteries in cosmology. Why is it that stars so far removed from one another can have both linear momentum and angular momentum?

If there can be an exchange of energy from the spin state to set up linear motion, then that need no longer be a problem. The angular momentum of a star can still be balanced against that which it possesses owing to its motion around the centre of the galaxy and the energy exchange can be local to the star.

Of more direct relevance to electronics, however, there is the classical question of the electrodynamic interaction between two electrons. Anyone who has thought about this will know that the Lorentz force law as used to work out the mutual forces between two electrons in motion gives an out-of-balance linear force and an out-of-balance linear couple. Physicists excuse this by saying that all charge motion is circuital and arguing that the out-of-balance effects then cancel out. However, they are wrong in this and cannot escape the perpetual controversy kept alive by those who do believe in the search for the real truths.

Ampere is famous for trying to avoid the issue by insisting on a complete balance of action and reaction. Maxwell, in his treatise, drew attention to an empirical law which insisted on there being no linear out-of-balance but was tolerant of an out-of-balance couple. I, however, have insisted for thirty years that the real truth rests in accepting that there has to be no out-of-balance couple, but there could be an out-of-balance linear action. This is exactly what has emerged from the gyroscope experiments.

Why is this important? Well, it comes back to that problem which Einstein could never

THE FORCE-PRECESSED GYROSCOPE

In the top diagram (above), owing to torque T applied to bearing assembly S about the vertical axis, the contra-rotating offset flywheels on pivotally-supported shafts rise, as they precess in a vertical plane. There are no vertical reaction forces on the central support, even though the masses of the flywheels are rising. (Gravity forces are disregarded).

In the middle diagram in order to force the flywheels back to a lower position, forces F are exerted between the flywheel shafts and the bearing assembly. This results in complementary forces on the bearing assembly F' acting through the pivots. However, the vertical components of the F' forces, are less than the vertical components of the F forces, because the effect of these forces and their reaction is to apply couples to the flywheel shafts which tend to lift the bearing assembly relative to the flywheels. This means that there is an upward thrust P acting on that assembly as it moves in relation to the flywheels from the position shown in the top diagram to that shown in the middle diagram. (Again, gravity forces are disregarded).

In the lower diagram, the effect of relatively weak forces F is depicted, with the precession of the flywheels needed to balance the angular momentum now being about the vertical axis. Here there is no out-of-balance force. (This disregards gravity forces, but note that such forces due to the weights of the flywheels are analogous in effect to the forces F in this case.)

Whereas the lower diagram is representative of the non-anomalous behaviour of the toy gyroscope, a combination of the actions of the top two diagrams can result in a machine with an anomalous net lift force. Such a machine was recently demonstrated by Scott Strachan, an Edinburgh research scientist. His machine incorporates a cam profile in the bearing surfaces of the bearing assembly. This allows the action to alternate between a progressive rise of the flywheel shaft and a lift-developing reset by downward thrust imposed via the cam surface. The fact that the machine develops a sustained lift force in defiance of Newton's Third Law is indisputable, owing to the placement of the demonstration machine on a balance with a knife edge support and the use of counter-weights.

solve. How can the law of electrodynamics and the law of gravitation be made compatible? Remember that Einstein was locked into electrodynamics that could be deduced from the Lorentz transformations. The Lorentz force law could hardly fit with gravity, which does require a force to act directly between the interacting particles. Ampere's old law bore no resemblance to gravitation, because it gave different forces at the same distance for different relative orientations of the particles and their motion.

Equally, the law mentioned by Maxwell was not of much use, because it involved a turning couple as part of the interaction. This leaves my law and this works for gravity, because the imbalance of linear force vanishes in the special case of mutually parallel charge motion and the law then fits the form of the gravity force. However, more than this, the law is merely based on adding a term to the Lorentz force to account for Faraday's inductive action.

CONCLUSIONS

Thanks to the development of force-precessed offset gyroscopic machines it is now established that Newton's law of action and reaction balance stands disproved. This makes it essential to regard Newton's rule as more fundamental than his Third Law of Motion. Newton's rule can be deduced from electromagnetic energy conservation as matter, which is electronic in content, interacts or collides. Starting with Newton's rule and allowing energy conservation to draw on the spin energy of a flywheel there is physical basis for understanding why an out-of-balance linear force can be produced.

In its turn, as applied, to the electrodynamic charge interaction, this condition allows the unique law of electrodynamics to be determined empirically. This law happens to be of the form required to comply with gravitation, hence advancing us towards that ultimate goal of field unification. An incidental result of this is that the difference between the Lorentz force law and that deduced in this way is precisely that needed in electronic interaction to account for the effects of magnetic induction.

In writing this article no specific reference has been made to those who deserve praise for their efforts to get the world to wake up to the practical significance of the precessing gyroscope's anomalous-force producing properties.

Supporters of Einstein's theory acclaim Einstein for having shown that Newton's law of gravitation was inadequate, but are all too ready to assume that error is involved and so scorn those who demonstrate precessing gyroscopes operating in a way which defies Newton's laws.

Who then are the pioneers that attract this attention? Are they just those who have received media publicity? So far as the writer is aware, the primary credit of long standing goes to Alex Jones, Sandy Kidd and Eric Laithwaite, but names such as Scott Strachan and Frederick Scovell are also likely to feature in the technological race that lies ahead. The patent literature extends beyond UK and already adds other names of inventors contributing to this field. This is revealed by a study commissioned by L.F. Holihan, Director of the Advanced Energy Research Institute in London.

We are on the verge of a transition concerning the viability of Newton's Third Law but, since the history of science and invention cannot be written as it happens, we must await events. In this regard, however, and concerning the author's interpretation of the phenomena discussed above, it is appropriate to note that, in accepting this article, the Consulting Editor has stated that he is mindful of similar views expressed to him over many years by Alex Jones. This article therefore serves essentially to reinforce the prior work of others and, hopefully, will further their cause.

Readers who do not remember the photograph showing Professor Laithwaite supporting a heavy precessing gyroscopic flywheel with his little finger and his arm partially extended should refer to Alex Jones' contribution on p. 64 of the January 1987 issue of *E&WW*. Surely Isaac Newton would have burned out many a candle revising his laws had he been aware of this phenomenon.

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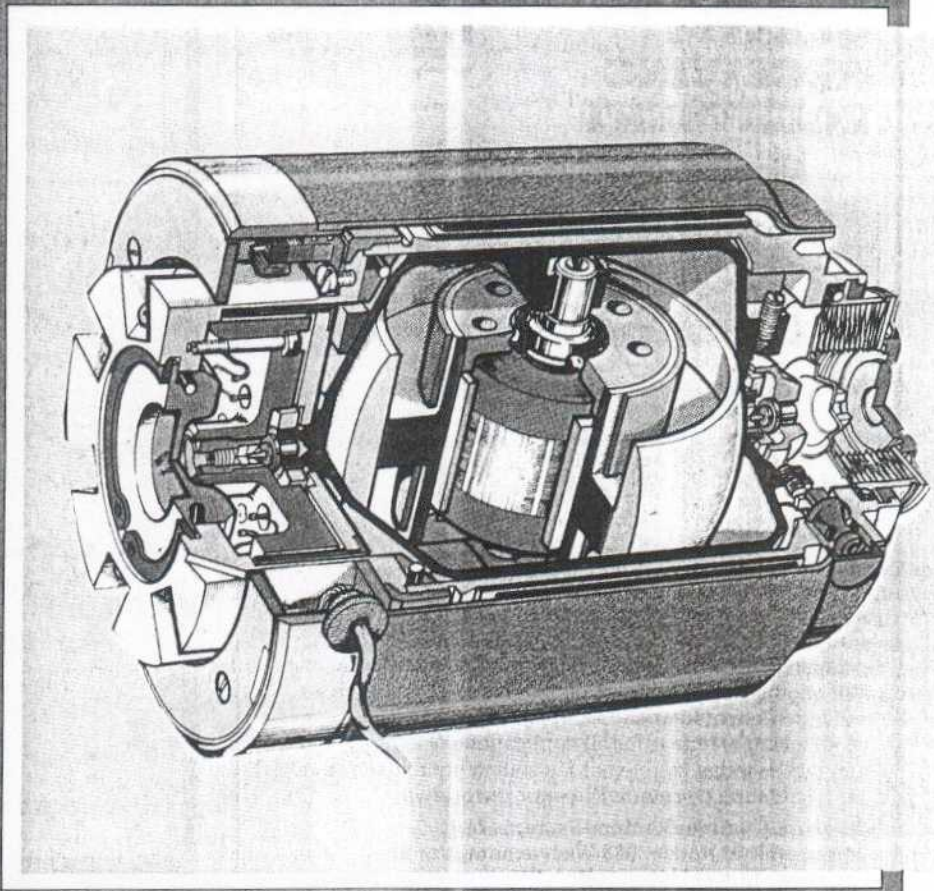
Gyroscope life test exceeds 12 years

After running almost continuously for 12 years, twelve gyroscopes based on this design have outlived their running equipment. Originally, their life test was intended to run for two years using Ministry of Defence funding; the contract was extended to five years and then continued with funding from the European Space Technology Centre and British Aerospace in support of the European Space Agency's Olympus communications satellite.

The practicability of expensive communications satellites depends on the long-term reliability of gyroscope-based attitude control and pointing systems. This particular gyroscope – the 125 – is produced by Ferranti for Iras, Exosat and the European Spacelab Instrument Pointing System. It is also used in the inertial guidance and flight-control system for the Ariane Launcher.

Apart from stops for routine tests, the twelve gyroscopes have only occasionally had extended breaks during their twelve year marathon. In the late 1970's industrial action by power workers resulted in low mains voltages which tripped out the running gear and the three month firemen's strike reduced the running time to forty hours a week for safety reasons. The gyroscopes have now achieved over ten years continuous running since the start of the tests and there are plans to run them for at least another three.



FEEDBACK

for some forty years and for the last twenty-five years or more anti-theft devices were an option on most General Motors cars but standard on Cadillac. They made use of the fact that any door which opened operates a light switch and as there are also lights under the bonnet and under the boot lid, that information is passed into a control unit which comes into operation when the central-locking system has been activated by key.

Any attempt to open a door, bonnet or boot immediately sets an alarm off which, in my opinion, is the obvious type of alarm in that alternately the horns sounds, followed by all four headlights flashing. This goes on for twenty minutes, ceasing just before the batteries run down.

It is interesting that if anybody hears a car horn being used they turn round to see what it is, whereas there are so many alarm noises now made by sirens etc. that nobody takes any notice of them.

I have all the circuit diagrams available of the General Motors system and in my view it would be quite easy for a person with reasonable intelligence to make use of all these door switches as described by Mr Stevens.

Joshua Sieger
Poole
Dorset

No integers for $a^n+b^n=c^n$

There seems to be no magazine in Australia which invites letters of the range dealt with by the incomparable Wireless World. I am sure that this will interest other readers.

The following, in which all variables are integers greater than zero, is offered as a proof that where $n>2$; there can be no integers for $a^n+b^n=c^n$.

Where $n>1$, x^n-y^n can always be divided into two factors, one of which will be $x-y$. When such exercises have been carried out a few times it becomes apparent that the process could be continued indefinitely and that the number of elements, all positive, within the second set of brackets equals the value of n. For example,

$$x^{11}-y^{11}=(x-y)(x^{10}+y^{10}+xy^9+x^9y+x^2y^8+x^8y^2+x^3y^7+x^7y^3+x^4y^6+x^6y^4+x^5y^5)$$

Of course, $x^2-y^2=(x-y)(x+y)$

and $x^3-y^3=(x-y)(x^2+y^2+xy)$

$x^4-y^4=(x-y)(x^3+y^3+xy^2+x^2y)$

$x^5-y^5=(x-y)(x^4+y^4+x^3y+xy^3+x^2y^2)$

ad infinitum.

So, regarding the equation $a^2+b^2=c^2$ and the supposition $a^n+b^n=c^n$, $c-a$ must always be a factor of b^n (or of c^n-a^n) and $c-b$ must always be a factor of a^n (or of c^n-b^n).

Regarding the supposition, a^n and b^n can be factorized in accordance with these rules only when a, b and c values match sets of integers applicable to the equation; for, if a^n and b^n are respectively divisible by $c-b$ and $c-a$ then so must be a^2 and b^2.

Name and address supplied
Western Australia

Mine not Wien's

Many thanks for publishing my articles on "Remotely controlled RC oscillator" in October and November of 1988. I would like however to make the following comment.

The original title of the article was "Another look at RC oscillators", this was changed by your staff to include the wording "Remotely controlled Wien oscillators". Although the Wien-bridge circuit was referred to in the article the various forms of the oscillator described were of my own design and not based on the Wien bridge circuit.

Austyn J.P. Williams
Raglan
Gwent

Anti-gravity electronics

My article on "Electronic Action and Reaction" in this issue (p.29) was written before the news that the lift forces in the Kidd machine were confirmed. Readers may have seen the front page story in the *Sunday Express* of 23 October and the following BBC reports. The device has moved from the realm of being a scientific curiosity and is headed towards commercial technological application. There are tremendous prospects ahead in the space and aviation fields.

From the layman's point of view this is not perpetual motion, but a means of 'swinging' through space, like a Tarzan who can hook the end of a rope to any chosen point in the sky.

Physicists need something more by way of scientific justification and, with this in mind, I feel I should comment further on the electronic explanation in my article. The 'relative velocity' proposition from which Newton's rule is derived is really better formalized in Clerk Maxwell's treatise by what is termed 'electrokinetic energy'. To derive the more familiar forms of electrodynamic law, Maxwell used Fechner's hypothesis. This says that an electronic current is really attributable to a counterflow of charges of opposite polarity. In modern scientific parlance this implies electron-positron pair creation and annihilation in a way that corresponds to current flow. I emphasize this because I well appreciate the problem of defining proper frames of reference for electron collisions, especially where electrons collide when moving in the same direction.

The following references to my prior published work on this theme will help readers interested in this subject.

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1 "The Maxwell-Fechner hypothesis as an alternative to Einstein's Theory", *Spec. Sc. Tech.*, vol.8, 283 (1985).
2 "New perspective on the law of electrodynamics", *Physics Letters*, vol.111A, 23 (1985).

Smps waveform distortion

I am afraid that Dr Pedder in his article 'How to combat waveform distortion by switch-mode supplies' on page 1016 of the October 1988 issue, has got it all wrong. I went through the same calculations and found that the input currents are much smaller.

During recharging of the capacitor mean current is,

$$i=C\frac{dV}{dt}$$

where $dV=20V$ and

$$dt=\frac{10\times20}{180}=\frac{10}{9}ms,$$

which gives

$$i=450\frac{20\times9}{10}=8.1A.$$

Mean current over one period is therefore,

$$\frac{8.1\times20}{180}=0.9A$$

With the 1A switching converter current, it gives a mean input current of 1.9A (not 9A).

Also, the rms value of the current pulse of trapezoidal form is,

$$i_{rms}=(3+\left(\frac{12\times10}{20}\right)^{1/2})\times\frac{20}{180}$$

$$=(3+2.45)\frac{1}{9}=0.605A$$

and not 3.2A as Dr Pedder stated.

A. Bouhadjera
Basingstoke
Hampshire.

• Dr Pedder comments: Dr Bouhadjera has misunderstood the article. Firstly, 9A is mean current level *during* the recharging pulse, not the whole cycle. The recharging current is shown, when idealized, in Fig.3: 15A peak, 9A mean during the pulse and 1A mean over the whole cycle. Secondly, the rms input current is 3.2A as stated. Dr Bouhadjera has somehow calculated an rms level below his mean level – a form factor of less than unity – which would be very useful.